Hong Kong Association for

Testing, Inspection and Certification Ltd.

Professional Certification Scheme for Testing Personnel

CC04

CERTIFICATION HANDBOOK

MICROBIOLOGICAL TEST

First Issue
Issued by Hong Kong Association for
Testing, Inspection and Certification Limited

Secretariat
G.P.O. Box 471, HONG KONG

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FOREWORD

The Professional Certification Scheme for Testing Personnel (PCSTP) is a comprehensive scheme which provides for the examination and certification of individuals seeking to demonstrate their knowledge and/or competence in their field of operation.

The scheme is developed under HKTIC (hereafter named as Certification Body) and managed by the Certification Board, which is responsible for the granting, reviewing and revising the personnel certification titles and requirements in accordance to the prevailing demand of the testing industries served by the scheme. The Certification Board, in turn, may appoint specialist Working Committees as it deems necessary to oversee specific parts of the scheme.

The sole criteria for certification of personnel engaged in microbiological testing are given in this document (and any subsequent amendments) and no other criteria will be applied. Certification is not conditional on the candidate applying for other services or membership from HKTIC or any other groups or associations.

The benefits of certification include:

1. recognition and prestige for the individual and creation of a competitive advantage over non-certified individuals in the same field;
2. enhanced employment opportunities;
3. establishment of a professional standard for individuals in a particular testing field;
4. assistance to employers in making more informed recruitment decisions;
5. a more productive and highly trained workforce for employers;
6. enhanced professional impression on customers;
7. assistance to clients in making informed decisions about qualified providers;
8. protection of the general public from using incompetent and unfit practitioners; and
9. assurance of the general public of the accuracy and validity of testing results.

Requirements of Certification of Personnel Engaged in Microbiological Testing

1. General

1.1. This document prescribes procedures by which personnel may be examined and, if successful, certified for microbiological testing.

2. Scope of Certification

2.1. The levels of certification available are

2.1.1. Certified Testing Technician and;

2.1.2. Certified Testing Professional.

3. Eligibility for certification

3.1. Candidates shall have a combination of education, training and experience adequate to ensure that they have the potential to understand the principles and procedures of the applicable methods.

3.2. Academic qualifications and experience

3.2.1. Certified Testing Technician (CTT)

    (a) The candidate shall have

- a diploma in science with no less than two years of relevant testing experience; or
- 10 years of relevant testing experience; or
- any other qualifications and experience deemed as equivalent.

3.2.2. Certified Testing Professional (CTP)

    (a) The candidate shall have a bachelor's degree in microbiology, or equivalent, or he/she is a registered medical laboratory technologist and with no less than three years of relevant experience.

    (b) A candidate without a bachelor's degree in microbiology but a bachelor's degree in science, he/she shall have

- taken at least 3 undergraduate relevant microbiology courses of different levels with substantial coverage of laboratory techniques and microbiological

testing or successfully completed a certificate course in microbiological testing at an academic institute; and

- no less than 3 years of relevant experience.

(c) Candidate without a degree shall
- have been certified as Certified Testing Technician by the Certification Board and have no less than five years of relevant supervisory experience post certification as CTT; or
- have no less than 15 years of relevant experience of which 5 years shall be at a managerial position.

(d) Candidates shall have any other qualifications and experience deemed as equivalent.

3.3. Training

3.3.1. Certified Testing Technician shall

(a) provide certificates of achievement   (satisfactory results in end-of-course evaluation) in training courses approved by the Certification Board in the respective competence requirements; or

(b) obtain satisfactory results in certification examinations as arranged by the Certification Board.

Details of approved training courses are available on www.hktic.org.

3.3.2. Certified Testing Professional shall

(a) any one of the following:
   (i) provide certificates of achievement (satisfactory results in end-of-course evaluation) in training courses approved by the Certification Board in respective competence requirements; or

   (ii) obtain satisfactory results in certification scheme examinations as arranged by the Certification Board; or

   (iii)have no less than 15 years of relevant experience, of which 5 years shall be at managerial position; or

(iv) HOKLAS approved signatory with not less than 8 years of relevant experience and the scope of signatory approval covering the major measurement techniques or methods as stipulated in this Certification Handbook for the sub-category the certification is being sought; and

(b) obtain satisfactory results in professional assessment by interview.

Details of approved training courses are available on www.hktic.org.

3.4. Competence requirements for Certified Testing Technician

3.4.1. General requirements

- Understanding of ISO/IEC 17025
- Laboratory safety
- Integrity management

3.4.2. Technical requirements

- Understanding basic laboratory techniques
- Knowledge of equipment usage

3.5. Competence requirements for Certified Testing Professional

3.5.1. Management requirements

- Management skills
- Integrity management

3.5.2. Quality requirements

- Laboratory management in compliance with ISO/IEC 1702
  - Statistical treatments of data and quality control requirement
  - Method verification
- Laboratory safety

3.5.3. Technical requirements

- Estimation of measurement uncertainty
- Interpretation of results and reporting requirements
- Requirements of equipment calibration
- Principles of laboratory techniques employed in testing

4.   Examination Procedure

4.1. A candidate who can provide certificates of achievement in training courses in all competence requirements may be exempted from examinations.

4.2. Partial exemption for examinations is not allowed.

4.3. No exemption is permitted for professional assessment by interview for Certified Testing Professional candidates.

4.4. Examinations consists of

4.4.1. Written examination; and/or

4.4.2. Professional assessment by interview (for Certified Testing Professionals only).

4.5. Candidates must satisfy the examiner(s) in all parts. Details of the examination format follow the syllabus and specimen examination questions as given in Appendices 1 and 2 respectively.

4.6. Types of questions

4.6.1. Multiple choice questions

4.6.2. Short answer questions

4.6.3. Open-ended questions

4.7. Examination for Certified Testing Technician

The examination will comprise the following:

4.7.1. General
- multiple–choice questions
- short answer questions

4.7.2. Technical
- multiple–choice questions
- short answer questions

4.7.3. Time length of examination
- Written examination – 2 hours

4.7.4. Weighting of each topic

	Topics	Weighting (%)
a)	Understanding ISO/IEC 17025 and quality control	20
b)	Laboratory safety	10
c)	Integrity management	10
d)	Understanding laboratory techniques	35
e)	Equipment usage	25

Weighing of each topic shall not deviate from the pre-set percentage by more than 5%.

4.7.5. Marking system
- Model answer shall be set for each multiple choice questions. Marks will be given for correct answers and half of the mark will be deduced for each wrong answer.

- Suggested answers shall be set and marks should be allocated according to key points of answers for short questions. Marks for each key point should be pre-set. Marks would be given to answers with meanings which match the suggested answers as judged by the marker.

4.7.6. Passing mark
- The passing mark for each section shall not be less than 40% and the overall passing mark is 60%.

4.8. Examination for Certified Testing Professional

The examination will comprise the following:

4.8.1. Management requirements
- Multiple choice questions
- Short answer questions

4.8.2. Quality requirements
- Multiple choice questions
- Short answer questions
- Open-ended question(s)

4.8.3. Technical requirements
- Multiple choice questions
- Short questions
- Open-ended question(s)

4.8.4. Professional assessment by interview
- The interview will cover all certification criteria and focus on underlying principles, limitations, quality control checks and reporting requirements of tests currently undertaken by the candidate.

4.8.5. Time length of examinations
- Written examination – 3 hours
- Professional assessment by interview – 30 to 50 minutes

4.8.6. Weighting for each topic

Topics	Weighing (%)
a) Management requirements	10
b) Integrity management	10
c) Laboratory management in compliance with ISO/IEC 17025	15
d) Laboratory safety	5
e) Estimation of measurement uncertainty	10
f) Interpretation of results and reporting requirements	10
g) Requirements of equipment calibration	15
h) Principles of measurement methods	25

Weighing of each topic shall not deviate from the pre-set percentage by more than 5%.

4.8.7. Marking system
- The same marking system as Section 4.7.5 shall apply. The marking system for open-ended questions shall be the same as that for short questions.

4.8.8. Passing Mark

- The passing mark for each section shall not be less than 40% and the overall passing mark is 60%.
- A candidate must pass both the written examination and the interview.

5.   Application Procedure for Certification/Examination and Fees

5.1. Application form

5.1.1. Applications must be made on the appropriate application form which is available at www.hktic.org.

5.1.2. Application form asks for specific details of experience and training and must be signed confirming that these details are correct and supported by such other documents as may be necessary to confirm that the candidate is eligible for examination.

5.1.3. No applications can be confirmed or examination dates issued until receipt of a correctly completed application form and the full fees. In the event of false statements being discovered any certificate awarded as a result of the test will be revoked and declared null and void.

5.2. Application and examination fees

5.2.1. The fee structure is as follows:

Level	Type of application/examination	Fee (H.K. $)
CTT	Initial and upgrade application	300
	Examination (written), if applicable [Note]	500
	Annual subscription fee	500
CTP	Initial and upgrade application	500
	Examination (written), if applicable [Note]	500
	Examination (professional assessment)	1000
	Annual subscription fee	500

Note:

Written examination can be exempted under the following conditions by:

a. achieving certificate of achievement (satisfactory results in end-of-course evaluation) in approved training courses for all competence requirements; or

b. fulfilling the academic requirements and having no less than 15 years of relevant experience, of which 5 years shall be at a managerial position for testing professionals.

5.3. Initial certification, certification upgrade and extension of certification of new category

5.3.1. Candidates who are seeking certification for the first time or for those wishing to upgrade or extend their certification credential can go to website www.hktic.org and download an application form and Handbook for the test category to be certified.

5.3.2. The candidate shall submit payment, completed application form and documentation consisting of :
- Academic qualifications;
- Certificate of achievements in appropriate training courses; and
- Any other relevant records

5.3.3. The application is reviewed and evaluated by the Programme Officer for confirmation of acceptance at the requested level of certification. The candidate is notified of the decision and/or date and time of examination where applicable.

5.3.4. The Certification Board may grant certification to Testing Technicians directly without examination on condition that they fulfill the academic and training criteria as stipulated in clauses 3.2.1 and 3.3.1.

5.3.5. The Certification Board may recommend that a candidate seeks certification at an alternate level, or terminate the certification process after reviewing the documents submitted. The application fee would not be refunded.

5.3.6. The examiners involved are independent and do not respond to questions from candidate. The Programme Officer provides the information about the certification process to the candidate and answers any questions he/she may have.

5.3.7. The Certification Board makes the decisions on awarding a pass or fail based primarily upon the recommendation of the examiners.

5.3.8. A candidate applying for Certified Testing Professional is advised to take and pass the written examination before applying for professional assessment by interview.

5.3.9. All certified personnel will be registered in databases and presented as public information on their respective websites. The candidate is notified of the result of the

certification procedure within 30 calendar days after the examination or submission of application. They are entitled to use the designation as CTP or CTT.

5.4. Re-certification

5.4.1. Candidates are required to re-certify after the period of certification validity, which is normally 3 years from the date of issue of the certificate, has expired.

5.4.2. The re-certification process is different from the first certification process. It concentrates on the continuing professional development (CPD) of the individual that has taken part in since the last certification or re-certification. Similar to first certification, candidate shall visit the website and download the application form and shall submit payment and completed documentation, consisting of

- Application form for re-certification
- Working experience in the past 3 years and
- Records of Continuing Professional Development (form for recording of CPDU is available on website www.hktic.org)

5.4.3. The Programme Secretariat will review the records of CPD to determine whether the re-certification candidate fulfils the CPD requirements for his/her level.

5.5. Continuing Professional Development (CPD)

5.5.1. The Continuing Professional Development programme supports the ongoing educational and professional development of individuals who have attained the certification. The purpose of the CPD program is to:

- enhance ongoing professional development;
- encourage and recognize individualized learning opportunities;
- maintain the value and recognition of the certification; and
- provide a vehicle for attaining and recording professional development activities.

5.5.2. In order to satisfy the CPD programme and maintain an active certification status, candidate must accrue and report a minimum of 30 and 60 Continuing Professional Development Units (CPDUs) during each three-year certification cycle for Certified Testing Technician and Certified Testing Professional respectively. A Certified Testing Technician can accrue the necessary CPDUs by participating in any one or more activities as listed in Appendix 4. A Certified Testing Professional shall

participate in at least two activities. The number of CPDUs accrued for one activity shall not be less than 30 in case the Professional attends only two activities. The expiry date of validity is shown on the certificate.

5.5.3. Continuing Professional Development Units (CPDUs)

● The Continuing Professional Development Units (CPDUs) is the measuring unit used to quantify approved learning and professional service activities. Typically, one CPDU is earned for every one hour spent in a planned, structured learning experience or activity. There is a range of opportunities available to candidates to acquire CPDUs through training/education programmes and professional activities covering seminar, industrial discussion group, symposium, training course, etc. Appendix 4 gives guidelines for counting CPDUs.

5.6. Cancellations, Rescheduling, No Shows

5.6.1. If candidate needs to cancel or reschedule an interview or an examination, he/she must do so no later than 48 hours before the scheduled appointment.

5.6.2. If he/she fails to notify the appropriate party within the specified time period and/or fails to meet a scheduled examination appointment, he/she forfeits the full certification fee and will have to pay the full certification fee in order to schedule another interview or examination.

5.6.3. There are times when extenuating circumstances (e.g. medical emergency, death in immediate family, illness in immediate family) may prevent a candidate from meeting a scheduled interview or examination appointment, resulting in a no show. Should such a situation arise, the candidate will be asked to provide explanations along with supporting documentation (e.g. accident report, medical documentation, death certificate). If he/she does not make contact within 72 hours following a missed appointment, fees will apply in order to schedule a new appointment. All claims will be reviewed on a case-by-case basis. The candidate is allowed a maximum of one year, from the date of application is approved, to apply for re-examination.

6. Appeals

6.1. As a policy, the Certification Board has a procedure for considering appeals against the decisions at the end of each stage of the certification cycle.

6.2. Written examination recheck

6.2.1. The marks awarded for a particular section may be subject to a recheck. A recheck is carried out to ensure that there have been no arithmetical or clerical errors, that the marks awarded are appropriate and that all the marks to which the candidate is entitled have been included in the final total.

6.3. Professional assessment Review

6.3.1. The grounds for such review must clearly identify the element or elements of the assessment for which the review is sought. It must also specify the grounds on which the review is sought and must contain all information, which the candidate requests to be taken into account in the review.

6.3.2. The grounds for a review are:
- The regulations have not been properly implemented.
- The regulations do not adequately cover the candidate's case.
- Compassionate or medical circumstances related to the candidate's assessment situation, which were made known by the candidate in writing.
- Significant performance related information which the candidate believes was not considered by the examiners.

6.4. Appeal for a written examination recheck

6.4.1. A request for a recheck must be received no later than 10 working days after the date of posting of the examination results.

6.4.2. Only a written request for a recheck will be considered.

6.4.3. A fee, as stipulated in the Schedule of Fees, will be charged, which must be included in the request for a recheck. Such fee is non-refundable.

6.5. Appeal for a professional assessment review

6.5.1. A request for a review must be received no later than 10 working days after the date of posting of the assessment results.

6.5.2. Only a written request will be considered.

6.5.3. As the result of the appeal needs to be ratified by the Certification Board, it may take some time before the candidate is notified of the decision.

6.5.4. The fee for the professional assessment review is as set forth in the Schedule of Fees. Such fee is non-refundable.

6.6. An appeal form for appeal of written examination and professional assessment is available on website www.hktic.org.

7. **Obligations**

7.1. All certified personnel shall at all times:-

7.1.1. commit to abide with the Regulations as set for the PCSTP scheme;

7.1.2. pay the fees and charges as determined by the Certification Board;

7.1.3. represent honestly and truthfully to any person concerned that he/she is only certified for activities stated in the scope of certification;

7.1.4. endeavour to ensure that the certification granted by the Certification Board is not used in a misleading manner; and

7.1.5. maintain complete integrity and impartiality in all circumstances.

7.2. Details of regulations are given in the document PCSTP01 "Regulations for Professional Certification Scheme for Testing Personnel".

APPENDIX 1:

Examination syllabus and specimen questions for Certified Testing Technician

Any aspect of the syllabus may be included in the written examinations or professional assessments. The level of knowledge required by the candidates varies according to the topic. To ensure comprehension by all parties, the following terms have been selected to demonstrate an increasing level of knowledge.

Definitions

Outline Knowledge: The candidate must be familiar with the subject in outline terms. He/She should know that the topic exists and what it is applied to. In the context of methods/techniques the candidate would be expected to know "what it is, what it does" but would not be expected to know the finer points of application of the technique.

Knowledge: The candidate must have a working knowledge of the subject and be able to apply it.

Detailed Knowledge: The candidate must have a depth of knowledge sufficient to enable him/her to exercise judgment.

Types of questions

For all multiple-choice questions candidates are required to tick or otherwise indicate the correct answer in the space provided.

Candidates are expected to give a few words, a phrase or a sentence as answers for short answer questions in the space provided.

Candidates are required to explain in depth for open-ended questions.

1. Examination syllabus of Certified Testing Technician

1.1. General requirements (outline knowledge)
1.1.1. Understanding of ISO/IEC 17025
- Document control
- Verification of critical consumables
- Technical records

- Environmental conditions
- Sample handling such as storage conditions, etc.
- Traceability and reference culture
- Quality control requirement
  - In process control checks to be implemented such as
    - Sterility check
    - positive and negative strain
    - duplicate analysis

1.1.2. Laboratory safety (knowledge)

- General laboratory safety and biosafety precaution
- Handling of broken glass, contaminated sample, sharp point, etc.
- First and second protection barrier
- Measures in using high pressure autoclave

1.1.3. Integrity management (detailed knowledge)

- Prevention of Bribery Ordinance, Cap. 201
  - Corruption
  - Advantages
- Confidentiality and proprietary right
- Outside Employment
- Use of Company Assets
- Conflict of Interest
- PCSTP01 "Regulations – Professional Certification Scheme of Testing Personnel"
  - Code of ethics in general
  - Code of ethics in relation to employer
  - Code of ethics in relation to public
  - Obligation of Certified Testing Personnel
  - Use of Certification symbol and claim of certification status

1.2. Technical requirements (knowledge)

1.2.1. Understanding on basic laboratory techniques

- Aseptic, staining, pour plate, streak plate and membrane filtration technique
- Autoclave requirement
- Expected results for biochemical or other confirmation tests
- Counting and use of microscope
- Temperature and tolerance for incubation

- Sample maximum holding time of samples
- Sample preparation requirements

1.2.2. Equipment usage (knowledge)
- Autoclave
- Monitoring of temperature of each cycle
- Oven
- Incubator
- Freezer/refrigerator/cold storage room
- Biohazard hood or laminar flow cabinet
- Temperature monitoring device
- Balance
- Pipette/autopiette

2.   Specimen examination Questions

2.1. The minimum volume of agar used for pour plate in accordance with BAM Chapter 3 (petri dish size: 15 x 90 mm) is
   a. 8mL
   b. 12mL
   c. 18mL
   d. 20mL
   e. 24mL

2.2. Name two biochemical tests and their expected results for confirmation of E. Coli.

2.3. Define sterility test.

APPENDIX 2:

Examination syllabus and specimen questions for Certified Testing Professional

1. Examination Syllabus of Certified Testing Professional

1.1. Management requirements (Detailed Knowledge)

1.1.1. Manager's Basic Functions

1.1.2. Time Management

1.1.3. Communication in Your Workplace

1.1.4. Team Building – Basic understanding of concepts

1.1.5. Delegation and Management of Generation Y

1.2. Quality requirements

1.2.1. Laboratory management in compliance with ISO/IEC 17025 (Detailed Knowledge in the following aspects)

- Document control
- Review of contract
- Subcontracting
- Verification of critical consumables
  - Reagent water
  - Quantitative evaluation of medium (based on ISO/TS 11133-1)
  - Serological/biological kit
  - Labware
- Difference between correction and corrective actions and control of non-conforming work
- Preventive actions
- Technical records – test result, medium preparation, subculture history, etc.
- Laboratory layout in segregation of activities and prevention of contamination
- Traceability (acceptable reference culture)
  - Procedures of sub-culture
  - Verification of working culture
- Sample identification and integrity within laboratory
- Quality assurance procedures and plan
  - Method verification
    - Minimum method verification such as precision criterion for different textiles and garments encountered

- Participation in proficiency testing programme
- Continuing competence
  - Statistical treatments of data and quality control requirement (detailed knowledge)
    - Establishment of control limit and precision criterion
    - Construction of control chart
  - Quality control check
    - Negative and positive strain for confirmation test
    - Subculture and verification of reference culture procedures
    - Storage period of working culture, broth and medium
    - In-process control checks

1.2.2. Laboratory safety (knowledge)
- Handling of spill
- Principles in use of different disinfectant
- General laboratory safety and biosafety precaution
- Handling of broken glass, contaminated sample, sharp point, etc.
- First and second barrier
- Measures in using high pressure autoclave

2.3.1. Integrity management (detailed knowledge)
- Prevention of Bribery Ordinance, Cap. 201
  - Corruption
  - Advantages
- Confidentiality and proprietary right
- Outside Employment
- Use of Company Assets
- Conflict of Interest
- PCSTP01 "Regulations – Professional Certification Scheme of Testing Personnel"
  - Code of ethics in general
  - Code of ethics in relation to employer
  - Code of ethics in relation to public
  - Obligation of Certified Testing Personnel
  - Use of Certification symbol and claim of certification status

1.3. Technical requirements (knowledge)

1.3.1. Estimation of measurement uncertainty

- Approaches for estimation of measurement uncertainty e.g. EURACHEM, MIKE
- Factors affecting measurement uncertainty
- Intermediate precision based on ISO5725-3 and additional consideration
- Uncertainty of one-off analysis
- Reporting of uncertainty and compliance

1.3.2. Interpretation of results and reporting requirements (detailed knowledge)

- Count of spreader
- Report of TNTC
- Number of significant figures
- Reporting limit as stated in test standard
- Conditions of sample to be reported

1.3.3. Requirements of the following equipment calibration

- Autoclave
- Monitoring of temperature of each cycle
- Oven
- Incubator
- Freezer/refrigerator/cold storage room
- Biohazard hood or laminar flow cabinet
- Temperature monitoring device
- Balance
- Pipette/autopiette

1.3.4. Basic microbiological techniques (detailed knowledge)

- The same basic techniques as CTT
- Underlying principles of the techniques
- Implication of the microbial being identified
- Difference between indicator and pathogen
- Precautions and limitation for testing of different matrices

Professional assessment syllabus on sector specific tests (only for testing professional)

1. Principles of test procedures and measurement techniques
1.1   Medium used for enrichment
1.2   Medium used for isolation
1.3   Expected change and characteristics appearance and the principle involved (major critical composition present in the medium)
1.4   Scope and limitation of the test
1.5   Legislation requirements in different matrices

2   Requirements of standards
2.1   Sample bottle (pre-treatment procedure), if appropriate
2.2   Maximum holding time of sample
2.3   Storage requirements
2.4   Sample size
2.5   Tolerance and temperature for incubator
2.6   Confirmation requirements (any specified positive and negative strain)
2.7   Reporting requirements
2.8   Environmental requirements such as clean room

2.   Specimen examination questions

2.1. Define productivity of medium?

2.2. State the minimum requirements for verification of a working culture and give examples to one species.

2.3. What measures do you implement for ensuring the proper functioning of an autoclave?

2.4. Professional assessment by interview (Sector specific requirements)
   ● Lists two of the selective media used for isolation of Salmonella according to BAM and briefly describe the expected characteristics appearance and any change of media and principles of the reactions involved.

APPENDIX 3

Training courses approved by the Certification Board

Before 1 January 2012, candidate attending the courses as listed below is deemed to satisfy the competence requirements shown.

1. Certified Testing Technician

Competence requirements	Course Name	Training Provider
ISO/IEC 17025	Laboratory Management	HKAS/HKTIC/IVE
Laboratory Safety	Laboratory Safety	HKTIC/VTC/OSHC/Labour Department
Basic laboratory techniques	Certificate course in microbiological test	SPACE
Use of Equipment and Understanding of ISO/IEC 17025	Quality Control and Measurement Uncertainty for Microbiological tests	HKTIC

2. Certified Testing Professional

Competence requirements	Course Name	Training Provider
ISO/IEC 17025	Laboratory Management	HKAS/HKTIC
Laboratory Safety	Laboratory safety	HKTIC/VTC/OSHC/Labour Department
Measurement uncertainty	Measurement Uncertainty for Microbiological tests	HKAS
Statistical treatment of data and quality control requirement	Quality Control and Measurement Uncertainty for Microbiological tests	HKTIC
Measurement uncertainty		
Method verification		
Equipment calibration		

HKTIC – Hong Kong testing, Inspection and Certification Limited
HKAS – Hong Kong Accreditation Services

VTC – Vocational training Council

IVE – Hong Kong Institute of Vocation Education

OSHC - Occupational Safety and Health Council

As commence from 1 January 2012, candidate is required to obtain certificates of achievement (satisfactory results in end-of-course evaluation) in approved courses in meeting the competence criteria. Lists of training organizations and training courses are available on the Scheme website www.hktic.org.

1. Certified Testing Technician (both quality and technical requirements)

Competence requirements	Course Name	Duration (hours)
Quality requirement	Understanding ISO/IEC 17025 and laboratory safety	12 hours
Technical requirements	Basic laboratory technique and use of equipment	30 hours
Integrity requirements	Ethics	3 hours

2. Certified Testing Professional

Competence requirements	Course Name	Duration (hours)
Management skills	Comprehensive management	14
ISO/IEC 17025 Statistical treatment of data and quality control requirement	Laboratory management and quality control for microbiological tests	21
Safety	Safety for microbiological laboratories	7.5
Measurement uncertainty and calibration/checks of equipment	Measurement uncertainty and equipment calibration/check requirements for microbiological tests	15
Basic techniques and use of equipment	Principles of laboratory techniques for microbiological tests	36

APPENDIX 4

Guidelines for counting Continuing Professional Development Unit (CPDU)

Activities	CPDUs
Training course, seminar or workshop on relevant topics (Internal training and workshops on relevant topics are also counted[Note1])	1 CPDU for candidate attending workshops or seminars which involve each contact hour.
Author or co-author of an article published in a refereed journal	30 CPDUs per article (author) 20 CPDUs per article (co-author)
Author or co-author of an article published in a non-refereed journal	15 CPDUs per article (author) 10 CPDUs per article (co-author)
Lecturer/Speaker on relevant topics at a conference, seminar or formal course.	10 CPDUs per activity
Member or moderator on relevant topics at a conference, symposium, workshop or formal course.	5 CPDUs per activity
Author or co-author of textbook on relevant field	40 CPDUs (author) 20 CPDUs (co-author)
Developer of content for a testing learning courseware.	10 CPDUs per new course
Board or committee member of testing or certification organization	20 CPDUs (board)per annum 10 CPDUs (committee) per annum
Development of new international/regional test standard	30 CPDUs
Verification and implementation of new international/regional test standard[Note2]	10CPDUs
Development of new accredited in-house method (limited to 3 developers)[Note3]	15 CPDUs
Technical visit	1 CPDU per each visit hour

Remarks:

- Note 1: Internal training should be organized in similar structure as external training with training materials, assessment and attendance or assessment certificate.

- Note 2: Organization should maintain evidence in support of competence in performing the tests including documentation (test procedures), satisfactory results in proficiency testing activities (proficiency testing programme, interlaboraotry comparison programmes or verification by certified matrix reference materials).

- Note 3: Accreditation should be granted by HKAS (Hong Kong Accreditation Services) or accreditation body having MRA (mutual recognition agreement) with HKAS.

APPENDIX 5

References

1. *ISO/IEC 17025* "General requirements for the competence of testing and calibration laboratories"

2. *HKTIC PCSTP01* "Regulations for Professional Certification Scheme for Testing Personnel"

3. *ISO/TR 13843:2000* Water quality – Guidance on validation of microbiological tests

4. *AOAC INTERNATIONAL* Criteria of Laboratory performing Microbiological Testing and Chemical analyses for food and pharmaceuticals: 2006

5. *ISO 5725-3: 1994* Accuracy (trueness and precision) of measurement methods and results Part 3 – Intermediate measure of the precision of a standard measurement method

6. *EURACHEM/CITAC Guide:2000* Quantifying Uncertainty in Analytical measurements

7. *GUIDEBOOKS FROM LABOUR DEPARTMENT OF HKSAR*

7.1. A brief guide to first aid
7.2. A brief guide to the Occupational Safety and Health Ordinance
7.3. A brief guide to the Occupational Safety and Health Regulation
7.4. Code of practice on safety management
7.5. Guidelines for good occupational hygiene practice in a workplace
7.6. Hazards during chemicals in use and safety guidelines

8. *Standards in relation to laboratory safety*
8.1. AS/NZS 2243.3 Safety in Laboratories Microbiological aspects and containment facilities

主辦機構
Organised by

香港測驗認證協會有限公司
Hong Kong Association for Testing, Inspection and Certification Ltd.