CERTIFICATION SCHEME FOR PERSONNEL

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Requirements for the Certification of Plant Inspectors and Senior Plant Inspectors

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FOREWORD

The Certification Scheme for Personnel (CSWIP) is a comprehensive scheme that provides for the examination and certification of individuals seeking to demonstrate their knowledge and/or competence in their field of operation. The scope of CSWIP includes Welding Inspectors, Welding Supervisors, Welding Instructors, Welding Quality Control Co-ordinators, Visual Offshore Inspectors, Plant Inspectors, Underwater Inspection Personnel, Plastics Welder, Plastics Welding Inspectors and NDT personnel.

CSWIP is managed by the Certification Management Board, which acts as the Governing Board for Certification, in keeping with the requirements of the industries served by the scheme. The Certification Management Board, in turn, appoints specialist Management Committees to oversee parts of the scheme. All CSWIP Boards and Committees are comprised of member representatives from relevant industrial sectors and other interests.

TWI Certification Ltd understands the importance of impartiality in carrying out its certification activities, managing conflict of interest and ensuring the objectivity of all its certification activities, in accordance with BS EN ISO/IEC 17024.

This document covers the certification of Plant Inspectors and Senior Plant inspectors.

ACCESS TO CERTIFICATION

Access to certification schemes is not improperly restricted. The sole criteria for certification are as given in the appropriate 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 TWI Certification Ltd, its parent, or any other group or associations.

1 GENERAL

1.1 Scope

Given the increasing demands of integrated asset management within process plants, the increasing complexity of plant systems themselves and the legislative background in the EU and overseas, it is recognised that a need exists for a formal Plant Inspector certification scheme. To be effective, a certification scheme needs to ensure that Plant Inspectors have sufficient training and practical experience before being adjudged competent to perform statutory or non-statutory inspections on engineering plant.

The scheme will add value to plant integrity management by being applicable to the inspection of aging assets, i.e. equipment that has been put in service. It will cover both statutory and non-statutory equipment and be universal, i.e. not tied to one specific inspection code. Equally, it is recognised that there will be some sector–specific and plant–specific topics covered at the appropriate level and depth (e.g. for power generation, offshore and chemical process/refineries sectors). The scheme allows for increasing specialisation at Senior Level, promoting the Inspector into a complimentary role to the engineer. Training and competence assessment for the inspection of statutory plant (pressure vessels, piping and aboveground storage tanks) and Plant Integrity Management (FFS, RBI and damage mechanisms) are given special significance.

It is recognised that personnel considering this scheme will come from the main disciplines of plant inspection, non-destructive testing, welding inspection and mechanical inspection. It is also likely to draw candidates who are suitably experienced and qualified with related quality assurance and quality control backgrounds.

The scheme is designed to suit inspectors working for equipment owner/user companies; commercial works (vendor) inspection organisations, independent third party inspection organisations, classification societies and insurance companies.

CSWIP Plant Inspector certification is seen as conferring renewable international certification at two levels (Plant Inspector and Senior Plant Inspector). This document prescribes procedures by which personnel may be examined, and, if successful, certificated for the duties of Plant Inspector and Senior Plant Inspector, as defined in Clause 1.2. This document does not purport to cover personnel who do not have the responsibilities defined in Clause 1.2.

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1.2 Responsibilities of personnel

Typical areas of work activity and knowledge of personnel for whom CSWIP Plant Inspector certifications would be suitable are given below:

1.2.1 CSWIP Plant Inspector

A person certified as a CSWIP Plant Inspector has a wide-ranging knowledge of technical issues relating to in-service inspection of ageing assets in process plants, terminals, refineries, power stations etc. CSWIP Plant Inspectors can carry out unsupervised inspection tasks in the field, supervise supporting personnel (e.g. NDE contractors) and write inspection reports.

a) Execute on-site inspection work in accordance with a Written Scheme of Examination (WSE).
b) Assess equipment deterioration and compare against given acceptance criteria's.
c) Supervise contractors (e.g. NDE, blasting/painting, welding inspection).
d) Evaluate provided examination results and compare against given acceptance criteria's.
e) Prepare inspection reports inclusive of basic code calculations (Corrosion rate, remaining life, MAWP and maximum fill height)
f) Execute a material verification program
g) Codes and standards commonly used by the industry.
h) Equipment types (pressure vessels, process piping, aboveground storage tanks, and pressure relief devices) and basic materials.
i) Purpose of a Written Schemes of Examination (WSE) and inspection plan.
j) Inspection techniques and principles, including Non-intrusive inspection (NII).
k) Common damage and degradation mechanisms.
l) Detection and evaluation of imperfections by means of Non-destructive examination (NDE).
m) Basic code calculations (Corrosion rate, remaining life, MAWP and maximum fill height)

1.2.2 CSWIP Senior Plant Inspector

The Senior Plant Inspector is a role complementary and supportive to the engineer, within their field of competence. They are a technical authority, able to give technical supervision and aid in decision making and for all aspects of the CSWIP Plant Inspector role.

a) Perform all tasks of the CSWIP Plant Inspector.
b) Perform an FFS assessment to determine if a defect is acceptable or if further assessment of a specialist is needed.
c) Contribute (as inspection specialist) to the development of RBI plans.
d) Approvals of routine repair work.
e) Contribute to non-routine repairs, alterations or changes of the operation parameters outside the original design envelope.
f) Advanced concepts for evaluating in-service damage of pressure containing piping components like Fitness-For-Service (FFS) which includes a basic understanding of the significance of defects.
g) Principles and application of Risk-Based Inspection (RBI).
h) Repair methods and design
i) Welding methods and procedures (WPS / PQR).
j) Testing of equipment after repairs (Hydrotest, pressure testing, leak testing)

1.3 Requirements prior to taking a certification test

Job responsibilities and experience criteria for examination eligibility as given below are strictly adhered to and enforced.

1.3.1 CSWIP Plant Inspector

Candidates shall hold as a minimum a current ISO 9712 Level 2 (SNT-TC-1A certification may be acceptable under certain conditions; to be reviewed by the examiner) in Ultrasonic testing and one other method, which must be Radiographic Inspection/Interpretation, Liquid Penetrant Inspection or Magnetic Particle Inspection and have two years relevant experience in a minimum of two of the following areas (accumulated total five years of relevant experience):

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- Welding inspection activities
- Painting inspection activities
- Hydrotesting and pneumatic testing
- Basic corrosion assessment
- Total three months of relevant shutdown experience in a plant environment

Or

Candidates shall hold a current CSWIP Welding Inspector (or equivalent) and have two years relevant experience in a minimum of two of the following areas (accumulated total five years of relevant experience):

- Non-Destructive testing activities
- Painting inspection activities
- Hydrotesting and pneumatic testing
- Basic corrosion assessment
- Total 3 months of relevant shutdown experience in a plant environment

In addition to the above, candidates must comply with Clause 1.3.3 and 1.3.4

1.3.2 CSWIP Senior Plant Inspector

Candidates shall hold a valid CSWIP Plant Inspector certification

And

Candidates shall have minimum two years relevant experience in inspection activities as for the CSWIP Senior Plant Inspector including:

- Having performed basic pressure calculations
- Material properties and their strengths
- Having worked with basic process flow diagrams on process plants
- Having performed assessments of corrosion of materials at different environments

In addition to the above, candidates must comply with Clause 1.3.3 and 1.3.4

1.3.3 Training

All candidates (with the exception of 'mature candidates,' see section 1.4) must attend a CSWIP approved course of training at the appropriate level prior to examination. Details of such courses are available on request.

1.3.4 Vision requirements

The candidate shall provide documented evidence of satisfactory vision in accordance with the following requirements:

a) Near vision shall permit reading a minimum of Jaeger number 1 or equivalent type and size letters (e.g. Times Roman N5), at not less than 30 cm on a standard Jaeger test chart for near vision, in at least one eye, corrected or uncorrected;

b) Colour vision should be sufficient that the candidate can distinguish and differentiate contrast between the colours used in the inspection methods at the level of familiarity required in the certification being sought.

The evidence must be in the form of a certificate issued by a medically recognised person within the previous 24 months, covering all of the above points.

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With all of the above eligibility requirements, the onus is on the candidate to provide the necessary evidence prior to the examination. An examination appointment will not be confirmed until the evidence has been received. Subsequent to certification, tests of visual acuity shall be carried out annually.

1.4 Mature candidate Route

A mature candidate route offering exemption from formal training is available for the following:

1.4.1 CSWIP Plant Inspector

Candidates who hold a minimum of a UK Higher National Certificate (or equivalent) in a relevant engineering subject or Incorporated Engineer with an appropriate professional body and have a minimum of seven years of experience with relevant inspection activities covering the disciplines listed in 1.3.1 above.

1.4.2 CSWIP Senior Plant Inspector

Candidates with more than 10 years of relevant experience and holding a valid CSWIP Plant Inspector certificate. Access to the mature candidate route shall be subject to review.

2 EXAMINATION PROCEDURE

The Plant Inspector and Senior Plant Inspector assessment comprises theory and case study multiple choice examinations appropriate to the respective level. Candidates shall demonstrate the necessary competence required to carry out the inspection tasks for aging assets on- and offshore (i.e. equipment that has been placed in service) defined by this Plant Inspector certification scheme.

Examinations are conducted only by TWI Certification Ltd Authorised Examining Bodies. The present requirements are intended to meet the majority of users' needs for the practical inspection of engineering plants and to provide industry with an assured minimum standard of proficiency.

Examinations are designed to test the candidate's grasp of the wide subject matter of inspection of aging assets and his/her understanding of the technical and procedural aspects of the Plant Inspectors role. The examination procedure involves a combination of closed book and open-book questions at Plant Inspector level and closed book only at Senior Plant Inspector level.

2.1 CSWIP Plant Inspector

2.1.1 Theory examination part

The candidate is required to demonstrate overall knowledge of all the subjects covered within the training syllabus by answering the multiple choice type questions.

- 100 multiple choice questions (closed book)
- Time allowed 3 hours
- Pass mark 70%

2.1.2 Specific examination part

The candidate is required to demonstrate overall knowledge of all specific subjects covered within the training syllabus by answering the multiple choice type questions. This may require to search for the information in the documentation provided or to perform a set of calculations.

- 25 multiple choice questions (open book)
- Time allowed 3 hours
- Pass mark 70%

Details of the syllabus can be found in Appendix 1: Examination Syllabus

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2.2 CSWIP Senior Plant Inspector

2.2.1 Theory examination part

The candidate is required to demonstrate overall knowledge of all the subjects covered within the training syllabus by answering the multiple choice type questions. These are based on the following scopes of knowledge:

Module 1: Advanced concepts for evaluation in-service damage of pressure containing piping components like Fitness-For-Service (FFS) which includes a basic understanding of the significance of defects

Module 2: Application of the principles and application of Risk-Based Inspection (RBI) and contribution as inspection specialist to the development of RBU plans.

Module 3: Assessment of damage mechanisms for RBI and FFS, based on API RP 571

Module 4: Weld Repair of Pressure Equipment and Piping.

- 100 multiple choice questions covering four modules (closed book)
- Time allowed 3 hours (total)
- Pass mark 70%

Details of the syllabus can be found in Appendix 1: Examination Syllabus

2.3 Application for Examination and Fees

Candidates will be required to submit an application form and CV. All information requested must be on these forms. No applications can be considered confirmed until receipt of correctly completed documents. Application forms ask for specific details of experience and training and must be signed to the effect that these details are correct.

In the event of a false statement being discovered on any submitted document, any examination undertaken will be declared null and void. A certificate is automatically invalidated if there are any outstanding examination fees in respect of that certificate.

Candidates proved to have cheated or found to have attempted to remove or found to have removed examination material in a CSWIP examination will not be accepted as a candidate for any CSWIP examination for a minimum period of five years from the date of the examination where cheating, attempting to remove or removal of examination material, was established to have taken place.

Examinations may be taken at Test Centres approved in the United Kingdom and overseas for the CSWIP Plant Inspector certification scheme. Lists of approved examination centres are available on request.

3 CATEGROIES OF CERTIFICATION

Candidates may apply for one of the following certification categories:

- CSWIP Plant Inspector
- CSWIP Senior Plant Inspector

4 Certification

4.1 Results Notices

All candidates shall be sent a results notice. This notice shall also be sent to the organisation paying the examination fee, if not paid by the candidate.

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4.2 Successful Candidates

Two copies of a certificate of proficiency will be issued to the organisation or person that pays the examination fees. Duplicate certificates to replace those lost or damaged will only be issued after extensive enquiries.

4.3 Unsuccessful Candidates

Candidates who fail to obtain a pass on any paper may take one retest on those parts of the examination in which success was not achieved. The retest must be completed within one year of the initial module test; otherwise candidates will have to repeat the complete examination.

Candidates who are unsuccessful in the retest will be required to re-take the full-approved course followed by the full examination.

4.4 Period of validity

The certificate is valid for five years from the date of completion of the final initial module examination and may be renewed for a further five years on application, provided evidence is produced in accordance with Clause 4.5.1. Certificates are only valid provided:

a) They are within date
b) They are on standard cream CSWIP paper bearing the CSWIP logo in black on gold signed by an officer of CSWIP and embossed with the CSWIP stamp
c) They have been signed by the individual to whom the certificate is awarded; and
d) They are accompanied by a valid official CSWIP identity card.

Photocopies are unauthorised by CSWIP and should only be used for internal administrative purposes.

4.5 Renewal

4.5.1 Five year renewal

In order for the certificate to be renewed after five years, the holder has to demonstrate that he/she has maintained his/her competence by:

i) Providing evidence of continuous satisfactory work activity without significant interruption during the previous five years in plant inspection; and

ii) Providing evidence that the holder has kept up to date in plant inspection.

Any previous certificate is invalidated upon issue of the five-year renewal certificate.

The certificate will not be renewed without further test if a substantiated complaint is received by the Governing Board during the period of its validity. Further instruction and retest may then be required.

Renewal must take place no later than 21 days after the date of expiry. It is the certificate holder's responsibility to ensure that renewal takes place at the appropriate time. Only under extreme circumstances will certificates be renewed up to a maximum of six calendar months from the date of expiry shown on the certificate and late renewal will be subject to a special fee. Candidates who do not renew or cannot provide verified evidence of work activity will be required to undertake an examination as directed by the Certification Body.

[1] As a guide, 'reasonable continuity' in any given five year period means that absences from work for which the certificate was granted should not exceed one year in one or several periods

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4.5.2 Ten-year renewal procedure

Certificates are renewed beyond ten years from the initial examination (or from a previous ten-year renewal) by the holder successfully completing a renewal examination prior to the expiry of the certificate in addition to the renewal procedure given in Clause 4.5.1. Requests for the appropriate documentation should be made to TWI Certification Ltd.

The ten-year renewal examination consists of a multi-choice paper related to the initial examination syllabus.

One retest within six months of the ten-year renewal examination will be allowed.

Failure at the retest point (for both CSWIP Plant Inspector and CSWIP Senior Plant Inspector) will mean that the candidate must take the full course and full initial examination again to regain the certification.

4.5.2.1 CSWIP Plant Inspector 10 Year renewal examination

The candidate is required to pass the specific examination part as defined for the initial examination

- 25 multiple choice questions (open book)
- Time allowed 3 hours
- Pass mark 70%

4.5.2.2 CSWIP Plant Inspector 10 Year renewal examination

The candidate is required to pass the 30 multiple choice question paper covering the same 4 knowledge areas as defined by modules for the initial senior plant inspector examination.

- 30 multiple choice questions (open book)
- Time allowed 1 hour
- Pass mark 70%

4.6 Complaints and Appeals

An aggrieved party in a dispute which considers itself to have reasonable grounds for questioning the competency of a CSWIP qualified person may petition the Governing Board for non–renewal of the certificate. Such a petition must be accompanied by all relevant facts and, if in the opinion of the Board an adequate case has been presented, a full investigation of the circumstances under dispute will be initiated. If the petition is substantiated to the satisfaction of the Board, the certificate will not be renewed without further test.

Appeals against failure to certify or against non-renewal of the certificate may be made by the inspector or the employer upon application in writing to the governing Board.

5 Records

TWI Certification Ltd maintains records of successful and unsuccessful candidates. These records are accessible to the Governing Board or its nominees at all reasonable times.

6 REFERENCES

1. ISO 17024 General criteria for certification bodies operating certification of personnel.
2. ISO 9712 Non-destructive testing – Qualification and certification of personnel.'
3. Recommended Practice Guideline to Personnel Qualification and SNT-TC-1A, 1, Certification in NDT

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7 ADDRESSES

For further general information contact:

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For specific information on training and examinations and tests and arranging for them to be carried out, contact the approved Examination Body:

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CERTIFICATION SCHEME FOR PERSONNEL

CERTIFICATION OF
CSWIP SENIOR PLANT INSPECTORS

APPENDICE TO DOCUMENT NO CSWIP-PI-11-01

Appendix 1: Examination Syllabus

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APPENDIX 1: EXAMINATION SYLLABUS

1 Modules

1.1 Module 1: Advanced concepts for evaluating in-service damage of pressure containing piping components like Fitness-For-Service (FFS) which includes a basic understanding of the significance of defects.

- Introduction to fitness-for-service (FSS)
- Material properties and API 579 annexes
- Stress analysis for FFS
- Identification of damage mechanisms for FFS:
- Interaction with other assessment procedures

1.2 Module 2: Application of the principles and application of Risk-Based Inspection (RBI) and contribution as inspection specialist to the development of RBI plans.

- Reasons for implementing risk based inspection
- Benefits of using risk based inspection
- Practical planning and implementation of RBI
- Preparing inspection plans

1.3 Module 3: Assessment of damage mechanisms for RBI and FFS, based on API RP 571

- Common damage mechanisms in oil and gas production, refining and manufacturing processes and where they can be found
- Key process parameters affecting damage mechanisms
- Prevention and control of damage mechanisms
- Most appropriate inspection and non-destructive testing methods

1.4 Module 4: Weld Repair of Pressure Equipment and Piping

- Selecting an appropriate repair method
- Life of weld repair
- Type of equipment and industry
- Codes and standards to make weld repairs or alterations
- Use of weld procedures and welder qualifications

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