



CERTIFICATION SCHEME FOR PERSONNEL

Document: CSWIP-PWI-24-16

Requirements for the Certification of Visual Plastics Welding Inspectors, Plastics Welding Inspectors and Senior Plastics Welding Inspectors

2nd Edition, October 2019

Issued under the authority of the Governing Board for Certification

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CSWIP is administered by TWI Certification Ltd

The use of the UKAS Accreditation Mark indicated accredited in respect of those activities covered by Accreditation Certification No 25

FOREWORD

The Certification Scheme for Personnel (CSWIP) 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 scope of CSWIP includes all levels of Welding Inspectors, Welding Supervisors, Welding Instructors, Welding Quality Control Coordinators, Heat Treatment Operatives, Cathodic Inspection personnel, Plant Inspectors, Underwater Inspectors, Plastics Welders 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 specific parts of the scheme. All CSWIP Boards and Committees comprise member representatives of relevant industrial and other interests. TWI Certification Ltd is accredited by UKAS to BS EN ISO/IEC 17024 for certification of personnel.

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.

The current document covers the Certification of Visual Plastics Welding Inspectors, Plastics Welding Inspectors and Senior Plastics Welding Inspectors. There are three categories within each level: Pipes, Sheet and Geomembrane.

ACCESS TO CERTIFICATION

Access to certification schemes is not improperly restricted. The sole criteria for certification are given in the 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 groups or associations.

1. GENERAL

1.1 Scope

This document prescribes procedures by which personnel may be examined, and, if successful, certificated for the duties of Visual Plastics Welding Inspector, Plastics Welding Inspector or Senior Plastics Welding 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. The examinations are primarily intended for pipe, sheet and geomembrane welding inspections.

1.2 Responsibilities of personnel

Typical areas of work activity of personnel from whom CSWIP Plastics Welding Inspector certifications would be suitable are given below.

1.2.1 Visual Plastics Welding Inspectors

- a) Post weld visual inspection
 - Visual inspection and dimensional check of completed welds against specification requirements and drawings.

and under the direct supervision of a Plastics Welding Inspector or Senior Plastics Welding Inspector:

- b) Knowledge
 - Prepare reports.
 - Understand the fundamentals and equipment for welding of plastic pipes, sheets and geomembranes.

- Communicate effectively orally and written.
- c) Codes and Standards
 - Verify to available current standards (e.g. BS EN 12814, 13100, 14728, 16296, 13705 and PD CEN/TR 16862).
- d) Parent material identity
 - Verify parent material compliance against documentation.
- e) Welding consumables identity
 - Verify filler material compliance; filler material storage/handling compliance; inspection records compliance; proper documentation; parent material and filler material compatibility.
- f) Procedure
 - Verify welding equipment appropriateness, welding preparation compliance, joint geometry compliance.
- g) Pre-weld visual inspection
 - Verify that dimensions, fit up and weld preparations are in accordance with the engineering drawings.
- h) In-process welding surveillance
 - Verify compliance with specified procedure during welding.
- i) Safety
 - Verify safety requirements compliance.

1.2.2 Plastics Welding Inspectors

Those defined in Clause 1.2.1 above, plus:

- a) Knowledge
 - Interpret welding symbols and drawings.
 - Understand the fundamentals of the various NDT processes, quality procedures and quality audits/surveillance.
- b) Procedure
 - Verify compliance of procedure qualification records (PQRs), welding procedure specification (WPS) and NDT procedures.
 - Witness procedure qualification testing.
- c) Performance
 - Verify welder qualification compliance.
 - Request welder performance requalification.
- d) Production
 - Verify welder qualification appropriateness.
 - Verify production welding compliance to WPS.
 - Verify personnel qualification.
- e) Inspection
 - Review visual welding inspection reports.
 - Determine if welded assemblies conform to workmanship and/or defined acceptance criteria.
 - Verify implementation of non-destructive and destructive testing methods.
- f) Training
 - Provide training for Visual Plastics Welding Inspectors.

- g) Supervision and evaluation
 - Supervise Visual Plastics Welding Inspectors and evaluate their performance.

1.2.3 Senior Plastics Welding Inspectors

Those defined in Clause 1.2.1 and 1.2.2 above, plus:

- a) Procedure
 - Prepare, review, interpret and approve welding procedures.
 - Prepare, review, interpret and approve visual inspection procedures.
- b) Inspection
 - Prepare visual inspection reports.
 - Maintain visual inspection records and ensure that they conform to the requirements of the applicable standards.
 - Provide NDT inspection planning and scheduling (before, during and after project).
 - Prepare NDT requirements.
 - Report quality inspection dispute investigation results.
 - Prepare destructive testing requirements.
- c) Safety
 - Develop and approve safety procedures.
- d) Quality
 - Perform audits and surveillance.
 - Develop quality assurance plans.
 - Prepare base material control requirements.
 - Prepare weld consumable control requirements.
 - Prepare audit and surveillance plans.
 - Prepare documentation control requirements.
 - Understand weldment workmanship standards.
- e) Project planning
 - Be aware and understand contract requirements.
 - Understand vendor proposal compliance.
 - Review and understand the purchase specifications.
- f) Training
 - Develop visual inspection training.
 - Verify implementation of visual inspection training.
 - Provide training for Plastics Welding Inspectors.
 - Provide technical leadership for Plastics Welding Inspectors.
 - Develop quality assurance training.
 - Verify implementation of quality assurance training.
 - Provide guidance and direction to inspectors for maintaining and upgrading their individual qualifications.
- g) Supervision and evaluation
 - Supervise Visual Plastics Welding Inspectors and Plastics Welding Inspectors and evaluate their performance.
 - Perform inspection results trend analysis.

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 Visual Plastics Welding Inspector

Although there is no specific experience requirement it is strongly recommended that candidates possess a minimum of six months plastic welding related engineering experience and two years industrial experience.

In addition, candidate must comply with Clauses 1.3.5 and 1.3.6.

1.3.2 Plastics Welding Inspector

Plastics Welding Inspector for a minimum of 3 years with experience related to the duties and responsibilities listed in Clause 1.2.2, independently verified. In addition, candidates must comply with Clauses 1.3.4, 1.3.5 and 1.3.6.

or

Certified Visual Plastics Welding Inspector for a minimum of 2 years with job responsibilities in the areas listed in Clause 1.2.2. In addition, candidates must comply with Clauses 1.3.4, 1.3.5 and 1.3.6.

or

Certified Welding Inspector (fusion welding) in accordance with the requirements of CSWIP-WI-6-92. In addition, candidates must comply with Clauses 1.3.5 and 1.3.6.

1.3.3 Senior Plastics Welding Inspector

Certified Plastics Welding Inspector for a minimum of 2 years with job responsibilities in the areas listed in Clause 1.2.3.

or

at least 5 years' authenticated experience related to the duties and responsibilities listed in Clause 1.2.3, independently verified.

In additional to the above, candidates must comply with Clauses 1.3.4, 1.3.5 and 1.3.6.

1.3.4 Qualifying experience

Candidate shall submit verifiable documentation of experience in an occupational function with a direct relationship to weldments fabricated to national or international standards and directly involved in:

- a) The development of plans, drawings, procedures, inspection requirements, acceptance criteria, and specifications for weldments.
- b) Planning, control, supervision, and application of base materials and filler materials in preparation and completion of production weldments.
- c) Fabrication, construction, and supervision of personnel in erection of welded assemblies or sub-assemblies.
- d) Evaluation of weld discontinuities by application of visual or other non-destructive evaluation processes conforming to a written procedure.
- e) Supervision of personnel engaged in material and weld examination.
- f) Repair welding or supervision of personnel performing weld repairs.
- g) The preparation of written procedures for welding, non-destructive evaluation or destructive tests.

- h) The qualification of welders or welding procedures to various codes, standards and specifications.
- i) Welding design functions, as specified in the applicable code, standard or specification.
- j) Operational techniques and activities used to fulfil quality control requirements for weldments.
- k) Using a quality control system.
- l) Teaching the occupational skill of welding or subjects related to welding; its application, control, materials and processes.

1.3.5 Training

All candidates must attend a CSWIP approved course of training at the appropriate level prior to examination. Details of such courses are available on request.

1.3.6 Health/Eyesight

Candidates need to be in satisfactory physical condition and the person completing the application form will be required to signify that the candidate's health and eyesight are adequate to enable him/her to carry out his/her duties. Unaided or corrected near visual acuity in at least one eye shall be such that the candidate is capable of reading Times Roman N4.5 type or Jaeger J1 at a distance of not less than 30cm on a standard reading test chart or should be conducted in accordance with BS EN ISO 18490:2015, Non-destructive testing – Evaluation of visual acuity of NDT personnel, using the “tumbling E” chart. An eyesight test certificate must be submitted with the application form.

Note: Near vision acuity is considered essential to the proper performance of welding examination. Failure to meet the above level of acuity shall be adequate cause to reject a candidate or refuse re-qualification. Colour vision acuity is desirable in some specific applications, but is not considered essential for all examinations. It shall be the employer's responsibility to establish and enforce colour perception requirements for those Visual Plastics Welding Inspectors, Plastics Welding Inspectors and Senior Plastics Inspectors in his/her employment.

1.3.7 Mature candidate route

The requirements for training may be waived for candidates already certified as Welding Inspector or Senior Welding Inspector (fusion welding) in accordance with the requirements of CSWIP-WI-6-92, or BGAS Senior Welding Inspector or BGAS Welding Inspector in accordance with the requirements of BGAS-CSWIP-BG-22-12, and satisfying the qualifying experience outlined in 1.3.4 relevant to the categories of certification sought, on presentation of documented evidence.

2. EXAMINATION PROCEDURE

2.1 Visual Plastics Welding Inspector

The examination procedure for the Visual Plastics Welding Inspector consists of a written test and a practical examination and candidates must satisfy the examiner in all parts. The written test consists of multiple-choice questions, which are designed to test the candidate's knowledge of the syllabus. For each category of certification, candidates will be required to inspect and report on a minimum of two items representative of the certification sought.

2.2 Plastics Welding Inspector and Senior Plastics Welding Inspector

The examination procedure for Plastics Welding Inspector and Senior Plastics Welding Inspector consists of three sections as follows:

- a) An open book multiple-choice test on the requirements of a fabrication standard.
- b) A closed book multiple-choice test on the topics covered in Clause 2.3 applicable to each qualification level of Plastics Welding Inspector.

For each category of certification sought:

- c) A scenario-based test on the application of plastics welding inspection knowledge, which will include inspecting and reporting on two examination samples and comparing with specified acceptance criteria.

Candidates shall pass each part of the examination during a single testing session as applicable to Plastics Welding Inspector or Senior Plastics Welding Inspector. Individuals failing one part of the examination must retest on all parts of the examination as applicable.

2.3 Examination Structure

The examination structure and body of knowledge for Visual Plastics Welding Inspector (VPWI), Plastics Welding Inspector (PWI) and Senior Plastics Welding Inspector (SPWI) are summarised below:

| Examination Subjects | VPWI | PWI | SPWI |
|---|-------------|------------|-------------|
| Definitions and terminology | ✓ | ✓ | ✓ |
| Duties and responsibilities | ✓ | ✓ | ✓ |
| Fundamentals of the relevant welding technique(s) | ✓ | ✓ | ✓ |
| Equipment of the relevant welding technique(s) | ✓ | ✓ | ✓ |
| Material compliance | ✓ | ✓ | ✓ |
| Material storage/handling compliance | ✓ | ✓ | ✓ |
| Materials compatibility | ✓ | ✓ | ✓ |
| Joint geometry compliance | ✓ | ✓ | ✓ |
| Weld preparation compliance | ✓ | ✓ | ✓ |
| Welding equipment appropriateness | ✓ | ✓ | ✓ |
| Visual examination of welds | ✓ | ✓ | ✓ |
| Weld compliance to AWS G1.10M or BS EN 16296 | ✓ | ✓ | ✓ |
| Safety requirements compliance | ✓ | ✓ | ✓ |
| Welding symbols and drawings | | ✓ | ✓ |
| Welding procedure compliance | | ✓ | ✓ |
| Welder qualification appropriateness | | ✓ | ✓ |
| Destructive testing methods | | ✓ | ✓ |
| Destructive testing procedure compliance | | ✓ | ✓ |
| Non-destructive testing methods | | ✓ | ✓ |
| Non-destructive testing procedure compliance | | ✓ | ✓ |
| Quality assurance/control | | ✓ | ✓ |

2.4 Application for Examination and Fees

Candidates will be required to submit an application form. All the 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 forms 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, attempt to remove or removal of examination material, was established to have taken place.

Examinations may be taken at any one of a number of Test Centres in the UK and overseas. Lists are available on request. Arrangements may also be made for examinations to be carried out on the employer's premises.

3. CERTIFICATION

3.1 Categories of Certification

Candidates may apply for one of the following certification categories:

- 3.0P Visual Plastics Welding Inspector - Pipe
- 3.0S Visual Plastics Welding Inspector - Sheet
- 3.0G Visual Plastics Welding Inspector - Geomembrane
- 3.1P Plastics Welding Inspector - Pipe
- 3.1S Plastics Welding Inspector - Sheet
- 3.1G Plastics Welding Inspector - Geomembrane
- 3.2P Senior Plastics Welding Inspector - Pipe
- 3.2S Senior Plastics Welding Inspector - Sheet
- 3.2G Senior Plastics Welding Inspector - Geomembrane

3.2 Results notices

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

3.3 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 destroyed will be issued only after extensive enquiries.

3.4 Unsuccessful candidates

Candidates who fail to obtain a certificate may attempt 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 examination, otherwise candidates will have to repeat the complete examination.

The retest (or complete re-examination) may not be taken within 30 days of the previous examination, unless additional approved training is undertaken before taking the retest.

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

3.5 Period of validity

The certificate is valid for five years from the date of completion of the initial test and may be renewed for a further five years on application provided evidence is produced in accordance with Clause 3.5.1. 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.

3.6 Renewal

3.6.1. 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 work activity in welding inspection; and
- ii) providing evidence that the holder has kept up to date in welding technology.

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

Renewal must take place not 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.

3.6.2. Ten Year Recertification

Certificates are renewed beyond ten years from the initial examination (or from a previous ten year recertification) by the holder successfully completing a recertification examination prior to the expiry of the certificate in addition to the renewal procedure given in Clause 3.5.1. Requests for the appropriate documentation should be sent to TWI Certification Ltd.

3.7 Supplementary Tests

3.7.1 Visual Plastics Welding Inspector

Candidates already holding certification in one category of Visual Plastics Welding Inspector seeking to gain certification in another category of Visual Plastics Welding Inspector will be required to undertake a supplementary examination. This may be taken as an option at the time of the initial Visual Plastics Welding Inspector examination or at any time during the life of the certificate. Success in this supplementary examination does not extend the life of the certificate to which it is added.

3.7.2 Plastics Welding Inspector

Candidates already holding certification in one category of Plastics Welding Inspector seeking to gain certification in another category of Plastics Welding Inspector will be required to undertake a supplementary examination. This may be taken as an option at the time of the initial Plastics Welding Inspector examination or at any time during the life of the certificate. Success in this supplementary examination does not extend the life of the certificate to which it is added.

3.7.3 Senior Plastics Welding Inspector

Candidates already holding certification in one category of Senior Plastics Welding Inspector seeking to gain certification in another category of Senior Plastics Welding Inspector will be

required to undertake a supplementary examination. This may be taken as an option at the time of the initial Senior Plastics Welding Inspector examination or at any time during the life of the certificate. Success in this supplementary examination does not extend the life of the certificate to which it is added.

3.8 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.

4. 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.

5. REFERENCES

AWS B2.4, *Specification for Welding Procedure and Performance Qualification for Thermoplastics*

AWS G1.10M, *Guide for the Evaluation of Thermoplastic Welds*

BS EN 1778, *Characteristic values for Welded Thermoplastic Constructions – Determination of Allowable Stresses and Moduli for Design on Thermoplastic Equipment*

BS EN ISO 9001, *Quality Management Systems - Requirements*

BS EN 12814, *Testing of Welded Joints of Thermoplastics Semi-finished Products*

BS EN 13100, *Non Destructive Testing of Welded Joints of Thermoplastics Semi-finished Products*

BS EN 13705, *Welding of Thermoplastics – Machines and Equipment for Hot Gas Welding (including Extrusion Welding)*

BS EN 14728, *Imperfections in Thermoplastic Welds – Classification*

BS EN 16296, *Imperfections in Thermoplastics Welded Joints – Quality Levels*

BS EN ISO/IEC 17024, *Conformity Assessment – General Requirements for Bodies Operating Certification of Persons*

CSWIP-WI-6-92, *Requirements for the Certification of Visual Welding Inspectors Welding Inspectors and Senior Welding Inspectors (Fusion Welding) in Accordance with the Requirements of BS EN ISO 17637:2016*

PD CEN/TR 16862, *Plastics Welding Supervisor – Task, Responsibilities, Knowledge, Skills and Competence*

6. ADDRESSES

For further general information contact:

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

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