



TWI COURSES



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CUTECH QUALITY SOLUTIONS PTE LTD
#03-19 PIONEER JUNCTION, 3 SOON LEE STREET
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3.0

Visual Welding Inspector - Level 1



Suitable for

Welders, operators, line inspectors and foremen who undertake visual examination of welded joints; quality control staff associated with welding; all staff who need basic training in welding inspection coupled with a qualification in this field.

Entry requirements

Although there is no specific experience required, it is recommended that candidates possess a minimum of six months' welding-related engineering experience and two years' industrial experience.

In addition, candidates must comply with Clause 1.3.4 of CSWIP document WI-6-92 available at www.cswip.com.

Certification/Awarding Body CSWIP

- Course Duration** : 2 Full days or 4 Evenings Training
+ 1 day Examination
- Course Timing** : 9:00 AM to 5:30 PM Full day
or 6:00 PM to 10:00PM Evening

Course & Exam Fees : **S\$ 1200 + GST**

Course content

This welding inspection course covers: visual inspection procedures; relevant codes of practice, terms and definitions; welding processes and typical welding defects; weld measurements; typical documentation and requirements; practical inspection and reporting.

All CSWIP requirement documents are available at www.cswip.com

Objectives

- To identify various weld imperfections (defects)
- To understand the relevant welding technology related to visual inspection
- To understand the need for documentation in welding
- To be aware of codes and standards related to inspection requirements
- To carry out inspection of parent materials and consumables
- To carry out visual inspection of welds, report on them and assess their compliance with specified acceptance criteria
- To pass the CSWIP 3.0 Visual Welding Inspector qualification



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3.1

Welding Inspector - Level 2



Suitable for

Inspection engineers and supervisory staff, and for those in preparation for the CSWIP Welding Inspector examination.

Personnel with little or no previous welding experience are advised to attend the Certificate in Visual Inspection of Welds course to prepare for this course.

Entry requirements

Welding Inspector for a minimum of 3 years with experience related to the duties and responsibilities listed in Clause 1.2.2 of CSWIP document WI-6-92, under qualified supervision, independently verified OR

Certified Visual Welding Inspector (Level 1) for a minimum of 2 years with job responsibilities in the areas listed in 1.2.1 and 1.2.2 of CSWIP document WI-6-92 OR .

Welding Instructor or Welding Foreman/Supervisor for a minimum of 5 years.

In addition to all the above, candidates must comply with Clause 1.3.4 of document WI-6-92 available at www.cswip.com. Experience will need to be verified by either your previous/present employer/company.

Certification/Awarding Body CSWIP

- Course Duration** : 5 Full days or 1 Week (part-time)
+ 1 day Examination
- Course Timing** : 9:00 AM to 5:30 PM Full days
6:00 PM to 10:00PM Mon- Sat Evening
- Course & Exam Package Fee** : **S\$ 3000 + GST**

Course content

The duties and responsibilities of a welding inspector; fusion welding processes; typical weld defects; types of steel; carbon-manganese, low alloy and stainless steels; hardening of steels; weldability; heat treatment; parent metal defects; visual inspection; testing parent metals and welds; destructive tests; NDT techniques; welder and procedure approval; codes and standards; outline of safe working practices; practice in examination questions; continuous and end of course assessment.

In addition, candidates can purchase TWI's online CSWIP Welding Inspector Pre-Learning package which prepares them for the course.

Course objectives

- To understand factors which influence the quality of fusion welds in steels
- To recognise characteristics of commonly used welding processes in relation to quality control
- To interpret drawing instructions and symbols to ensure that specifications are met
- To set up and report on inspection of welds, macro sections and other mechanical tests
- To assess and report on welds to acceptance levels
- To confirm that incoming material meets stipulated requirements and recognise the effects on weld quality of departure from specification
- To be in a position to pass the Welding Inspector - Level 2 examinations



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3.2

Senior Welding Inspector – Level 3



Suitable for

Experienced welding inspectors and quality control staff, especially those who are proceeding to the CSWIP Senior Welding Inspector examination. It is essential that course members have a knowledge of the subjects covered in the course Welding Inspector before joining this course.

It is the responsibility of the examination candidates to either hold CSWIP Welding Inspector or consider attending the Welding Inspector course and examination (WIS5E) prior to this course/examination. The CSWIP Senior Welding Inspector course covers a wide range of subjects and therefore it is advisable for the student to do some preparation before attending the course.

Entry requirements

Certified Welding Inspector (Level 2) for a minimum of 2 years with job responsibilities in the areas listed in 1.2.1, 1.2.2 and 1.2.3 of CSWIP document WI-6-92 OR

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

In either case above candidates must hold a valid CSWIP Level 2 (3.1) certificate. In addition to the above, candidates must comply with Clause 1.3.4 of document WI-6-92 available at www.cswip.com

Certification/Awarding Body CSWIP

Course Duration : 4 Full days + 1 or 2 days Examination

Course Timing : 9:00 AM to 5:30 PM Full days
6:00 PM to 10:00PM Mon- Sat Evening

Course & Exam Package Fee : **S\$ 2750 + GST** (Without RI)
S\$ 3050 + GST (With RI)

Course content

QA and QC; destructive testing; heat treatments; welding procedures; welding dissimilar; residual stress and distortion; weldability; weld fractures; welding symbols; non-destructive testing; welding consumables; weld repairs; specifications; joint design; HSLA and quenched and tempered steels; arc energy and heat input.

As can be seen from the above, there are sixteen different subjects and therefore a good prior knowledge or preparatory work of these would give any student a significant advantage before they attempt the course and examination.

The CSWIP Senior Welding Inspector course builds on knowledge from the CSWIP Welding Inspector course, therefore it is advisable to refresh knowledge by reading the course material.

There are various sources where a student can gain knowledge of the subjects mentioned. Here is a list of good welding handbooks which can be purchased:

- A C Davies The science and Practice of Welding & The Practice of Welding
- AWS Welding Handbook Volumes One and Two
- Welding Principles and applications

Although this course covers most of the syllabus for the examination it does not include training in interpretation of radiographs. Examination candidates who do not possess a current CSWIP or PCN Radiographic Interpreter's certificate should attend the Interpretation of Radiographs - Part B (light and dense metal welds) course and examination.



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ISO 9712 PENETRANT TESTING Level 2 –Welds Sector



Suitable for

All NDT personnel, inspectors and technicians engaged in, or responsible for, inspection of castings, forgings or fabricated items during manufacture or in-service in different product sectors.

Suitable for personnel working in the aerospace industry.

Entry requirements

No mandatory course entry requirements.

Training requirements:

The minimum required duration of training, which includes both theoretical and practical elements, is:

Level 1 - 16 hours

Level 2 - 24 hours (**Direct Level 2 - 40 hours**)

The training hours requirement is fulfilled when candidates attend one of TWI's training courses.

Certification requirements:

The minimum duration for experience prior to or following success in the qualification examination is:

Level 1 - 1 month

Level 2 - 3 months (**Direct Level 2 - 4 months**)

Certification will not be issued until successful completion of the examination and the required experience is achieved.

Certification/Awarding Bodies CSWIP ISO 9712

Course content

Materials, methods, compatibility of materials, equipment and safety aspects; practical exercises; methods of assessing sensitivity. During the Level 2 instruction writing and application, attendees requiring only Level 1 training will carry out practical applications to written instructions.

The course ends with a written and practical test.

Training in accordance with requirements of BS EN ISO 9712.

Objectives

- To explain the basic principles of penetrant inspection methods
- To carry out penetrant inspection using solvent-removable, water-washable and post-emulsifiable /removal processes
- To write clear and concise inspection instructions and test reports

Course Duration : 4 Full days + 1 day Examination

Course Timing : 9:00 AM to 5:30 PM Full days

Course & Exam Package Fee : **S\$ 1300 + GST**



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ISO 9712

Magnetic Particle Testing

Level 2 –Welds Sector



Suitable for

All NDT personnel, inspectors and technicians engaged in, or responsible for, inspection of castings, forgings or fabricated items during manufacture or in-service in different product sectors.

Suitable for personnel working in the aerospace industry.

Entry requirements

No mandatory course entry requirements.

Training requirements:

The minimum required duration of training, which includes both theoretical and practical elements, is:

Level 1 - 16 hours

Level 2 - 24 hours (**Direct Level 2 - 40 hours**)

The training hours requirement is fulfilled when candidates attend one of TWI's training courses.

Certification requirements:

The minimum duration for experience prior to or following success in the qualification examination is:

Level 1 - 1 month

Level 2 - 3 months (**Direct Level 2 - 4 months**)

Certification will not be issued until successful completion of the examination and the required experience is achieved.

Certification/Awarding Bodies CSWIP ISO 9712

Course Duration : 4 Full days + 1 day Examination

Course Timing : 9:00 AM to 5:30 PM Full days

Course & Exam Package Fee : **S\$ 1300 + GST**

Course content

Principles of magnetism; magnetic fields; induction; permeability and reluctance; magnetisation; lines of force, methods of testing; interpretation of indications; demagnetisation; practical exercises; methods of assessing sensitivity; instruction writing.

During the Level 2 instruction writing and application, attendees requiring only Level 1 training will carry out practical applications to written instructions.

The course ends with the certification examination.

Training in accordance with requirements of BS EN ISO 9712.

Objectives

- To explain the basic principles of magnetic particle inspection methods
- To carry out magnetic particle inspection
- To write clear and concise inspection instructions and test reports
- To meet syllabus requirements for CSWIP/PCN Level 2



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ISO 9712

Radiographic Film Interpretation

Level 2 –Welds Sector

Suitable for

Radiographers, inspectors, engineers and surveyors who wish to interpret radiographs but do not have a good understanding of the principles of radiography.

Entry requirements

No mandatory course entry requirements.

Training requirements:

The minimum required duration of training, which includes both theoretical and practical elements, is:

Level 1 - not applicable

Level 2 - 56 hours

The training hours requirement is fulfilled when candidates attend one of TWI's training courses. This course takes place over 7 consecutive week days with the exam on the 8th day.

Certification requirements:

The minimum duration for experience prior to or following success in the qualification examination is:

Level 1 - not applicable

Level 2 - 6 months

Certification will not be issued until successful completion of the examination and the required experience is achieved.

Certification/Awarding Bodies **CSWIP ISO 9712**

Course Duration : 7 Full days + 1 day Examination

Course Timing : 9:00 AM to 5:30 PM Full days

Course & Exam Package Fee : **S\$ 1400 + GST**

Course content

This course designed for personnel responsible for judging the quality of radiograph and reaching informed decisions regarding the identity and extent of the defects revealed. Training in radiographic interpretation provides essential knowledge on radiographic theory and practice to enable interpreters to judge radiographic quality and practical interpretation of welds and castings respectively.

Principles of X- and gamma-radiography; equipment; safety; selection of films and screens; exposure; processing; characteristics of the image; choice of technique; relevant standards; sensitivity, factors affecting the quality of radiographs.

The course ends with the certificate examination.

Training in accordance with requirements of BS EN ISO 9712.

Objectives

- To explain the basic theory of radiography
- To state origin of defects
- To state basic radiation safety principles
- To explain principles relating to selection of films, energy levels and techniques
- To evaluate radiographic sensitivity
- To recognise and differentiate between film artefacts and defect indicators and interpret radiographs



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ISO 9712 Ultrasonic Testing Level 2 –Welds Sector 3.1 & 3.2

Suitable for

All personnel including testers, inspectors, engineers and surveyors who require a thorough and comprehensive introduction to ultrasonic testing of welded joints.

This course is also suitable for personnel working in the aerospace industry and can be found under the Aerospace section.

Blended learning option

If time is an issue, please consider our blended learning option— study theory and concepts when and where you choose, then join the class-room sessions for hands-on practical.

Entry requirements

No mandatory course Entry requirements.

Training requirements

The minimum required duration of training, which includes both theoretical and practical elements, is:

Level 1 - 40 hours

Level 2 - 80 hours (Direct Level 2: 120 hours)

The training hours requirement is fulfilled when candidates attend one of TWI's training courses.

Certification requirements

The minimum duration for experience prior to or following success in the qualification examination is:

Level 1 - 3 months

Level 2 - 9 months (Direct Level 2: 12 months)

Certification will not be issued until successful completion of the examination and the required experience is achieved.

Certification/Awarding Bodies CSWIP ISO 9712

Course content

Basic principles of sound; generation and detection of sound; behaviour of sound in a material; the flaw detector; use of angled beam probes for weld scanning; welding processes and weld defects; practical exercises on test specimens containing simulated flaws; examination of parent plate, butt welds; instruction writing.

The course ends with the certification examination.

Training in accordance with requirements of BS EN ISO 9712.

Course objectives

- To explain the theoretical background of the techniques
- To calibrate ultrasonic equipment
- To measure the thickness of steel plates and determine levels of attenuation
- To locate and evaluate laminations
- To select the correct type of probe to examine welded butt joints in steel plate and aerospace components/structures
- To report on the location and size of defects in typical welded butt joints
- To interpret code requirements
- To meet the syllabus requirements for CSWIP Levels 1 and 2

Course Duration : 15 Full days + 2 days Examination

Course Timing : 9:00 AM to 5:30 PM Full days

Course & Exam Package Fee : **S\$ 2300 + GST**



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Painting Inspection

Grade 2/3



Suitable for

Candidates with or without experience in the painting inspection industry.

Entry requirements

Experience may be acquired prior to or following success in the examination. In the event that the experience is sought following successful examination, the results of the examination shall remain valid for two years.

The minimum duration for industrial experience prior to or following success in the qualification examination is 6 months, showing knowledge of dry abrasive blast cleaning or industrial paint application techniques.

Certification/Awarding Body **BGAS-CSWIP**



Course Duration : 4 Full days + 1 day Examination

Course Timing : 9:00 AM to 5:30 PM Full days

Course & Exam Package Fee : **S\$ 2205 + GST**

Objectives

- To recognise and identify the benefits/disadvantages of paint systems
- To understand the importance of surface preparation
- To understand methods of application and testing
- To understand paint system inspections
- To interpret the requirements of standards
- To meet the syllabus requirements for the BGAS-CSWIP Painting Inspector examination

Course content

- Corrosion theory
- surface preparation
- surface contaminants and tests
- paint constituents and technology
- solutions and dispersions
- drying and curing properties and performance
- specified painting conditions
- cathodic protection
- holiday/pinhole detection
- paint application methods
- paint film testing
- paint identification
- metal coatings
- paint faults
- colour
- inspection methods
- specification requirements
- health and safety and working practice



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