

IIW-India's National Welding Inspectors Certification Scheme

(NWICS)

Introduction: The purpose of welding inspection is to determine if a weldment meets the acceptance requirements of a code, standard or other document. The welding Inspector must be familiar with welding processes, welding procedures, welder qualification, materials, non-destructive and destructive testing of welds, be able to read drawings, prepare and keep records, prepare and make reports and make responsible judgements and decisions.

IIW India's **National Welding Inspectors Certification Scheme (NWICS)** is a comprehensive scheme which provides for examination and certification of personnel seeking to demonstrate their competence and knowledge in the field of welding inspection. The scheme is managed by the Governing Board of IIW India's Authorised Nominated Body (ANB-India) for personnel education, qualification and certification. IIW India is accredited by NABET (a division of QCI) as a conformity assessment body (CAB) as per ISO/IEC: 17024-2012 for certification of personnel. Now it is in the process of transferring accreditation from NABET to NABCB (both divisions of QCI) as a conformity assessment body. ANB understands the importance of impartiality, managing conflict of interest, ensuring security and confidentiality in all its activities in accordance with ISO/IEC: 17024-2012.

Scope of certification: This specification establishes the requirements for the IIW India-ANB Division to certify welding inspectors, supervisors, engineers, quality control co-ordinators and examiners with respect to his / her competency in carrying out welding inspection functions in fabrication and construction industry covering the following:

- a) Working safety
- b) Review & preparation of required documentation
- c) Inspection of weld joints before, during and after welding
- d) Evaluation and acceptance of weld joints based on Destructive & Non-Destructive test results/reports

Levels of Certification: IIW India's NWICS program provides for 3 (three) levels of certification

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|---------------------------------------|-------------------|
| 1. Basic level (NWIC – Basic) | Code: CWIB |
| 2. Standard level (NWIC – Standard) | Code: CWIS |
| 3. Advanced level (NWIC – Advanced) | Code: CWIA |

Role and functions of Welding Inspectors: The candidate should be able to carry out the following activities at different levels of certification.

A. Welding Inspector – Basic level

- a) To independently carry out before, during and post-weld visual inspection and dimensional checks of weldments against specification requirements and drawings.
- b) To carry out the following functions under the supervision of a Welding Inspector – Standard level or Welding Inspector – Advanced level
 - 1) Understand the application of various standards, codes, specifications, welding symbols, drawings, WPS and statutory/regulatory requirements.
 - 2) Verify the compliance of raw materials & consumables, certificates against the applicable standards, codes & specifications.
 - 3) Verify that joint dimensions, edge preparation, fit up, welding equipment and weld preparations are in accordance with the drawings, standards and process requirements.
 - 4) Verify the compliance of pre-heat procedures against the applicable standards.

- 5) To carry out in-process surveillance during welding to verify compliance with specified procedure including pre-heat, welding parameters, inter-pass temperature control and any post-heat requirements.
- 6) Understand and ensure compliance of applicable safety requirements

B. Welding Inspector – Standard level

- a) Supervise the activities of Welding Inspectors – Basic level as given in **A**, b) above
- b) Independently carry out the following functions
 - 1) All functions carried out by a Welding Inspector – Basic level as given in **A**, b) 1 to 6 above
 - 2) Develop, comment and review quality control plans and inspection & testing plans based on product standards, codes, specifications, drawings and statutory/regulatory requirements.
 - 3) Review welding procedures (WPS) for compliance with code and contract requirements and verify welding procedure qualification (WPQR) compliance.
 - 4) Witness procedure qualification test including testing of specimen and verify compliance with WPQRs, WPSs and Welders Qualification against applicable standards for conventional welding processes. (e.g. arc welding processes, steels, aluminium alloys etc.)
 - 5) Verify the compliance of PWHT procedures against the applicable standards.
 - 6) Verify NDT procedure compliance
 - 7) Take decisions on acceptance of quality documents related to welded fabrication (e.g NDT, material testing, production testing, etc.)
 - 8) Take decisions based on quality documents (e.g. NDT, Material Testing, production testing, etc.) according to the requirements defined for the construction
 - 9) Implement weld inspection quality assurance plans
 - 10) Evaluation & acceptance of welded fabrication on the basis of DT & NDT test reports.
 - 11) Conduct surveillance and audit of suppliers and vendors
 - 12) Report on all the above actions.
 - 13) Training and evaluation of Welding Inspectors – Basic level

C. Welding Inspector – Advanced level

- a) Supervise the activities of Welding Inspectors – Basic and Standard levels as given in **A**, b) above and **B** b) above
- b) Independently carry out the following functions
 - 1) All functions carried out by a Welding Inspector – Basic level as given in **A**, b) 1 to 6 above and Welding Inspector – Standard level as given **B** b) 1 to 13 above
 - 2) Verify base material and filler material compatibility
 - 3) Witness procedure qualification test including testing of specimen and verify compliance with WPQRs, WPSs.
 - 4) Conduct Welders Qualification tests and qualify the same against applicable standards for conventional welding processes. (e.g. arc welding processes, steels, aluminium alloys etc.)
 - 5) Write Welding Procedures Specifications and Welder Performance Qualification
 - 6) Prepare visual inspection, NDT and destructive testing requirements
 - 7) Identification of weld defects and determination of their acceptability including Radiographic film interpretation for carbon, low alloy and stainless steels.

- 8) Final acceptance and certification that all requirements specified for the weldment have been met
- 9) Prepare welding inspection quality assurance plans, audit and surveillance plans along with documentation and control requirements.
- 10) Maintenance of comprehensive inspection reports
- 11) Training and evaluation of Welding Inspectors – Standard level
- 12) Provide technical leadership and guidance to team of Welding Inspectors

Required competence and examination: IIW India ANB's certification process for Welding Inspectors requires that ANB India conducts an examination comprising of theory, practical and viva-voce to determine a candidate's knowledge & competence in welding technology, welding inspection and related technical areas commensurate with the level of certification.

The candidate should be able to demonstrate appropriate level of knowledge & skill in welding inspection covering the following:

- i) Codes and standards
- ii) Raw Material, Control and Traceability
- iii) Knowledge of materials and their behaviour during welding
- iv) Conventional welding and cutting processes and equipment
- v) Safety practices during welding & cutting
- vi) Conventional DT and NDT methods including integrity testing.
- vii) Joint types, welding positions and welding symbols.
- viii) Welding qualification – procedure and performance
- ix) Detection and interpretation of discontinuities through VT & PT.
- x) Interpretation and evaluation of RT & UT reports.
- xi) Comment on & review the quality control documents viz. QAPs, WPSs, PQRs, WPQs, MTCs, DT & NDT reports
- xii) Carry out inspection of welded fabrications before, during and after welding including Dimensional Inspection PMI and PWHT as per the requirements of relevant standards.
- xiii) Communicate effectively orally and written and prepare reports

Details of the theoretical and practical knowledge and competency requirements along with examination procedure and requirements for each of the three levels are given as Annexure 1 to this certification scheme.

ANB India suggests that candidates undergo a training program at an ANB India Approved Training Centre, at the appropriate level as preparation for appearing for the examinations.

Pre-requisites: Qualification, experience and visual acuity requirements for candidates for access to the various levels of certification are as given below.

A) Qualification & Experience

Basic Level: The candidate should possess any of following combination of Educational Qualification and experience as tabulated below:

| Sl No | Educational Qualification | Experience |
|-------|--|--|
| 1 | Class VIII | 5 Yrs. Industrial experience out of which 3 yrs in welding area /inspection / NDT of welds |
| 2 | Class X (With Sc. &Math) / ITI (Mech.) | 3 Yrs. Industrial experience out of which 2 yrs in welding area /inspection / NDT of welds |
| 3 | Class XII / IWS/IWIP(B) diploma or an equivalent Welding Inspectors course | 2 Yrs. Industrial experience out of which 1 yr in welding technology / inspection / NDT of welds |

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| 4 | MSc/BE/ IWE/ BSc /Diploma in Engg / IWT, IWIP (S) diploma or equivalent Welding Inspectors course | 6 months Industrial experience in welding technology /inspection / NDT of welds, desirable but not essential |
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Standard Level: The candidate should possess any of following combination of Educational Qualification and experience as tabulated below:

| SI No | Educational Qualification | Experience |
|-------|--|---|
| 1 | Class VIII | 8 Yrs. Industrial experience out of which 5 yrs in welding area/ inspection / NDT of welds |
| 2 | Class X (With Sc. &Math) / ITI (Mech.) | 5 Yrs. Industrial experience out of which 3 yrs in welding area/ inspection / NDT of welds |
| 3 | Class XII / IWS /NWICS – B / IWIP(S) diploma or equivalent Welding Inspectors course | 3 Yrs. Industrial experience out of which 2 yrs in welding technology/ inspection /NDT of welds |
| 4 | BSc /Diploma in Engg. / IWT, IWIP (S) diploma | 2 Yrs. Industrial experience in welding technology / inspection / NDT of welds. |
| 5 | MSc/BE/ IWE | 1 Yr.Industrial experience in welding technology / inspection / NDT of welds. |

Advanced Level: The candidate must possess NWICS - Standard level or equivalent certification along with any of following combination of Educational qualification and experience as tabulated below:

| SI No | Educational Qualification | Experience |
|-------|--|---|
| 1 | Class X (With Sc. &Math) / ITI (Mech.) | 10 Yrs. Industrial experience out of which 5 yrs in welding area /inspection /NDT of welds |
| 2 | IWS /IWIP(S) / Class XII (with Sc & Maths) | 5 Yrs. Industrial experience out of which 3 yrs in welding technology/inspection / NDT of welds |
| 3 | BSc /Diploma in Engg. / IWT | 3 Yrs. Industrial experience out of which 2 yrs in welding technology/inspection / NDT of welds |
| 4 | MSc/BE/IWE / IWIP (C) | 2 Yrs. Industrial experience out of which 1 yr in welding technology/inspection / NDT of welds |

B) The candidate should also possess the following minimum standard of vision acuity level certified by a registered ophthalmologist / optometrist / eye specialist:

- i) Near Vision- Jaeger J2 or better with correction (not more than 12 months old)
- ii) Colour Vision- As per ISHARAS chart (not more than 12 months old).

Required code of conduct:

- Considering the importance of quality of welded fabrication and also the consequences of its failure to individual life and society, the candidate should act with complete integrity and in a professional manner in welding inspection and acceptance of the final product.
- Undertake and perform welding inspection assignments only when qualified / certified to do so.
- The candidate should behave in a professional and disciplined manner which will not affect the safety and security of his fellow members associated in the manufacturing of the final product.
- The candidates behaviour towards his/her superiors, peers and sub-ordinates should be in line with organisation’s protocol.
- The candidates shall avoid any conflict of interest with the employer or the client and shall disclose any business association or circumstance that might be so considered.

Validity of Certification

The certificate is valid for an initial period of five (5) years from the dated of certification and maybe renewed for a further period of five (5) years on application by the candidate subject to re-assessment of continued competency by ANB India. Re –certification will be required after ten (10) years of initial certification.

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