



The Indian Institute of Welding

National Welders' Training & Certification Scheme

(NWTCS)

1. INTRODUCTION

The Indian Institute of Welding (IIW) is a National Professional body for the advancement of Welding Technology in the country and was established in April, 1966. The Institute is the only **Authorised National Body of "International Institute of Welding**

The Institute is already engaged in training of welding professional personnel and **conducting AMIWI examination** which is considered as **equivalent to an Engineering Degree**, and is approved by HRD Ministry of Government of India. The Institute also conducts tailor made courses for welding professionals at various levels ranging from Welder to Welding Engineer based on specific requirements for a particular industry. IIW also assists and jointly conducts in-house welding **training** programmes in industrial establishments covering both **theoretical and practical skill** all over India.

IIW-India has also been empanelled by Government of India, DGE&T (Directorate General of Employment and Training) as an **Assessing Body for all Fabrication sector courses under their MES-SDI (Modular Employment Skills – Skill Development Initiative Scheme).**

Dearth of properly qualified and competent welders is a major problem for the Indian fabrication industry. Most welders are developed from unskilled personnel. At present welding training provided by ITIs and private training institutes is inconsistent in quality and trainees vary in competency. **No standard national certification scheme exists.**

IIW's NWTCS has been prepared to meet the demand by industry for welders, trained and certified to a level of competency commensurate with the requirements of any of the welder qualification and certification specifications or codes i.e. IS:7310 / IS:817, ISO:9606-1, BSEN:287 and ASME Sec IX/AWS D1.1.

The scheme covers requirements for **'Training & Certification' or 'Certification'** only to be operated by the **IIW National Certification Board.**

2 Demand Projection for Steel and Welders

India presently consumes about **50 mil tons of steel every year**, most of which is used for fabrication and construction activities. Steel is used for creating infrastructure – roads, bridges etc, for building power plants, petro-chemical and refinery complexes, for railways rolling stock & track, manufacturing ships, locomotives and cars etc.

A major process used in fabrication is welding. The process is used in fabricating everything we see around us like buildings, bridges, flyover, cars, locomotives & coaches, ship, airplanes, general machineries, consumer durables and defense equipment. In fact for **every ton of steel used about 5 kg of weld metal is required** to be deposited by different welding processes.

The sustainable level of per capita consumption of steel is about 300kg/person/year in a developed economy. When a country is in infrastructure creation mode, the consumption goes up even to 1,000 kg/person/year and finally may stabilise at around 300 kg. The per capita steel consumption for **China is 220 kgs** and that for **South Korea is as high as 950Kg** presently. Compare this with **India's steel consumption of 35 kg/person/year**

The global economic downturn has affected earlier growth projections in all core sectors especially the investment plans in steel production. However the latest CII survey indicates a reversal of the trend in manufacturing sector with growth in steel sector. The declared Government plan of massive priority investment in infrastructure and construction requiring much more steel consumption. The

conservative estimate of steel consumption in India getting **doubled to 100m.mt by 2018** even if delayed by few years may not be able to meet the hunger for steel for a developing Indian economy.

Advancement in technology demands use of improved quality, higher tensile and low corrosion steels, increased large scale use of stainless steel in construction & transportation segment including railways and use of other materials of construction & fabrication. Need for environment, health and productivity consideration is quickly changing the fabrication & construction procedure dramatically.

Obviously, there will be a corresponding growth in welding activities. There is a great demand for qualified and knowledgeable welders and other related skilled professionals in fabrication and construction industries, **such that expert welding professionals have become a 'precious commodity' all over the world.**

3 SCOPE OF THE SCHEME

- The scheme defines the requirements for IIW to certify welders at different skill levels **Basic, Standard & Advanced.** for **MMAW (SMAW), GTAW & GMAW** processes
- Also the theoretical and practical training facilities and program requirements for a Welders Training Institute to be approved as an **IIW Approved Training Institute (IIW ATI)** to operate the Scheme in two parts
 - ◆ **Part 1** – Main Scheme which defines curriculum and certification requirements for different courses along with ATI requirements
 - ◆ **Part 2** – Provides lesson plan and course notes to IIW ATIs for delivery of the training

4 FEATURES OF THE SCHEME : TRAINING & CERTIFICATION

- Provides theoretical and practical curriculum for each course
- Specifies viva-voce test for theoretical assessment of MMAW basic level and objective type written tests for standard and advanced level MMAW, GTAW and GMAW courses
- Provides practical test requirements for certification against each course
- Specifies form for recording welder test details (WPS + PQR)
- Specifies criteria for acceptance of test pieces.
- Certification tests to be conducted by IIW Authorised examiners
- Trainees at an IIW ATI may continue from a lower level course to a higher level course through internal assessment of the ATI for final certification test by IIW examiner
- Specifies National Register of IIW certified welders to be maintained

5 BENEFITS

Welders Career: Welding is a widely used skill offering opportunities for careers in the fabrication and construction industries as well as for self employment in small scale enterprises. People starting out through practical welding qualifications can achieve high level of welding skills which are greatly sought after. The scheme is specifically designed for large number of pre-school leaving candidates who are unable to continue with formal education and opportunity to build alternative careers. The National Welders' Training and Certification Scheme (NWTCS) will make the qualified welders better acceptable to industry all over India and open up opportunity and mobility throughout the country.

ATI - Approved Training Institute: By adopting the IIW National level welding Training & Certification scheme along with the technical collaboration from IIW, will enable the ATI to improve the consistency of training programme to acceptable national level. This is an opportunity for all welding training institutes in the country to standardise their training syllabus and award certificates to their trainees under the IIW banner, which will have immediate industry recognition and acceptance. The students are likely to be attracted to training institutes which provide quality training acceptable all over India for employment.

Industry: The NWTCS to be administered by Indian Institute of Welding will provide a pool of welding personnel at grass-root level trained to a uniform minimum National standard for the industry with known degree of required skill and knowledge. This will enable industry to meet their human

resource requirement for skilled welders without worrying about quality and fulfil relevant IS standards and other international standards to ensure continued business in a highly quality & cost competitive market.

6 APPROVED TRAINING INSTITUTE (ATI) : IIW REQUIREMENTS

Approved Training Institutes (ATI) are to be approved through an extensive process of verification to ensure the existence of minimum required facility to impart the training by authorised representative of the National Certification Board of IIW. Further, periodic audit / reviews will be conducted to ensure compliance with the scheme requirements.

Workshop: The range of welding and auxiliary equipment must reflect the welding processes and must be in sufficient quantity for imparting training and practice, providing plates, material and consumables etc. All the facilities required must cover the required number of students. The welder training workshop has to include the required number of training booths. The booths are to be fully equipped for training, have correct ventilation and correct screening to protect other workers.

Class Rooms: The ATI must have well ventilated class rooms with teaching aids, and employing adequately qualified teachers and instructors with administrative support. The academic environment must encourage learning process with availability of books, videos of processes as available and other learning aids.

Course approval: The approval of an ATI and the courses they are authorised to conduct is the responsibility of the NCB of the Indian Institute of Welding. A course is approved with respect to the programme, the team of instructors, course materials, facilities and equipment on successful completion of proper inspection, on the basis of application received from the ATI. To ensure quality of training the maximum number of trainees should be restricted to 30 maximum per course.

Faculty: The ATI will conduct courses by duly qualified persons, designed to prepare candidates for examinations and qualifications of welding personnel to (NWTCS) Standard. This will enable the welders after acquiring required skill & practice to exercise option to obtain certificate as per IIW scheme.

7 PROCEDURE FOR BECOMING AN APPROVED TRAINING INSTITUTE

1. The intending training Institute may contact the nearest IIW branch, the Regional Director-IIW at South & West or the Executive Director at Kolkata Head Quarter for details.
2. A Brochure will be provided free of cost along with an Application Form
3. The intending Training Institute has to submit the properly filled up "Application for Becoming an Approved Training Institute-IIW FORM" with details of the facilities, the courses to be conducted etc. along with Xerox copy of any document as required along with a nominal Application Fees.
4. IIW will organise a formal scheduled inspection of the training facilities by a IIW authorised Inspector and they will also assist the potential ATI by pointing out any facility requiring improvement.
5. After satisfactory inspection of the training establishment, IIW will formally intimate the potential ATI. The applicant Institute is required to pay the one time specified Registration Fees to IIW.
6. An Agreement will be executed between the applicant training Institute and IIW detailing the rights and obligation of the signing parties. The legally authorised signatories will be required to sign the Agreement on behalf of each party respectively
7. Clauses in the the Agreement include all essential operational and administrative requirements, conduct of examination and test, record keeping, maintenance of Confidentiality, Statutory Compliance, Non-Transferability of Registration, conditions for Termination, Jurisdiction etc
8. The ATI will be provided with a free copy of detailed Scheme on NWTCS for implementation.
9. The Registration is subject to renewal every 5 years on application by ATI & review by IIW.
10. The course approval is valid for a period of 12-months from the date of issue of the certificate & may be extended on a year to year basis at the request of ATI and discretion of IIW-India'

8 COURSE ELIGIBILITY

- Minimum class VIII pass with knowledge in regional language and basic English vocabulary for all levels and processes.
- However, students who have completed Class X / School Leaving Examination will have advantage in the learning process for both Standard and Advanced courses of MMAW, GTAW & GMAW.
- Pass at one level qualifies the trainee for access to next level of course in an IIW ATI.
- Lateral entry to Standard / Advanced level courses available for experienced welders, subject to internal assessment of Basic / Standard level course requirements by the IIW ATI
- Decision of IIW ATI on eligibility once reviewed by the IIW Certification Board is final

8 COURSES OFFERED

Sl. No.	Course Name	Material	Course Code	Duration
7.1.1	MMAW Basic Level	Carbon Steel	MMAW-B	6 weeks
7.1.2	MMAW Standard Level	Carbon Steel	MMAW-S	3 weeks
7.1.3	MMAW Advanced Level	Carbon Steel	MMAW-A	3 weeks
7.2.1	GTAW Standard Level	Carbon Steel & Stainless Steel	GTAW-S	3 weeks
7.2.2	GTAW Advanced Level – Module I	Carbon Steel & Stainless Steel	GTAW-A 1	2 weeks
7.2.3	GTAW Advanced Level – Module II	Aluminium	GTAW-A 2	2 weeks
7.3.1	GMAW Standard Level	Carbon Steel & Stainless Steel	GMAW-S	3 weeks
7.3.2	GMAW Advanced Level – Module I	Carbon Steel & Stainless Steel	GMAW-A 1	2 weeks
7.3.3	GMAW Advanced Level – Module II	Aluminium	GMAW-A 2	2 weeks

The recommended duration for the different courses as given above are indicative only and will depend upon the actual facilities available with the ATIs, the duration of theoretical and practical instruction every week and the capacity and motivation of the students to absorb the instructions and learn.

The durations indicated are based on full time course with about 42 hours of theory teaching and practical every week with adequate infrastructure support.

Training in gas welding and cutting specified in MMAW basic course and Brazing and Braze Welding in MMAW standard course curriculum, although these are not included in certification requirements.

Optional provision of training in FCAW process on carbon and stainless steels is given in GMAW advanced level curriculum although this is not included in certification requirements.

9 NWTCS EXAMINATION AND ASSESSMENT

The ATI has to carry out regular internal assessment of the candidates who are required to maintain lesson notes and record of their Practical exercises.

After completion of each course, the trainee welders will be assessed by Qualification tests and theory / oral tests by an IIW Authorised Examiner / competent authority delegated by the Indian Institute of Welding.

By mutual agreement between the ATI and Indian Institute of Welding the lower level examination may be combined with a higher level course for examination and testing.

Practical Skill testing as per the scheme will be tested as per procedure to be laid down in Section 13 and checked and inspected by IIW Authorised Examiner. A fee is payable to Indian Institute of Welding for examination and certification of each candidate for various processes and levels.

10 CERTIFICATION TEST REQUIREMENT

- Detailed requirement with for each process, type of weld joint & size, position and materials are codified and testing method for visual, NDT and mechanical are fully specified.
- Examination and testing is carried out under supervision of fully qualified IIW examiner or a qualified person duly delegated and authorised to act as examiner.

Certification tests for test coupons in MMAW process

Courses	Tests Conducted	Position of Welding	Size
MMAW Basic Level Fillet weld Joints in C.S. plate	a. Macro Examination: 2 test pieces. b. Fillet Weld Fracture Test: 3 test pieces.	3F (PF) & 4F (PD)	Thickness = 6 mm 100x125 mm
MMAW Standard Level Butt Joints in C.S. plate	a. Radiographic Examination. b. Root Bend Tests – 2 Nos. c. Face Bend Tests – 2 Nos.	3G (PF) & 4G (PE)	Thickness = 16 – 20 mm 200x225 mm (Preferable 300x250 mm)
MMAW Advanced Level Butt Joints on C.S. pipe	a. Radiographic Examination. b. Root Bend Tests – 2 Nos. c. Face Bend Tests – 2 Nos.	5G (PF) & 6G (H-L045)	D = 125 – 150 mm Total Length = 200-225 mm Thickness = 10-12 mm

Certification tests for test coupons in GTAW process

Courses	Tests Conducted	Position of Welding	Size
GTAW Standard Level Butt Weld on C.S. pipe – Root by GTAW and subsequent runs by MMAW	a. Radiographic Examination. b. Root Bend Tests – 2 Nos.	5G (PF)	114.3 O.D x 4 to 5 mm thickness
GTAW Standard Level Fillet Weld on S.S 304 plate	Visual Examination	2G (PC) & 4G (PE)	Thickness = 2 to 3 mm
GTAW Advanced Level Butt Weld on Carbon Steel pipe	a. Radiographic Examination. b. Root Bend Tests – 2 Nos.	6G (H-L045)	114.3 O.D x 3 to 4 mm thickness
GTAW Advanced Level Butt Weld on S.S. 304 pipe	Radiographic Examination.	6G (H-L045)	88.9 O.D x 4 to 5 mm thickness
GTAW Advanced Level Butt Weld on Aluminium pipe	Radiographic Examination.	2G (PC) & 5G (PF)	88.9 O.D x 4 to 5 mm thickness

Certification tests for test coupons in GMAW process

Courses	Tests Conducted	Position of Welding	Size
GMAW Standard Level Butt Weld on C.S. plate	a. Radiographic Examination b. Root and Face Bend Test	2G (PC) & 4G (PE)	Thickness = 5 – 10 mm Size = 200 x 225 mm Preferable: 300 x 250 mm
GMAW Standard Level Fillet Weld on S.S. Plate	a. Fillet Weld Fracture Test- 3 test pcs. b. Macro Etch test- 2 test pcs.	3F (PF) & 4F (PD)	Thickness = 5 – 6 mm Size = 100 x 150 mm
GMAW Advanced Level Butt Weld on C.S. plate with solid wire using CO2 gas	Radiographic Examination.	2G (PC) & 4G (PE)	Thickness = 5 – 8 mm Size = 200 x 225 mm Preferable: 300 x 250 mm
GMAW Advanced Level Butt Weld on S.S. plate with solid wire using Argon - O2 gas	Radiographic Examination.	2G (PC)	Thickness = 5 – 10 mm Size = 200 x 225 mm Preferable: 300 x 250 mm
GMAW Advanced Level Butt Weld on Aluminium plates	Radiographic Examination.	2G (PC) & 4G (PE)	Thickness = 5 – 8 mm

11. FEES & REGISTRATION CHARGES

ATI Registration: ATIs are required to pay a one-time fee for approval and registration to be renewed every 5 years. A part of the Registration Fees may be payable in advance along with the Application and before undertaking inspection by IIW authorised Inspector.

Lesson Plan & Course Notes: IIW-India, may provide lesson plans & Course Notes for the individual ATIs, if required to the ATI against fees.

Examination & Certification: A fee depending on the course & level is payable to Indian Institute of Welding by ATI for examination and certification of each candidate for various processes and levels.

IIW Branches in India

List of IIW-India Approved Training Institutes under National Welders' Training and Certification Scheme (NWTCS)

- M/s. Jagannath Institute of Technology & Management**
R. Sitapur, Alluri Nagar, Parlakhemundi, Orissa – 761 200
Cell: +91 9437619974 / Email: alisadat@rediffmail.com
Contact Person: Mr. Mir Sadat Ali, Asst. Professor
 - Om Sai Fabrications And Training Centre Private Limited**
Plot No.102, SIDCO Industrial Estate, Kakkalur, Thiruvallur, Chennai - 602 003
Tel: +91 44 2766 6512 / Email: omsai_placement@rediffmail.com
Contact Person: Mr. Mohan Rao. M.
 - Sri Ramakrishna Advanced Training Institute**
Sri Ramakrishna Polytechnic Campus, Vattamalaipalayam,
N.G.G.O. Colony Post, Coimbatore – 641 022
Cell: +91 9884108012 / 96004 99225 / Email: saran_cwi@hotmail.com
Contact Person: Mr. G. Saravanan, Tech. Mgr.
 - Advance Inst. of Welding Technology**
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Contact Person: Mr. V. Rajasekar
 - Quivan (India) Technical Institute**
N. N. Samaddar Road, Talbanda, PS:Ghola (Sodepur), Kolkata–700110
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Contact Person: Mr. S. K. Gupta, CEO
 - Institute of Precision Fabrication Technology (A Divn. Of Rishi Technical Services)**
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Contact Person: Mr. Ramesh V. Koti, Manager (Technical Training)
 - Ebrahim Bawany Technical Institute**
Near Old Jakatnaka Ajwa Road, Vadodara – 390019, Gujarat
Cell: +91 9825324389 Email: mbrathod2007@yahoo.com
Contact Person: Mr. M. B. Rathod
 - ESAB Welding Institute**
C/o. ESAB India Limited, P-41, Taratala Road, Kolkata – 700 088, West Bengal
Tel: +91 33 2401 9381 / Email: prabirkumarroy@esabindia.com
Contact Person: Mr. Prabir Kumar Ray, Manager
- Interested candidates are requested to contact these IIW-India Approved Training Institutes for various courses viz. Manual Metal Arc Welding (MMAW), Gas Tungsten Arc Welding (GTAW), and Gas Metal Arc Welding (GMAW) in Basic, Standard and Advanced level.*

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