American Welding Society
INTERNATIONAL AGENT

BETZ ENGINEERING & TECHNOLOGY ZONE

Educational & Research Division

American Welding Society

Certified Welding Engineer Part # 1& 2 and 3&4

Certification Program for the Year - 2017

Authorised International Agency:

BETZ ENGINEERING & TECHNOLOGY ZONE

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ASNT Corporate Partner

BETZ ENGINEERING & TECHNOLOGY ZONE

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About Us…

BETZ Engineering & Technology Zone is an accredited International Agency for American Welding Society, Florida, U.S.A., to conduct Seminars and Certification Programs for AWS in India and Worldwide. BETZ is an ISO 9001:2008 company, also BETZ is the Only 'ATF – Accredited Test Facility" of AWS to evaluate and certify welders in India.

The AWS-CWEng. Certification is one of the most reputed stamps of approval of any engineering industries. Industry professionals who qualify for AWS-CWEng are highly regarded and recognized throughout the welding and QA/QC segment, because this certification adheres to the highly documented level of capability.

Month	Seminar City	Seminar Dates		Exam Date	Exam City
		Part#1&2	Part#3&4		
January	Chennai	24 to 30		31st January'17	Chennai
February	Chennai		21 to 27	28th February'17	Chennai
March	Chennai	24 to 30		31st March'17	Chennai
April	Chennai		23 to 29	30th April'17	Chennai
May	Chennai	24 to 30		31st May'17	Pondicherry
June	Chennai		23 to 29	30th June'17	Coimbatore
July	Chennai	24 to 30		31st July'17	Pondicherry
August	Chennai		24 to 30	31st August'17	Pondicherry
September	Chennai	23 to 29		30th September'17	Chennai
October	Chennai		24 to 30	31st October'17	Coimbatore
November	Chennai	23 to 29		30th November'17	Chennai
December	Chennai		22 to 28	29th December'17	Chennai

As the slots are limited to Four Candidates per seminar the allocation would be on

" FIRST COME – FIRST SERVED" basis

You are invited to make use of this opportunity and we look forward to interact with you during this Technical Qualification Program.

Thanks and Regards
RG.Ganesan
9840175179

American Welding Society-Certified Welding Engineer

A person with AWS Certified Welding Engineer certification have demonstrated their skills for preparing or reviewing written instructions for the production of welded joints. They are thoroughly familiar with various codes, specifications, standards and other aspects of fabrication and assembly.

The CWEng often prepares and produces reports, which accurately reflect professional judgment and is able to work with management representatives, inspection personnel, welders and support crafts, understanding the integrated role of each in the development of weldments

The pivotal role of engineers: pre-production to final completion

The welding engineer[1]s activities begin before production or construction welding begins and continues through the production process…ending when the production process is complete. Each employer is responsible for defining the specific duties of the CWEng in their place of employment

Eligibility

In order to qualify for a certified welding engineer the candidate must be an individual

- Having Bachelor of Engineering (B.E) degree and a minimum of one (1) year relevant experience.
- Having Bachelor of Technology (B.Tech.) degree and a minimum of two (2) years relevant experience.
- Having other related Bachelor of Science (B.Sc.) degrees and a minimum of five (5) years of relevant experience.
- Having an Associate in Applied Science (A.A.Sc.) degree and a minimum of ten (10) years of relevant experience.
- who have successfully completed high school or an equivalent program and a minimum of fifteen (15) years relevant experience.

Seminar Pattern – Parts # 3&4

These Seven days course focuses on the knowledge in welding related disciplines and practical welding related applications.

Part 3 – Welding Related Disciplines (Essay Exam)

3 days seminar will be conducted to cover the NDE/Weld Discontinuities, Welding Heat Sources and Arc Physics, Welding Processes and Controls, Welding and Joining Metallurgy, Weld Design, Brazing and Soldering.

Part 4 – Practical Welding and Related Applications

3 days seminar will be conducted to cover the Welding safety, weldment design, welding metallurgy, materials, welding process selection, NDE including visual weld inspection, quality assurance, quality control in accordance with codes, specifications, other standards, and/or drawings.

- 1 day will be totally dedicated to discussion & review of parts – 3 and 4.

Part #3 – Welding Related Disciplines (Essay Exam)

NDE/Weld Discontinuities:

- NDE processes (radiographic, ultrasonic, magnetic particle, liquid penetrant, Eddy Current, etc.—characteristics, advantages and limitations)
- NDE symbols

Welding Heat Sources and Arc Physics:

- Power Source Static and Dynamic Characteristics (open circuit voltage and short circuiting current, slope)
- Differences Between CC And CV Designs (principle of self- adjusting)
- Welding Arc Characteristics (current and voltage relationship, arc length effect)
- Electron Emission (ionization potential, work function, electrode material, shielding gas and arc stability)
- Arc Temperature and Degree of Ionization (shielding gas influence)

- Magnetic Arc Blow (work lead location and condition)
- Lorentz Force (effect on droplet detachment and on adjacent power cables)
- Shielding Gas Drag Force (effect on droplet detachment and metal transfer mode) weld penetration and width for different shielding gases.

Welding Processes and Controls:

- Arc Welding Processes (SMAW, GMAW, FCAW, GTAW, SAW, PAW)
- Resistance Welding Processes (RW, high frequency RW), high energy density welding processes (LBW, EBW)
- Cutting Processes (OFC, CAC, and PAC)
- Surfacing Processing (SW, THSP)
- Solid-State Welding Processes (FRW, FW

Welding and Joining Metallurgy:

- Crystal Structure of Metals (FCC, BCC, HCP, unit cells, lattice parameter, c/a ratio, atom positions, interstitial positions)
- Melting and Solidification, Phase Transformations and Phase Diagrams (eutectic, eutectoid, peritectic and monotectic, lever rule calculation) metallurgy and weldability of typical engineering materials (low carbon structural steels, cast irons, stainless steels, nickel alloys, aluminum alloys, titanium alloys, etc.) microstructure (e.g., ferrous alloys—grain boundary ferrite, acicular ferrite, bainite, martensite, austenite, delta ferrite, etc.) and mechanical properties
- Carbon Equivalent (CEIIW, Pcm, expressions, alloying content and carbon content effect)
- Hydrogen Assisted Cracking (heat-affected zone cracking, cold cracking) base metal matching (e.g., electrodes with high strength steels)
- Solidification cracking (segregation of impurity atoms, shrinkage cracking, lamellar tearing)
- Delta Ferrite in Stainless Consumables, Specifications for Consumables (categories; all position, rutile, basic)

- Flux metal Reactions (oxygen and sulfur control in weld pool)
- Typical Temperature Range of a Heat Source
- Temperature Distribution in a Weldment
- HAZ Formation
- Multi pass Thermal Experience, Reheated Weld Metal Properties
- Weld Macro and Micro-Graph Interpretation
- Solidification Profile and Preferred Grain Orientation (epitaxial growth)
- Origin of Weld Ripples
- Special Attributes of Base Metal (as-cast structure, deformation texture and oxide on flame cut surfaces
- Thermal Treatments (preheat, post heat, inter pass influence on weld cooling rate and residual stress distribution)
- Solid-State Transformations in Welds (different forms of ferrite, bainite, and martensite, sigma phase in stainless steels, Guinier-Preston type precipitates zones and ageing in aluminum alloys)
- Corrosion (sensitization in stainless steel welds and stress corrosion cracking in welds)

Weld Design:

- Structural fabrication requirements, sectional properties and stress gradient
- Stress triaxiality, weld symbols, hardness and microhardness (e.g., across a weld cross section)
- Tensile properties, ductility, toughness, fillet break test (influence of second phase and porosity), ductile fracture, brittle fracture, fatigue (initiation, propagation, failure, high-cycle, low-cycle), temperature and strain rate effect.

Brazing and Soldering:

- Characteristics of Brazing and Soldering
- Fluxes and Substrates
- Capillary Action

- Wetting and Spreading
- Contact Angle
- Joint Clearance
- Viscosity
- Liquidus and Solidus
- Flow of Molten Filler in Horizontal and Vertical Joints (Maximum Penetration and Rate)
- Filler Metal Systems (Sn-Pb solders, Ni and Cu based alloys, Ag-Cu based brazing alloys)
- Intermetallic Compound Formation

Safety:

- Recognize health hazards relating to welding (fumes, toxic gases, noise and radiation)
- Recognize safety hazards (electric shock, compressed gases, fire, welding in a confined space, welding on Containers, piping and moving equipment)
- Recognize precautions to avoid injury
- Possess a working knowledge of safety and fire codes

Part #4 – Practical Welding and Related Applications

Exam using references on the application of welding engineering concepts in the areas of:

Welding safety, Weldment design, Welding Metallurgy, Materials, Welding Process Selection, NDE including Visual Weld Inspection, Quality Assurance, Quality Control in Accordance With Codes, Specifications, other Standards, and /or Drawings.

Registration Process.

All the registrations are to be completed preferably 5 weeks prior to the commencement of seminar with full payment to avoid disappointment. For more information call us on 9840175179 / 9551665681.

E-mail: registration@welding-certification.com / betzzone@vsnl.net. Upon completion of registration process, candidates can collect their soft copy of study materials and AWS QC1:2007 certification handbook. This will help candidates to start their preparations immediately.

Mode of payment:

The seminar fees for Parts-1 and 2 as mentioned below can be given as D.D drawn in favour of "BETZ ENGINEERING & TECHNOLOGY ZONE" payable at Chennai, India.

For the examination fee to be given in US$, a separate D.D. drawn in favour of "American welding society" payable at Florida, USA, Should be submitted.

Fees Detail for Parts- 1 &2	
Seminar	Rs.40,000/-*
Examination	US$750
* **Service Tax: 6000/-**	

Training Venue

All seminars will be conducted in our own state of the art training & research division situated in 12000 Sq.ft. premises.

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ALL THE BEST