



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

### *Admin Office*

Door#74, Jeevan Nagar 1<sup>st</sup> Street  
Adambakkam, Chennai-600088, Indian  
Phone: 65364123/22670206, Mobile: 9551665681/9551665683  
E-mail: [registration@welding-certification.com](mailto:registration@welding-certification.com), [betzzone@vsnl.net](mailto:betzzone@vsnl.net)  
[www.welding-certification.com](http://www.welding-certification.com)

### *Training Facility*

Door # 21, Dharakeshwari Nagar 1<sup>st</sup> Street,  
Sembakkam, Tambaram to Velacherry Main Road,  
Chennai – 600073, India.  
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## 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		31 <sup>st</sup> January'17	Chennai
February	Chennai		21 to 27	28 <sup>th</sup> February'17	Chennai
March	Chennai	24 to 30		31 <sup>st</sup> March'17	Chennai
April	Chennai		23 to 29	30 <sup>th</sup> April'17	Chennai
May	Chennai	24 to 30		31 <sup>st</sup> May'17	Pondicherry
June	Chennai		23 to 29	30 <sup>th</sup> June'17	Coimbatore
July	Chennai	24 to 30		31 <sup>st</sup> July'17	Pondicherry
August	Chennai		24 to 30	31 <sup>st</sup> August'17	Pondicherry
September	Chennai	23 to 29		30 <sup>th</sup> September'17	Chennai
October	Chennai		24 to 30	31 <sup>st</sup> October'17	Coimbatore
November	Chennai	23 to 29		30 <sup>th</sup> November'17	Chennai
December	Chennai		22 to 28	29 <sup>th</sup> 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

## **BETZ ENGINEERING & TECHNOLOGY ZONE**

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### **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'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.

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### Exam pattern

The AWS Certified Welding Engineer (CWEng.) examination consists of four parts. Parts 1 and 2 must be successfully completed in order to take Parts 3 and 4. The first two parts (1 and 2) of the exam are closed book and covers fundamentals of basic science and applied science. Exam will be of two hours for each part of written type with multiple-choice questions (total time of four hours). Part 1 consists of 35 questions of multiple choice and Part 2 has 25 questions of multiple choice. Both the Parts are given together and must be passed together. If the candidate fails in any one part, only that part must be repeated.

Examinations for Parts 3 and 4 are open book examinations on welding related disciplines and practical welding and related applications. Each examination is three hours in length ( Duration). Part 3 has 45 questions of essay type. Part 4 has 39 questions of multiple choice type. Candidates that successfully pass Parts 1 and 2 will be invited to sit for Part 3 and Part 4 examinations and a separate application must be submitted to AWS.

Candidates must pass each of the four examinations with an individual score of not less than 60% and attain a minimum weighted percentage of 70% for all 4 Parts.

### **Seminar Pattern – Parts # 1&2**

This Six days course focuses on the fundamental knowledge in Basic Sciences (Part #1) of Mathematics, Physics, Chemistry and applied sciences of (Part # 2) strength of Materials, Heat Transfer & Fluid Mechanics and Electricity.

- 2 days seminar will be conducted to cover the fundamentals of basic sciences of Part-1 examination that covers all the facets of AWS B5.16, knowledge of mathematics, physics and chemistry.
- 3 days seminar will be conducted to cover the Applied science fundamentals of Part-2 examination that covers the area of strength of materials, heat transfer, fluid mechanics and electricity.
- 1 day will be totally dedicated to discussion & review of Parts-1 \and 2.

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### Part #1 – Basic Science Fundamentals

#### **Mathematics:**

- Simple Calculations (multiple choices)
- Special Functions (exp, log)
- Trigonometric Functions (sin, cos, tan, cot, sec, csc, degrees, radians)
- Algebraic Equations (linear, quadratic, polynomial)
- Graphs And Equations (slope, intercept, roots, derivatives, minimum, maximum, interpolation and extrapolation)
- Geometry (common geometric shapes)
- Hyperbola, Parabola
- Complex Numbers
- Calculus (fundamentals of differential equations)
- Statistics (population and samples: normal distribution, mean, standard deviation and variance)
- Simple correlation: linear regression via least squares method, r2 correlation)

#### **Physics:**

- Unit Conversion (dimension, mass, temperature, time, energy, power)
- Mass, Weight, Volume, Density
- Force, Energy, Work Done, Power
- Stress, Strain, Hooke's Law (elasticity)
- Moment And Momentum
- Temperature, Heat, Temperature Measurement, Thermocouples, Pyrometers
- Thermal Properties of Materials (Thermal Conductivity, Thermal Expansion, Thermal stress and strain)

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### Chemistry:

- Symbols (elements and inorganic compounds—gases, fluxes, etc.)
- Molecular Weight and Stoichiometry
- Acids and Bases
- Balance Chemical Equations
- Gas Combustion Reactions (chemical heat generation) and oxidation-reduction reactions
- Ideal Gas Law (pressure, volume, temperature)
- Mass Balance (as in E7018 coating decomposition to gas, slag and metal)
- Bulk and Chemical Analysis Methodologies
- Reactivity, Toxicity, Environmental Effect, Disposal.

### Part #2 – Applied Science Fundamentals

#### Strength of Materials:

- Load, Deformation (elastic and plastic, buckling), Stress- Strain, Young's Modulus, Shear Modulus, Stress- Strain Curve (yield stress, ultimate tensile stress, elongation) and tensile stress
- Shear stress computation
- Welded member cross-section effect
- Mechanical testing (tensile, bend, fracture toughness, hardness, creep, and fatigue) and data interpretation
- Law of Conservation of Energy/Momentum
- Stress analysis
- Typical engineering material properties

## **BETZ ENGINEERING & TECHNOLOGY ZONE**

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### **Heat Transfer and Fluid Mechanics:**

- Heat Conduction, Convection and Radiation, Thermal Conductivity and Diffusivity, Heat Transfer Coefficients of Engineering Materials and Fourier's Law
- Heating Rate and Cooling Rate
- Industrial Heating Methods, Power Consumption and Gas Flow Rates
- Laminar and Turbulent Flow (reynold's number), Dew Point and Relative Humidity, Pressure and Regulators
- Venturi Effect and Gas Velocity Calculation
- Atmospheric Pressure and Hyperbaric Conditions
- Vacuum Equipment and Measurements

### **Electricity:**

- Current, Voltage, Resistance, Impedance and Circuits
- Ohm's Law
- Kirchhoff's Law
- Resistance Loss and Current Rectification
- Power Generation
- AC/DC, polarity
- Power Factor
- Electromagnetic Properties
- Right-Hand Rule
- Current and Voltage Measurements (devices and principles)

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### 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](mailto:registration@welding-certification.com) / [betzzone@vsnl.net](mailto: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.30,000/-*
Examination	US\$750
A/C.Accommodation Charges	Rs.5000/-
* Service Tax: 4500/-	

### 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**