



Certified Composites Technician CCT

Candidate Handbook

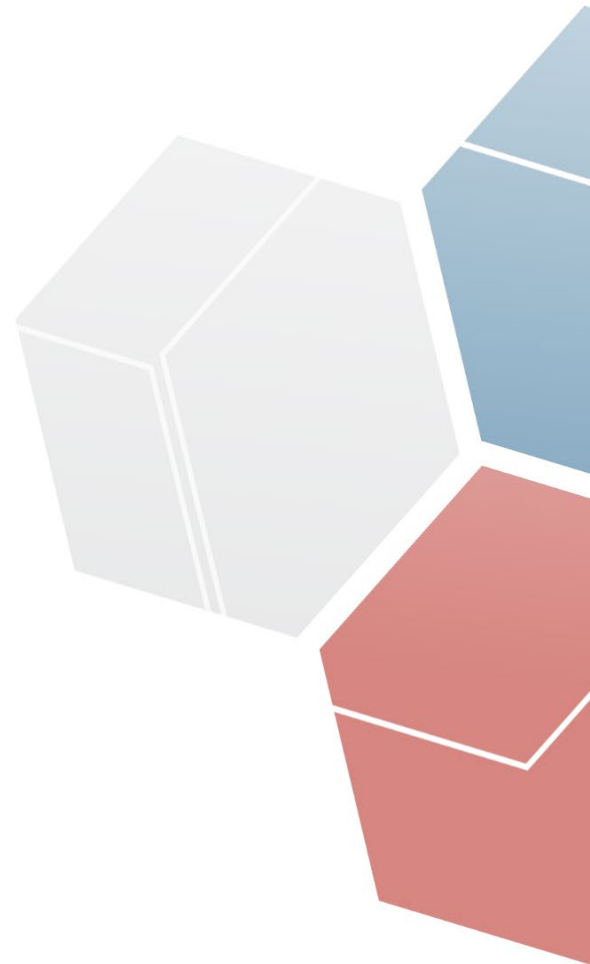
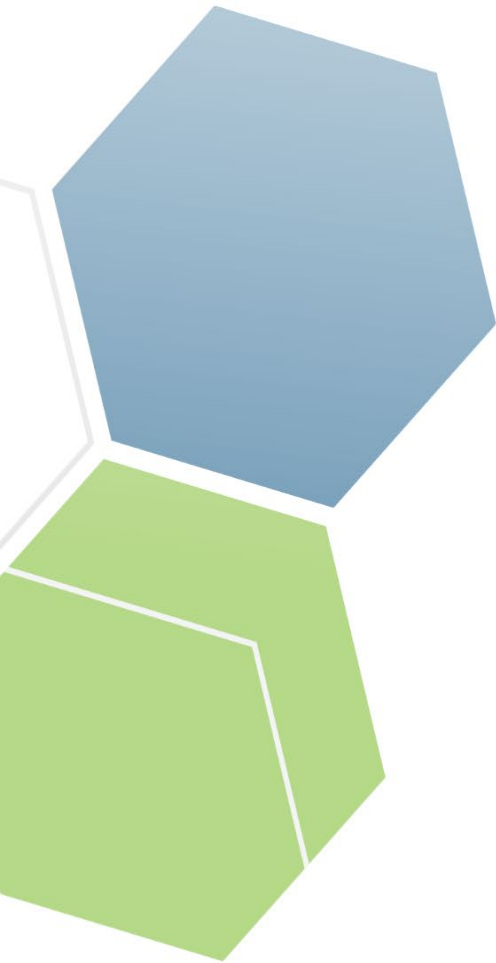




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Introduction

About the CCT Credential

ACMA's Certified Composites Technician (CCT) credential is the leading certification for professionals working with composites. The certification validates your expertise and demonstrates your commitment to professional growth in the composites industry.

About the American Composites Manufacturers Association (ACMA)

The American Composites Manufacturers Association (ACMA) is dedicated to helping composites manufacturers prosper by supporting the industry in delivering composite technologies that make structures more durable, transportation more efficient, and consumer and industrial goods higher performing, all while minimizing their environmental footprint and supporting the workforce that delivers them.

ACMA drives the growth of all industry segments by delivering leading composite material solutions through expert advocacy and strategic communications, education, networking, workforce development, and technical expertise and standards development.

ACMA strives to be the voice and protector for the composites industry and the essential driver of growth, providing an open forum for information exchange, discussion, and collaboration that benefits all.

- **Shared Voice:** ACMA convenes the industry and is the trusted voice to advance a strong, collaborative composites industry with respected policy experts, industry leaders, and advocates, along with industry-leading data.
- **Science:** Our leadership of the industry is predicated on the foundation of strong science, ensuring that composite technology is always viewed as an innovative, reliable, responsible, and sustainable industry.
- **Standards:** Incorporating composites into the work of established standard-developing organizations will ensure a regulatory framework that supports the composites industry in delivering the material solutions that enable growth.
- **Support:** Our team is committed to providing a range of activities to support the growth of our industry through education, representation, events, and public affairs.
- **Service:** An association is nothing without its members, and we will provide a superior level of service to meet their needs.

Section 1: ACMA CCT Requirements

Summary

ACMA has developed the Certified Composites Technician (CCT) program to establish clear standards for eligibility, ensuring a fair and impartial certification process for all applicants. Each eligibility requirement is designed to guarantee that certified individuals possess the knowledge and proficiency needed to meet the high standards of the composites industry.

The CCT program is a comprehensive training and certification initiative for professionals working in composites manufacturing and application. The program includes a series of targeted study modules, each designed to focus on critical aspects of composites technology and processes. Candidates must complete the designated study materials and pass a proctored exam to achieve certification, demonstrating their expertise and commitment to industry excellence.

To obtain the CCT credential, individuals must:

- Be 18 years of age or older.
- Have relevant work experience or an educational background in composites or a related field.
- Adhere to ACMA's enrollment procedures.

Exam Requirement

Candidates must earn passing scores of at least 80% on any of the CCT proctored exams.

Section 2: Preparing for the CCT Exams

Summary

The time required to prepare for the CCT exams varies based on the candidate's background and experience in the composites industry. To support candidates in their exam preparation, ACMA provides a recommended 6-week study schedule to guide individuals through the learning process. This schedule can be downloaded from the CCT program pages on the ACMA website at <https://acmanet.org>.

ACMA offers a variety of study materials to help candidates succeed in the CCT certification exams, including detailed study guides, digital training modules, and online practice exams designed to reinforce key concepts.

CCT Modules Overview

The study modules included in the CCT program study guides are tailored to provide a comprehensive understanding of composites manufacturing and application processes. Below is a breakdown of the core topics covered in the Basic Composites modules, which serve as the foundation for all CCT certifications:

Basic Composites Modules

- Module 1: Overview of Composites
- Module 2: Materials
- Module 3: Composite Material Components
- Module 4: Composites Manufacturing Processes
- Module 5: Composites Manufacturing Safety

Depending on the specific CCT pathway selected, candidates will receive an additional study guide and modules aligned with the technical content for their chosen area of focus, such as Open Molding, Vacuum Infusion Process (VIP), Light Resin Transfer Molding (LRTM), Compression Molding, and more. These pathway-specific materials build on the foundational knowledge provided in the Basic Composites modules and delve deeper into specialized techniques and applications within each discipline.

By studying both the core and pathway-specific modules, candidates gain a comprehensive skill set tailored to their professional needs in the composites industry.

Practice Questions

At the end of the modules, candidates can review key questions in each study guide to assess their readiness for the final certification test.

By thoroughly engaging with the study materials and following the suggested preparation schedule, candidates can build the knowledge and skills necessary to earn their CCT certification and advance their careers in the composites industry.

Section 3: Exam Administration

Exam Formats

The Certified Composites Technician (CCT) exams are delivered through a proctored online examination system. Each closed-book exam consists of 100 multiple-choice questions designed to assess a candidate's knowledge and understanding of composites manufacturing processes, materials, and safety.

Candidates are allocated two (2) hours to complete the exam. A minimum score of 80% is required to pass.

Exam Fees

The exam fee is \$310 for ACMA members and \$430 for non-members.

Exam Delivery

The exams are conducted online via ACMA's Education Hub and must be proctored by an approved individual to ensure proper test security and compliance with ACMA's guidelines. Candidates must provide their proctor's contact information, including name, job title, company, email address, and phone number, at least two (2) weeks before their desired exam date.

Exams are closed book, meaning no study materials, notes, or mobile devices may be used during the test. Familiarity with ACMA's Education Hub prior to the exam is strongly recommended to ensure a smooth testing experience.

Please note that passing the CCT exam certifies a candidate's proficiency in composites but does not guarantee employment or mastery in all related technical skills.

Exam Access

Candidates have one year from the date of enrollment to take the exam. A 30-day grace period may be granted upon request.

Time Limit

All credential exams are timed and must be completed within the allotted time. Candidates are allocated two (2) hours to complete the exam. Exams cannot be paused and resumed after starting. Any exam questions left unanswered at the end of the allotted time will be counted as incorrect.

Exam Results

Exam results are displayed immediately upon completion. Successful candidates immediately receive a temporary certificate they can save or print as needed, followed by a permanent, mailed certificate within 3-4 weeks.

Language

The CCT credential exams are offered in English. However, the CCT Open Molding study guide and exam are also available in Spanish.

Test Administration Modification

ACMA is committed to providing reasonable accommodations for candidates with disabilities, as defined by Title III of the Americans with Disabilities Act. Candidates requesting accommodation must submit a written explanation of their specific needs, along with appropriate supporting documentation, at the time of their certification application.

Requests must be submitted at least six weeks prior to the desired test date to allow adequate time for arrangements. Currently, ACMA's exam delivery platform can accommodate requests for extended testing time. Additional accommodation will be considered based on the submitted documentation.

All requests for accommodations must be submitted in writing to ACMA at cct@acmanet.org.

Statement of Non-Discrimination

ACMA endorses the principles of equal opportunity. Eligibility criteria for examination and credentialing as a CCT are applied equally to all individuals regardless of age, race, religion, gender, national origin, veteran status, or disability.

Confidentiality

ACMA recognizes candidates' rights to control personal information. ACMA policy is designed to safeguard this information from unauthorized disclosure. Candidates can change their contact preferences by updating personal preferences in their profiles. To protect the rights to control score distribution, exam scores are released only to the candidate and authorized ACMA staff.

ACMA does not release individual exam scores, except for use in research studies that preserve candidates' anonymity. Candidates' scores will always remain confidential unless authorized with the written consent of a candidate. Official statistics regarding the CCT credentialing exam, including all question performance data, individual data, and demographic data, will be considered confidential. However, ACMA reserves the right to publish aggregated, non-identifying information based on such data.

Exam Irregularities

Any problems, suspected instances of cheating, alleged inappropriate examination administration, environmental testing conditions severe enough to cause disruption of the process or any other irregularities related to test administration should be brought to the attention of ACMA at cct@acmanet.org. All such matters will be reported, investigated and subject to further action based on policies and procedures adopted by ACMA.

ACMA Credential Candidate Inquiry Policy

Candidates may submit written inquiries about ACMA study materials and credentialing exams. Credential examination inquiries must be submitted within 30 days of the examination date.

Inquiries regarding ACMA credentialing exams must be submitted by the exam candidate. ACMA will not review or respond to inquiries submitted on the candidate's behalf.

Correspondence will be conducted in accordance with ACMA's privacy policy contained in this handbook.

Exam Refund & Transfer Policy

Fees for examinations are not refundable. The right to sit for an ACMA examination belongs exclusively to the person named on the exam registration request. Candidates named on the exam registration request may transfer the right to another candidate. The transfer request must be submitted in writing to cct@acmanet.org not less than 15 days prior to the exam window expiry date.

Section 4: Credential Mark Usage Guidelines

Credential Mark Usage Policies and Procedures

An individual who has been granted the ACMA CCT may list the credential on stationery, websites, business cards and other promotional materials such as:

- First name Last name, ACMA CCT
- First name Last name, Certified Composites Technician
- First name Last name, CCT

Should the credential be suspended or withdrawn for any reason, the individual must immediately cease the use of the title ACMA CCT and acronym designation on stationery, websites, business cards, and all promotional materials.

Section 5: CCT Recertification Requirements

Maintaining your Certified Composites Technician (CCT) credential ensures your knowledge and skills remain current with industry standards. Recertification is required every three (3) years to keep your certification active and demonstrates your ongoing commitment to professional development in the composites industry.

Recertification Overview

The recertification process is designed as an online self-study course that reinforces information from the initial certification and updates credential holders on the latest trends, skills, and technical processes. The process includes completing an open-book, online recertification exam that verifies continued competency in the field.

Eligibility for Recertification

Candidates are eligible for recertification within the three-year certification cycle. If recertification is not completed before the expiration date on the credential, individuals have a 12-month grace period to renew their certification. Failure to complete recertification within the grace period will require re-enrollment as a new candidate, including full payment of certification fees and completion of the initial proctored exam.

Steps to Recertify

To complete the recertification process:

1. Verify Certification Expiration Date

Check the expiration date on your CCT certificate to ensure timely recertification.

2. Purchase the Recertification Program

Log in to your ACMA Education Hub account and select the recertification program that corresponds to your credential. Current members are eligible for discounted pricing.

3. Access the Recertification Workbook and Exam

Upon purchase, the workbook and recertification exam will be available immediately in your Education Hub account. You may download and print the workbook for reference while completing the exam.

4. Complete the Open-Book Exam

The recertification exam is open-book; candidates may use the workbook and notes to answer the questions. The exam may be saved and revisited as needed before final submission. A passing score of 90% or higher is required for recertification.

5. Receive Your Updated Certificate

Once the exam is successfully completed, a temporary certificate will be available for download.

ACMA will mail an updated hard copy certificate within four (4) weeks. Ensure your mailing address is up to date in your MyACMA portal.

Important Notes

- **Recertification Exam Format:** The exam consists of reference-based, open-book questions designed to reinforce key concepts.
- **Proctoring Requirements:** A proctor is not required for the recertification exam.
- **Timely Completion:** Credential holders are strongly encouraged to complete recertification on or before the expiration date to avoid lapses in certification status.

Contact Information

For questions about the recertification process or technical issues with the ACMA Education Hub, please contact ACMA at cct@acmanet.org.

Section 6: ACMA CCT Exam Outlines

Advanced Composites Body of Knowledge

<p>Module 1: Matrix and Fiber Technologies in Advanced Composites (10%)</p> <ol style="list-style-type: none"> 1. Mixing of resins/adhesives/potting compounds 2. Identifying prepreg/fabric/tow/resin/adhesive and interpreting purchasing, material, and construction specs 3. Best practices for reinforcement weave patterns; fundamentals of reinforcement selection; comparison of fabric weaves 4. Advanced automated production techniques 5. Thermoplastic materials 6. High temperature material and resin systems
<p>Module 2: Design Considerations, Composites History and Products (10%)</p> <ol style="list-style-type: none"> 1. Process modeling, design software, specification tools 2. Reading work instructions and drawings 3. Hand lay-up best practices 4. Understand balanced laminate 5. Understanding residual stress 6. Composites Industry history- development of advanced composites
<p>Module 3: Molding Methods and Practices for Advanced Composites (20%)</p> <ol style="list-style-type: none"> 1. Best practices for material handling 2. Cutting prepreg material 3. Calculation of out-time and working life 4. Working life and shelf-life best practices 5. Use of a scale and taring 6. Resin mix ratios 7. Best practices for mixing resin 8. Pot life and storage life 9. Quality control and verification testing 10. Best practices for fiber wet-out 11. Fundamentals of vacuum debulks 12. Comparison of fabric types 13. Vacuum bagging fundamentals 14. Oven and autoclave basics 15. Introduction to application of potting compound 16. Best practice for the application of a potting compound 17. Application of a potting compound 18. Final preparation of a repair area
<p>Module 4: Health and Safety (10%)</p> <ol style="list-style-type: none"> 1. Composite Machining, CNC Automation 2. PPE 3. Hazards 4. Exposure 5. Standards for safe manufacture 6. Repair 7. Storage and use of advanced composites

<p>Module 5: Core Material Applications (10%)</p> <ol style="list-style-type: none"> 1. Introduction to sandwich construction 2. Best practice for sandwich fabrication 3. Vacuum bagging techniques 4. Co-cure and Co-bonding of skins on core materials
<p>Module 6: Tooling for Advanced Composites (10%)</p> <ol style="list-style-type: none"> 1. Mold selection, demolding and design 2. Mold care, tool and mold prep and maintenance 3. Tooling repairs 4. Tooling material introduction 5. Automated layup equipment, fiber placement
<p>Module 7: Inspection and Testing (10%)</p> <ol style="list-style-type: none"> 1. Composite damage/defect detection and rating 2. Non-Destructive Inspection (NDI) 3. Quality control and documentation on repairs, layup, inspection 4. Calculate a terminated participant's forfeiture amount. 5. Data analysis introduction 6. Equipment, records, technology in inspection and testing
<p>Module 8: Bonding and Fastening (10%)</p> <ol style="list-style-type: none"> 1. Composite-composite and composite-metallic adhesive bonding and mechanical fastening 2. Lightning Strike Protection overview and applications
<p>Module 9: Composite Structure Repairs (10%)</p> <ol style="list-style-type: none"> 1. Laminate (monolithic and sandwich) and tooling repair 2. Layer identification 3. Scarfing 4. Plie counting 5. Damage removal 6. Scarfing and repair best practices 7. Hot bonder operations/field repairs

Prerequisite approval is needed prior to testing for Advanced Composites. Do not enroll in the Advanced Composite Certified Composites Technician program unless you have prepared the required prerequisite materials for submission. Requirements can be met in several ways: 1. Successful completion of an ACMA reviewed advanced composites program that delivers 30 or more hours of hands-on training that covers the skills in the prerequisite checklist. (must submit documentation from the institution). 2. Verification of one year or more working with an advanced composites fabrication employer. Documentation of employer, employer contact and reference of supervisor or manager for work history verification is required. 3. Any combination of the two previously mentioned prerequisites with online submission of records as requested are acceptable. Please allow two weeks for record review.

Cast Polymer Body of Knowledge

Module 1: Basic Composites Knowledge/Overview of Cast Polymers (10%)
<ol style="list-style-type: none"> 1. Production processes 2. Matrix and materials 3. Industry introduction 4. Understanding unique characteristics of cast polymers 5. Advantages of cast polymers 6. Cast polymer history 7. Reinforced composites manufacturing processes 8. Cultured marble molding 9. Solid surface molding 10. Engineered stone 11. Polymer concrete casting
Module 2: Cast Polymer Plant Safety (15%)
<ol style="list-style-type: none"> 1. Shop/plant safety basics 2. Chemical, fire, fluid handling, electrical safety 3. Power tool safety, lock out tag out 4. Lift truck safety, manual lifting, compressed air 5. Safety in handling MEKP 6. General housekeeping and safety
Module 3: Cast Polymer Materials (15%)
<ol style="list-style-type: none"> 1. The cast polymer matrix 2. Thermoset resins- polyester and vinyl ester 3. Initiators, promoters, inhibitors, additives 4. Gel coat/In mold coating 5. Cultured marble, onyx, granite, cast concrete, cast resin 6. Functional fillers and cast polymers/particle theory
Module 4: Gel Coat Application (10%)
<ol style="list-style-type: none"> 1. Mold preparation and release application 2. Gel coat safety 3. Gel coat technology and application methods 4. Controlled Spraying definitions, overspray containment 5. Spray gun setup and calibration, measuring gelcoat, quality control of gel coat 6. Summary of controlled spraying benefits 7. Gel coat spraying techniques, guns, checklist
Module 5: Matrix Casting Techniques (30%)
<ol style="list-style-type: none"> 1. Casting technology, temperature, measuring, veining, mixing 2. Casting techniques 3. Vibration 4. Demolding and finishing 5. Troubleshooting fillers and matrix systems 6. Solid surface application processing, cure 7. Renewing and repair techniques 8. Measuring, batching, documentation, samples 9. Trim and finish processes 10. Line setup- hand and automated casting

Module 6: Fabrication Techniques and Equipment Principles (10%)

1. Plural component application equipment
2. Plant compressed air system
3. Automated casting equipment
4. Fluid pumps and initiator delivery, operation
5. Equipment calibration, maintenance

Module 7: Quality Assurance and Finishing (10%)

1. The approach to quality
2. Quality in cast polymer and solid surface
3. Standards for finishing care and maintenance
4. Quality assurance system vs quality control
5. Management roles in quality
6. Building a quality system, Lean, Six-Sigma quality terminology
7. Procedural quality control, batch documentation

Compression Molding Body of Knowledge

Module 1: Overview of Composites (10%)
<ol style="list-style-type: none"> 1. Define composites 2. Understand what set composites apart from other materials
Module 2: Materials (2%)
<ol style="list-style-type: none"> 1. Organic vs inorganic materials 2. Material structures 3. Monomers and polymers 4. Properties
Module 3: Composite Materials (5%)
<ol style="list-style-type: none"> 1. Function of composite materials 2. Polymers-thermoplastic and thermoset
Module 4: Composites Manufacturing Processes (5%)
<ol style="list-style-type: none"> 1. Manufacturing process selection 2. Composites manufacturing processes 3. Thermoset vs thermoplastic processing
Module 5: Compression Molding Plant Safety (10%)
<ol style="list-style-type: none"> 1. Understanding and staying safe in handling the chemicals found in the compression molding plant 2. Fire safety 3. PPE 4. Compression molding press safety 5. High temperature and pressure safety
Module 6: Compression Molding Materials (15%)
<ol style="list-style-type: none"> 1. Formulations 2. Advantages and disadvantages of liquid composite molding (LCM) 3. Bulk molding compound (BMC) 4. Sheet molding compound (SMC) 5. Pre-preg and Glass mat thermoplastic (GMT)
Module 7: Compound Processes and Equipment (10%)
<ol style="list-style-type: none"> 1. Understand the various processes and equipment for producing the compounds utilized in compression molding- liquid composite; BMC; SMC 2. Understanding the preforming process; utilization of pattern cutting and placement of reinforcement 3. Knowledge of the molding process, and the use of in-mold coatings 4. Understand the Glass Mat Thermoplastic molding process 5. Saturated vs Unsaturated materials and process options
Module 8: Compression Molding Processing (25%)
<ol style="list-style-type: none"> 1. Compression press types and design 2. Compression press - controls, speeds

3. Compression tooling - materials, key design factors, heating
4. Compression molding conditions
5. General understanding of hydraulic pressure
6. New process variations, materials and hybrid methods

Module 9: Process Quality Control and Troubleshooting (10%)

1. Raw material quality control checks, in process material quality checks
2. Quality control on the shop floor, troubleshooting methodology
3. Defect identification and cause and effect corrective actions.

Corrosion Body of Knowledge

Module 1: General Composites Knowledge (5%)
<ol style="list-style-type: none"> 1. History and understanding of the composites industry 2. Understand why composites are unique 3. Basic knowledge of the advantages of composites
Module 2: Composites Manufacturing Processes (10%)
<ol style="list-style-type: none"> 1. Open Molding processes 2. Closed Molding processes 3. Manufacturing Process recognition
Module 3: Composite Materials (15%)
<ol style="list-style-type: none"> 1. Recognize the basic thermoset resins used in composites manufacturing 2. Identify and define resins used in corrosion-resistant products 3. Reinforcements and understanding their relationship in a composite part 4. Understand the importance of sandwich construction in composites manufacturing 5. Identify the fillers and additives used in resins
Module 4: Gel Coat Application (15%)
<ol style="list-style-type: none"> 1. Concepts and technics critical to the application of gelcoat 2. Basic understanding of Gelcoat Chemistry 3. Procedures for handling gel coats 4. Familiarity with the various types of gel coat application equipment
Module 5: Molding Laminating Techniques (15%)
<ol style="list-style-type: none"> 1. Purpose of the corrosion barrier and the structural laminate layer 2. Methods used when processing synthetic veils 3. Identify the factors to consider when applying structural portion of laminate 4. Filament winding, technics and processes commonly used for corrosion applications 5. Guidelines for processing core materials within specifications for corrosion applications 6. Common problem identification when using resins 7. Understand the process when joining parts during secondary bonding. Meeting the requirements for corrosion applications
Module 6: Controlled Spraying (15%)
<ol style="list-style-type: none"> 1. Controlled spraying application process 2. Terminology and equipment recognition for spray applications and its various options 3. Comprehend and apply "Controlled Spraying Performance Evaluation" Know the major benefits for controlled spraying

Module 7: Composites Plant Safety (15%)

1. Identify and select plural component application equipment used in the FRP industry
2. Learn the importance of clean, dry compressed air in a shop
3. Understand and implement general equipment operating procedures
4. Show knowledge of the importance of Plural Component Equipment Calibration

Module 8: Corrosion Quality Assurance (10%)

1. Develop a basic knowledge and ability to implement safety practices as related to the composites industry
2. Know the steps involved in building a quality system
3. Basic principles in Procedural Process Control
4. Factors to ensuring quality specific to the corrosion industry and applicable standards
5. Principles to assuring quality in raw materials

Light Resin Transfer Molding Body of Knowledge

Module 1: General Composites Knowledge (5%)
<ol style="list-style-type: none"> 1. History and basic understanding of the composites industry 2. Why composites are unique 3. Advantages of composites
Module 2: Composites Manufacturing Processes (10%)
<ol style="list-style-type: none"> 1. Open Molding 2. Closed Molding 3. Manufacturing process recognition
Module 3: Composite Materials Identification (10%)
<ol style="list-style-type: none"> 1. Materials, reinforcement, selection, orientation, advantages 2. Resin systems, initiators, curing agents, measurements, applications 3. Core materials and laminate bulkers
Module 4: Light Resin Transfer Molding Process and Production (20%)
<ol style="list-style-type: none"> 1. Darcy's Law 2. Light Resin Transfer molding process 3. Light Resin Transfer Molding production cycle
Module 5: Tooling and Equipment for LRTM (20%)
<ol style="list-style-type: none"> 1. Design for Light Resin Transfer Molding 2. LRTM Tooling, tool building basics, tooling materials, plug or master to build tooling, construction of tooling 3. Standard and accessory fittings 4. Vacuum pumps 5. The vacuum system 6. Mix and metering delivery of resins
Module 6: Materials for LRTM (15%)
<ol style="list-style-type: none"> 1. Reinforcements, resins, initiators and curing agents 2. Fillers 3. Core materials and laminate bulkers
Module 7: Gel Coat Application (10%)
<ol style="list-style-type: none"> 4. Introduction to Gel Coating 5. Gel Coating Safety, use, storage, handling 6. Raw material quality assurance 7. Spray gun setup, spraying technics 8. Gel coat application methods, spraying technics 9. Gel coating for Light Resin Transfer Molding
Module 8: LRTM Troubleshooting (10%)
<ol style="list-style-type: none"> 1. Quality methods for Light Resin Transfer Molding (LRTM) 2. Troubleshooting in Light Resin Transfer Molding

Open Molding Body of Knowledge

<p>Module 1: Basic Composites/Overview of Molding Lamination (20%)</p> <ol style="list-style-type: none"> 1. Production processes 2. Matrix and materials 3. Industry introduction 4. Open Molding process principles 5. Open Molding tooling 6. Basic functions of composites laminates 7. Application methodologies 8. Safety overview
<p>Module 2: Gel Coat Application Technology (20%)</p> <ol style="list-style-type: none"> 1. Gel coat materials, function, chemistry 2. Gel coat application 3. Gel coat storage and handling 4. Raw material quality assurance 5. Gel coat spray gun selection and setup 6. Spraying preparation - Pre-Gel Coat Checklist 7. Gel coat spraying methodology 8. Gel coat application safety
<p>Module 3: Laminating Application Technology (30%)</p> <ol style="list-style-type: none"> 1. Open molding laminate application 2. Fiber reinforcements and placement 3. Laminating tools of the trade 4. Hand Lay-up laminating techniques 5. Spray up lamination 6. Core and part bonding procedures 7. Laminating quality control for Open Molding 8. Field fabrication of composites 9. Lamination safety
<p>Module 4: Controlled Spraying Technology (10%)</p> <ol style="list-style-type: none"> 1. Types of application equipment 2. Plant compressed air, pumps and equipment 3. Equipment operating principles 4. Grounding of fluid handling equipment/ equipment calibration 5. Equipment maintenance 6. Peroxide and initiator safety 7. Spray application introduction and terminology
<p>Module 5: The Approach to Quality (10%)</p> <ol style="list-style-type: none"> 1. Procedural quality control 2. Shop conditions as a process control issue 3. Preventing gel coat problems 4. Quality improvement and processes 5. Finished product cosmetics and surface profiling

Module 6: Open Molding Finishing and Repair (10%)

1. Defect identification
2. Repair procedures
3. Repair materials and applications

Vacuum Infusion Body of Knowledge

Module 1: General Composites Knowledge (10%)
<ol style="list-style-type: none"> 1. Industry introduction - history, advancements, industry basics 2. Overview of materials and matrix 3. Safety, manufacturing processes, options and choices 4. Why VIP and its many variations
Module 2: Tooling for VIP and Closed Molding Processes (15%)
<ol style="list-style-type: none"> 1. Vacuum Infusion Process and many variations 2. Tooling requirements, options, features for closed molds 3. Fundamentals of tool development and technology 4. Closed mold requirements and options for B side tooling - LRTM, CCBM, other variations
Module 3: Understanding Vacuum and Pressure (10%)
<ol style="list-style-type: none"> 1. Motive force in driving resin flow- comparisons in processing 2. Types of vacuum pumps and vacuum systems 3. Resin volatilization and vacuum pressure
Module 4: Resin Flow Theory (15%)
<ol style="list-style-type: none"> 1. Flow characteristics 2. Darcy's Law and Resin Flow 3. Viscosity, permeability and pressure differential 4. Dynamics of infusion, flow patterns and infusion
Module 5: Vacuum Bag Configuration and Fabrication (10%)
<ol style="list-style-type: none"> 1. Bags, techniques in use, size, sealing and use 2. Fabrication of bags 3. Leaks, drawdown process, leak detection, process
Module 6: VIP Molding Process (15%)
<ol style="list-style-type: none"> 1. Sequence for the VIP Process
Module 7: Light Resin Transfer Molding Process (5%)
<ol style="list-style-type: none"> 1. Process variations - B side molds - infusion
Module 8: VIP and Light RTM Molded Components (8%)
<ol style="list-style-type: none"> 1. Serial production and advanced production 2. Preforms, robotics and fiber placement options 3. Resin mix and metering equipment 4. Process automation enhancements and industry 4.0 5. Temperature control
Module 9: Closed Mold Quality Control (10%)
<ol style="list-style-type: none"> 1. Procedural quality control / lean principles 2. Documentation of procedures for production 3. Processing documentation / standards / traceability 4. Digital and CAD tools for design, quality, production and simulation 5. Quality essentials, cosmetic quality 6. Controlling laminate voids and process standards

Wind Blade Repair Body of Knowledge

Module 1: Composites Knowledge/Materials in Wind Energy (20%)
<ol style="list-style-type: none"> 1. History and understanding of the composites industry 2. Manufacturing process and methods in composites 3. Why composites are unique and their advantages 4. Introduction and selection of composite materials 5. Why composites are unique and their advantages in wind energy 6. Where composites are used, overview and components
Module 2: Methods Materials and Composites Manufacturing Processes (20%)
<ol style="list-style-type: none"> 1. Open Molding processes 2. Closed Molding and other processes 3. Manufacturing process technology 4. Wind Blade component materials and processes
Module 3: Composites in Wind Energy, Repair Methods and Materials (20%)
<ol style="list-style-type: none"> 1. The matrix 2. Cores 3. Adhesives 4. Surface Coatings 5. Fabrication processes for wind energy applications 6. Repair decisions 7. Secondary fabrication 8. Material selection and compatibility
Module 4: Composite Blade and Component Repairs (20%)
<ol style="list-style-type: none"> 1. Background, industry growth and need 2. Identifying the composite 3. Damage and defect inspection - blade defects 4. Damage removal 5. Record of removal and documentation of damage 6. Repair - process and documentation 7. Field work instructions, manufacturers recommendation and quality documentation requirements 8. Repair of the Lightning Protection System
Module 5: Wind Energy Composites Safety (20%)
<ol style="list-style-type: none"> 1. Introduction to safety culture and requirements 2. Chemicals- handling and storage 3. Confined space entry 4. Electricity 5. Climbing 6. Onsite safety

Section 7: ACMA Examination Policy

The Certified Composites Technician (CCT) program at the American Composites Manufacturers Association (ACMA) includes proctored credential exams, online certificate assessments, and hands-on practical assessments. This policy outlines the requirements, procedures, and standards for conducting CCT exams.

Proctored Credential Exam Policy

Enrollment

- Candidates will receive enrollment notification immediately after completing their exam purchase.
- If bundled with study materials via the learning management system (LMS), candidates can access exams upon readiness through the LMS catalog.

Proctoring Requirements

- Candidates sitting for their CCT exam must be supervised by a previously identified proctor; substitute proctors will not be allowed. Proctors can be a CCT Instructor, the candidate's supervisor, or someone in the training or human resources department of their company. Some companies also prefer to use technical school, university or community college test centers to administer certification. These may have additional charge which employers should review and work out prior to getting proctor information to ACMA.
- Candidates must provide the name, job title, company name, email address, and telephone number of their proctor at least 2 weeks prior to their intended examination date. To provide this information, email cct@acmanet.org.
- ACMA will separately provide proctors with all the information they need prior to the exam. Best practice would not have an instructor who just completed giving training immediately proctor certification testing. Impartial test proctors are required.
- A proctor is not required for recertification exams.

Time Limits

Exams are timed and must be completed within the allotted period. Unanswered questions will be marked incorrect.

Exam Results

Results for online CCT exams are available immediately. Candidates who pass can download a temporary certificate of completion.

Examinations Standard of Conduct

Proctored Exam Standards

Candidates must:

- Prepare their testing space, ensuring it is free of prohibited items (e.g., phones, notes, unauthorized materials).
- Remain visible to the proctor throughout the exam.
- Avoid communication or unauthorized assistance during the exam.

Prohibited actions include:

- Leaving the room (except for scheduled breaks in long exams).
- Using external calculators or paper (on-screen tools are provided).

- Copying, sharing, or attempting to reproduce exam content.

Additional Exam Policies

- **Special Requirements and Appeals:** ACMA provides accommodation for candidates with documented needs. Requests must be made during exam registration. Appeals regarding exam irregularities or results must be submitted in writing within 30 days of receiving the results.
- **Retention Policy:** Exam records are retained for two years.
- **Exam Refund & Transfer Policy:** Fees for exams are not refundable. The right to sit for an ACMA exam belongs exclusively to the person named on the exam registration. That person may transfer the right to someone else. However, the transfer must be in writing from the original registrant and must be received no later than the final registration date.
- **Exam Copyright:** All CCT exam content is protected under ACMA copyright. Any unauthorized reproduction, transmission, or use is strictly prohibited.