



CANDIDATE AND CERTIFICANT HANDBOOK

for the

**CERTIFIED PRODUCTION TECHNICIAN 4.0
(CPT 4.0) Program**

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CANDIDATE and CERTIFICANTHANDBOOK

Welcome to the Certified Production Technician 4.0 (CPT 4.0) certification program!

MSSC developed the CPT program to assess and certify the skills of front-line manufacturing production workers. We define front-line production workers as entry-level through first level of supervision within all sectors of the manufacturing industry. According to the U.S. Bureau of Labor Statistics, there are about 9 million jobs in this category in the U.S.

MSSC is a leading, nationwide national certification body. Those who succeed in MSSC Assessments receive industry-recognized, nationally portable MSSC credentials. The CPT program was developed by industry experts and is updated annually to ensure that the skills assessed are the most relevant to today's manufacturing employers. For more information about MSSC, please visit our website at www.msscusa.org.

INTRODUCTION

Program Description

The purpose of the Certified Production Technician^{AE} program (CPT) is to recognize through certification individuals who demonstrate mastery of the core competencies of manufacturing production at the front-line level (entry-level through front-line supervisor) through successful completion of the certification assessments. The goal of the CPT certification program is to raise the level of performance of production workers both to assist the individuals in finding higher-wage jobs and to help employers ensure their workforce increases the company's productivity and competitiveness.

The CPT program consists of five individual certificate modules: Safety; Quality Practices & Measurement; Manufacturing Processes & Production; Maintenance Awareness and Green Production. Candidates must earn the first four certificates to qualify for the full CPT certification (Green Production is not required for full CPT).

Eligibility Requirements

Four CPT 4.0 program certificates: In order to earn the CPT 4.0 certification, candidates must successfully complete each of the following four assessments in the program: Safety; Quality Practices & Measurement; Manufacturing Processes & Production; and Maintenance Awareness.

Additional Requirements: MSSC does not have any other specific educational requirements in order to sit for the CPT assessment. However, MSSC strongly suggests that candidates possess at least a 10th grade reading (English) and 9th grade math level.

Training Requirements: MSSC does not require candidates to take a specific course or training program in order to sit for an assessment. However, we find that students enrolled in a training program perform better than those who do not. There are many training programs available and many used MSSC's own Authorized Courses.

MSSC Courses were developed in strict adherence to the industry-recognized, nationally validated standards upon which the Certified Production Technician 4.0 (CPT 4.0) is based. These Courses, developed and delivered by Amatrol, have a proven track record of success in teaching the knowledge and skills identified in the national standards. MSSC Courses are highly interactive and utilize state-of-the-art, computer-based, simulation e- learning technologies and are delivered by MSSC-Authorized Instructors. MSSC does not authorize, review or endorse any other courses or curricula. MSSC does not require that individuals take MSSC courses or any other MSSC-related courses before taking an MSSC assessment.

CERTIFICATES AND FEES

To obtain the total cost for registration and assessments, please contact your local assessment center.

Candidates can download from any computer a free copy of their MSSC certificate(s), after 3 business days from their assessment date. MSSC will provide a candidate who has earned the Full CPT-certification with a copy of their Full CPT certificate and a patch via the mail.

Certificates:

Additional copies of the certificates and/or patches can be ordered by the Site Coordinator. See fees below.

\$25 for one certificate + \$15 shipping = \$40

\$5 for one patch + \$15 shipping = \$20

Registrations and Assessments are **non-refundable**. No refunds will be issued for individuals who take the assessment or who fail to appear for a scheduled assessment.

REGISTRATION PROCESS

Submission

Prior to sitting for an MSSC assessment, all candidates must register with MSSC online at <https://login.msscusa.org>

Deadlines

Registrations must be submitted at least 72 hours prior to the scheduled assessment date. Individual Assessment Centers may have additional deadlines that will need to be followed.

Special Accommodations

MSSC strives to provide a favorable environment for every participant during the assessment session. Special accommodations must be approved by MSSC. The application for special accommodations must be submitted by the site coordinator to MSSC two weeks prior to the assessment date. The online assessment system supports the following accommodations when requested and/or determined appropriate:

- Text to speech: audio and visual enhancements for online assessments
- Extended time: option for adding time to assessment administration sessions, to accommodate individuals with documented reading or computer operation disabilities
- Readers: additional copy of the assessment can be provided when a reader is used to accommodate individuals with documented eyesight difficulties
- MSSC does not allow for translators or translation of assessments into languages other than those of the country in which the assessment is given.

ASSESSMENT ADMINISTRATION

Development of CPT 4.0 Assessment

The CPT 4.0 certification program was developed to credential front-line production workers in the United States. MSSC worked with 4000 front-line workers, 700 companies, leading industrial unions, 350 subject matter experts and a public-private investment of over \$9 million. In 2001, the industry-led, national production standards were formally endorsed by the National Skill Standards Board.

The MSSC National Experts Panel for Production ensures that the assessments and the standards upon which they are based are updated annually. The assessments are also reviewed annually to ensure that questions which are unclear, inaccurate or outdated are modified or deleted from the assessment item bank.

The CPT certification is awarded only when a candidate has completed the application, submitted the registration and assessment fees and successfully completed all four modular CPT assessments.

Language

The CPT assessments are offered in English and Spanish. To earn the Full CPT certification a candidate must pass all 4 assessments in the same language.

Assessment

Safety: The Safety assessment consists of 81 multiple choice questions. Candidates are allowed 90 minutes to complete the assessment.

Quality Practices and Measurement: The Quality assessment consists of 80 multiple choice questions. Candidates are allowed 90 minutes to complete the assessment.

Manufacturing Processes and Production: The Production assessment consists of 101 multiple choice questions. Candidates are allowed 90 minutes to complete the assessment.

Maintenance Awareness: The Maintenance assessment consists of 84 multiple choice questions. Candidates are allowed 90 minutes to complete the assessment.

Green Production: The Green assessment consists of 94 multiple choice questions. Candidates are allowed 90 minutes to complete the assessment.

Assessment Options and Locations

MSSC offers assessments at various Authorized Assessment Centers throughout the country. To find a center near you, see this map: <http://msscusa.org/locations>.

Computer-Based: The primary method of delivery for MSSC assessments is through an online assessment process supported by NOCTI/The Whitener Group.

Paper/Pencil: If computers are not accessible, MSSC offers paper/pencil assessments. Please read the Candidate and Certificiant Handbook for Certified Production Technician (CPT) Program Paper & Pencil Testing

Assessment Security

A significant component of a successful and respected professional certification credential is maintaining the security of the assessment. MSSC relies upon the ethical behavior of certificants and applicants to maintain the security of the CPT assessments. When those who seek to obtain the credential, or those who hold the MSSC credential reveal information about MSSC assessment content (other than that information published by MSSC), they violate the Affirmation and Authorization agreement all candidates agree to and accept when they apply for certification and take the assessment. They also violate the MSSC Code of Ethics.

The MSSC Board will take action against individuals who violate MSSC Board Policies and the Code of Ethics. Actions taken may include permanently barring individuals from pursuing MSSC credentials and revoking certifications from those who have been awarded the credential. MSSC will also pursue legal action against individuals or organizations who infringe upon our copyrights, proprietary rights and intellectual property.

Assessment Preparation

The MSSC Board employs strict measures to prevent the possession, reproduction and removal of assessment materials. A strategy for taking this assessment is:

1. Prepare in advance by becoming familiar with the concepts of the MSSC Production Standards. MSSC does not require that individuals take any courses, however, before taking a CPT assessment.
2. When you login to the online exam, answer the questions that you know, and skip those which you do not know the answer to or are uncertain about.
3. On the second review, go back through the questions you skipped and try to choose the best answer.
4. Use remaining time to answer any last questions and to make sure that you have answered all questions.

Assessment Admission

You are responsible for bringing your MSSC Identification Number (received upon registration) with you to the assessment and a valid photo ID. Candidates who do not possess valid identification will be denied access to the assessment. Identification must be a current government issued picture ID bearing the candidate's signature. Acceptable forms of government issued ID include a driver's license, passport, military ID, federal state or county issued ID.

You will not be permitted to take the assessment without a valid photo ID.

Assessment Rules and Procedures

The following rules and procedures will be strictly enforced on the day of the assessment.

- The assessment will begin promptly at the hour designated by the proctor and end at the stated time allowed for each particular exam offering.
- Candidates will not be allowed to enter the assessment after it starts.
- Visitors are not permitted in the assessment room.
- Pencils are not provided.
- Candidates are allowed to leave the room during the assessment with the proctor's permission. Lost time cannot be made up.
- Textbooks and notes are NOT permitted.
- Calculators and other such aids are NOT permitted (a four-function calculator is provided within the online testing system).
- Scratch paper may be permitted, but may not be taken from the assessment room.

- No cellular phones, pagers or other audible electronic devices, including watches with alarms are permitted to be used during the assessment.

MSSC will invalidate your assessment and take action in accordance with the disciplinary procedure if you access prohibited materials, have contact with anyone except proctoring staff, or engage in disruptive, unprofessional or conduct that violates the Code of Ethics at any assessment facility.

Actions / Disqualifications

The assessment center proctor or MSSC will take appropriate actions, up to and including disqualification from taking the assessment and withdrawal or revocation of certification when a candidate:

- Impersonates a candidate
- Creates a disturbance
- Gives or receives help on the assessment
- Uses a calculator or other such aid, which is prohibited during the assessment
- Attempts to remove assessment material or notes about the assessment from the assessment room
- Exhibits irregular assessment taking behavior, including consulting or attempting to consult with or give or obtain assistance during the assessment; bringing in or using unauthorized materials including cheat sheets, printed and/or other handwritten materials
- Provides false, misleading or incomplete information on the application form

Examinee Conduct

All candidates are required to sign a statement agreeing not to disclose the contents of the assessment nor remove assessment materials from the assessment room. All candidates are also required to attest to the authenticity of their credentials and the accuracy of all statements made in their application.

Cheating will not be tolerated, and all instances of suspected cheating will be fully investigated. Candidates that are caught cheating will have their assessment invalidated.

Scoring

Computer-Based Testing

Answers are recorded directly on the computer screen. If you have questions on any content specific to the assessment, the Proctor is to inform you that he/she is unable to answer content questions.

By completing the final online submission of the assessment answers, the candidates are certifying that they are the person whose name was submitted in the online registration and that they will not copy or retain assessment questions or transmit them in any form to anyone else. Scores of candidates sharing such assessment information will automatically be invalidated. If an individual has obtained the CLT certification, that certification will be forfeited for such actions. The Proctor is not allowed to respond to any inquiries about the assessment questions.

Paper/Pencil Scoring

Please reference the Candidate and Certificiant Handbook Paper & Pencil Assessments for Certified Production Technician (CPT) Program for complete guidelines.

Results

The passing score for Safety 4.0 is 76 percent (76%).

The passing score for Quality Practices and Measurement 4.0 is 75 percent (75%).

The passing score for Manufacturing Processes and Production 4.0 is 74 percent (74%).

The passing score for Maintenance Awareness 4.0 is 73 percent (73%).

The passing score for Green production is 78 percent (78%).

Assessment takers will learn at the end of their assessment whether they passed or did not pass. Based upon guidance from industry experts, MSSC has established a minimum score for passing all four CPT exams. MSSC policy prohibits release of any assessment scores to anyone other than the Candidate. The Candidate may choose to share their scores with the Proctor or other individuals.

Candidates taking the computer-based assessments receive a result screen immediately upon completion of the assessment. You may request that the Proctor allow you to print this page. This is the only document you are allowed to take from the assessment room. This print-out reflects an unofficial assessment result.

Confidentiality Statement

Assessment results are confidential. MSSC shall not disclose information regarding assessment results or other information without the candidate's consent except: 1. as necessary for MSSC staff, authorized consultants or others with a need to know; 2. when verifying references provided by the candidate; or 3. as required by law. Candidates must request disclosure of assessment information in writing and identify the person to whom the disclosure should be made.

MSSC will publish the names of all individuals who have passed the assessment and maintain current certification. MSSC reserves the right to publish on the MSSC website the name of any certificant when a complaint about them has been upheld.

Information Release Policy

MSSC will not release any information regarding a Candidate's application or assessment administration without written authorization from the Candidate. Assessment materials and answer sheets remain the sole property of MSSC. The materials are confidential and are not available for review by any persons or agency for any reason.

During the candidate registration process, candidates will be asked to verify that they have read and understand the following:

I hereby authorize the Manufacturing Skill Standards Council (MSSC) to share my assessment results, including date(s) and location of testing, pass/fail status and assessment scores, with the following entities: federal or state or local educational authorities funding my training or assessments; employers funding my training or assessments.

[PLEASE NOTE: MSSC does not require your authorization for participation. However, some funding entities may require access to your assessment results in order to fund or allow your participation. Opting out may result in termination from the program. If you have any questions about your disclosure requirements, please contact your training and testing organization for more information.]

The Family Education Rights and Privacy Act applies to schools that receive federal funding. Under this act, MSSC is authorized to share your assessment results with:

1. federal or state or local educational authorities conducting an audit or evaluation or enforcement of education programs;
2. organizations conducting studies on behalf of schools;
3. state and local officials in connection with service students under the juvenile justice system.

Rescheduling, Cancellation and Withdrawal Policy

Should you be unable to attend the assessment at the time you scheduled, you must notify your Assessment Site Coordinator in the timeframe established by your Assessment Site. Your assessment will remain valid for six months from your scheduled assessment date. You are responsible for rescheduling the assessment time with your Assessment Site.

Retaking the Assessment

Candidates who do not pass the assessment may retake the assessment after a 15-day waiting period. Candidate may take the assessment up to three times (the original assessment plus two retakes) within a 45-day period from the date of their initially taking the assessment. If the candidate does not pass the exam upon the third try, they must then wait an additional 60 days before attempting the assessment again.

RECERTIFICATION

Recertification Requirement

To ensure that the CPT certification reflects the most current standard in the front-line manufacturing profession, full- CPT certificate holders are required to re-certify every five years. Recertification may be obtained by earning points through continuing education and/or employment in a related field. For more information about the recertification process, please visit the website: www.msscusa.org/recertification.

APPEAL PROCESS

Right to Appeal

Candidates for the Certified Production Technician (CPT) Program and Certificant have the right to file an appeal on matters relating to their application, assessment, certification, annual renewal, recertification or other matters affecting their status as a Candidate or Certificant. There are generally two types of appeals, an administrative appeal and a personal appeal.

Administrative Appeal

Candidates for the CPT program who allege inappropriate administration procedures, severe environmental assessment conditions, or for other reason challenge results of an assessment have the right to file an administrative appeal in accordance with the appeal procedures.

Certificant who believe they were unjustly denied recertification, placed on "inactive" status incorrectly, or for other reasons have the right to an administrative appeal in accordance with the appeal procedures.

Appeal Procedures

All such appeals must be filed in the office listed below within the earlier of 30 days of the assessment or notice of non-certification or recertification. The appeal fee is \$50. The fee will be refunded to the candidate if the Appeal and Complaint Committee resolves the appeal in favor of the Candidate or Certificant.

Each appeal must include a statement submitted by the Candidate in writing or via email of no more than five typed pages setting out the basis of the appeal, including information as specific as the Candidate feels necessary why he or she is entitled to the relief requested.

The Appeal and Complaint Committee will consider each such written statement. The Appeal and Complaint Committee is entitled to seek further information from the applicant or any other person, organization or office that it feels appropriate and review any materials that it feels appropriate to determine the appeal. The Appeal and Complaint Committee will determine the appeal and respond to the applicant.

Appeals will be resolved within 90 days of submission. The Appeal and Complaint Committee reserves the right to waive or extend any time period set out in the procedure, or modify any process as it deems appropriate to properly determine any appeal. All steps of the Appeal and Complaint process will take place in writing unless otherwise determined by the Appeal and Complaint Committee.

Submit all Appeals along with the \$50 fee to:
MSSC Certification Department
900 N Washington St, Suite 600
Alexandria, VA 22314

Personal Appeal

Candidates and Certificants dissatisfied with the actions of the Appeal and Complaint Committee have the right to a Personal Appeal with the MSSC Board. A Personal Appeal must be submitted in writing and sent to the above address. A meeting of the Board will be set up within 180 days of receipt of the Personal Appeal. Appeal and Complaint Committee members are recused from the Personal Appeal process. Any action taken by a majority of a quorum of the Board pursuant to such appeal shall be final. The Board decision shall be sent to the person submitting the appeal within ninety (90) days of the decision of the Board.

CODE OF ETHICS

This document sets for the following code of ethics for CPT certificants:

- To comply with relevant provisions of the certification scheme
- To make claims only with respect to the scope (of the standards) for which the certification has been granted
- To discontinue the use of all claims to certification that contains any reference to the certification body upon suspension or withdrawal of certification
- To refrain from using certification in a misleading manner
- To understand the MSSC “Key Activities” document that describes the principal production activities to which the CPT certificates and full certification applies.
- To explain that the MSSC certificates document the individual's competency to achieve the required performance level on a national certification assessment only with respect to the Key Activities related to that certificate.
- To avoid using the certification in a manner that will bring MSSC into disrepute
- To understand that a violation of any of the above principles could lead to the suspension or withdrawal of this credential, after which the individual should discontinue the use of all claims to MSSC certification
- To refrain from altering the certification document in any way

Certificants shall, in their professional production activities, sustain and advance the integrity, honor and prestige of the CPT certification by adherence to this Code of Ethics. Certificants who intentionally or knowingly violate any provision of the Code of Ethics will be subject to revocation of the certification.

CPT LOGOS

Logo Usage

As a CPT in good standing, you may want to utilize the official CPT logo to place on your business cards; email signature or other personal identification documents.

To request an electronic version of the CPT color logo JPG please contact: MSSC at info@msscusa.org or 703-739-9000.

Please adhere to the following guidelines when using the CPT logo:

The logo may not be revised or altered in any way. The logo must be displayed in the same form as produced by MSSC and cannot be reproduced unless such reproduction is identical to the logos provided by MSSC. The CPT logo is meant to identify a Certificant as opposed to a business entity. The logo may be used only on the Certificant's own business cards, stationery, forms showing the Certificant's letterhead, inspection tags, and similar documents on which the name and address of the Certificant is prominently displayed.

The logo may not be used in any manner that detracts from the high ideals of MSSC or the CPT certification. The CPT logo may not be used in any manner which would tend to imply a connection between CPT and the Certificant which, in fact, may not exist. This includes any use of the logo the public might construe as an endorsement, approval or sponsorship by MSSC of a Certificant or a Certificant's business, or which might be taken to support or encourage a Certificant's sale of product, process or installation. A Certificant is allowed to print the logo on an advertisement or product literature. Without limiting the foregoing restrictions, the logo may in not be shown larger than 1.5 inches or 4 centimeters on a full page or proportionally on a smaller page.

If you have any questions regarding use of the logo, please contact MSSC at info@msscusa.org or 703-739-9000.

Affirmation of Proper Usage of CPT Logo

All CPT candidates and certificants sign an agreement that they will comply with the relevant provision of the CPT program described in the CPT Candidate Handbook. No person gains any rights whatsoever in the logo or its use; it remains the property of MSSC. MSSC reserves the right in its sole discretion to require the removal of the logo from any location or thing MSSC feels does not comply with these guidelines.

MSSC acts to challenge those who use the CPT designation without authority from MSSC. Penalties may include barring from pursuing the certification and publishing the names of the violators. MSSC may authorize the use of the symbol, the phrase "Certified Production Technician", and the initials "C.P.T." by certificants only; provided such holder currently possesses a valid certificate issued by MSSC. An applicant/candidate who has had their applicant status terminated may appeal to MSSC in accordance with the Appeal and Complaint Process described in the CPT Applicant Handbook. Certificants whose CPT status is terminated are entitled to the same Appeal Process.

VERIFICATION OF PERSONAL DATA

Candidates and Certificants wishing to verify any personal data on file other than scores may contact MSSC at 901 N. Washington St., Suite 600, Alexandria, VA 22314; 703-739-9000 or info@msscusa.org.

ASSESSMENT CONTENT OUTLINE (WORK STANDARDS)

Safety Content Area Weighting

The following shows the relative importance of each content domain on the certification exam. When preparing for the exam, candidates should spend proportionately more time studying the content domains that are more heavily weighted.

Work in a Safe and Productive Manufacturing Workplace (16%)

- Recognize systems of safety used by high-performance manufacturers and integrate in safety systems in all work
- Explain responsibilities of a frontline production worker in a high-performance, safety-conscious work organization
- Define OSHA and other health and safety requirements as applied to the workplace
- Identify the role of production workers in helping to ensure competitive levels of cost, quality and delivery in a safe work environment
- Identify external and internal customers
- Identify common safety practices and systems

- Explain workplace codes of conduct and responsibilities for ethical and responsible behavior in all work activities
- Recognize ways in which Industry 4.0 technologies impact manufacturing

Perform safety and environmental assessments (11%)

- Identify, report and monitor potential hazards in the workplace
- Take corrective action to eliminate potential hazards
- Review health, safety and environmental documentation and policies
- Locate and use Safety Data Sheets (SDS)
- Ensure that inspections meet all relevant health, safety and environmental laws and regulations
- Develop safety checklists
- Perform inspections according to company schedule and procedures
- Document inspections
- Store inspection records correctly

Perform emergency drills and participate in emergency teams (6.5%)

- Ensure that training and certification on relevant emergency and first aid procedures are complete and up to date
- Follow company and regulatory procedures for responding to fire, medical, and electrical emergencies
- Ensure that emergency response complies with company and regulatory policies and procedures
- Document emergency drills and incidents according to company and regulatory procedures

Identify unsafe conditions and take corrective action (8.5%)

- Identify, report and document conditions that present a threat to health, safety and the environment
- Describe ergonomic impact of work techniques
- Identify corrective actions
- Consult appropriate parties about corrective actions
- Take corrective actions according to company procedures
- Track and report ongoing safety concerns until corrective action is taken

Participate in safety training (12%)

- Follow orientation that covers all topics and procedures needed to facilitate employee safety
- Define health and safety education requirements
- Follow orientation that identifies needs and processes to raise safety concerns, ask questions and receive additional training
- Receive orientation on use of personal protective equipment
- Describe lock out/tag out requirements
- Document orientation according to company requirements
- Follow safety orientation for relevant laws, policies and regulations
- Participate in regular safety training

Participate in equipment safety training (13%)

- Receive complete orientation to equipment and guidelines for ergonomic safety
- Communicate all important information regarding equipment safety, including material handling equipment
- Make suggestions regarding training materials and content to the correct parties
- Provide evaluations and feedback to improve training materials and methods
- Ensure trainee has the correct tools to do the job during training
- Ensure that workers can operate equipment safely through post-training evaluation

- Ensure that training and facilitation techniques used are appropriate for trainees
- Document quality and effectiveness of training
- Describe robot safety objectives
- Describe types and use of automation safety devices

Suggest processes and procedures that support safety of work environment (6.5%)

- Consult health and safety representatives in the development of suggestions
- Provide operator feedback to create a safer, more effective work environment
- Make suggestions to correct parties, according to company procedure
- Communicate customer needs effectively to others including shift-to-shift, co-workers and managers, including needs that impact safety
- Describe what appropriate cross-training benefits
- Ensure that content of suggestions responds to safety, quality and productivity issues

Fulfill safety and health requirements for maintenance, installation, and repair (7.5%)

- Participate in regular safety communications
- Participate in job safety analyses regularly according to company policy
- Follow hazardous materials procedures and policies, such as Safety Data Sheets (SDS) and right-to-know
- Perform environmental testing of workplace on a regular basis as required by company policy and regulation
- Audit equipment to ensure there are no by-passes of safety guards
- Follow all regulatory and company safety procedures, including those related to lock-out/tag-out, confined space, arc flash awareness, and ergonomics
- Follow good housekeeping procedures

Monitor safe equipment and operator performance (9%)

- Perform regular monitoring
- Report out-of-compliance or unsafe conditions immediately
- Take corrective action on out-of-compliance or unsafe conditions
- Check equipment to ensure it is operating according to safety specifications
- Check tools to ensure they are in compliance with safety specifications
- Forward accident and injury data to appropriate personnel for inclusion in OSHA recordables
- Gather information on equipment use from operators to reveal existing or potential safety problems
- Document all safety monitoring data

Utilize effective, safety-enhancing workplace practices (10%)

- Communicate clearly
- Describe ways to improve reading, listening and writing skills
- Explain different forms of communication, such as e-mail, fax and phone
- Participate in work teams
- Make production job assignments
- Run training programs efficiently
- Follows company code of good conduct

Quality Practices & Measurement Content Area Weighting

The following shows the relative importance of each content domain on the certification exam. When preparing for the exam, candidates should spend proportionately more time studying the content domains that are more heavily weighted.

Participate in periodic or statistically based internal quality audit activities (10%)

- Describe the use and benefits of Statistical Process Control (SPC), Six Sigma, Total Quality Management (TQM), Lean Management, “Plan-Do-Check-Act” and the requirements of the International Organization of Standardization standards, especially ISO 9001 for manufacturers
- Describe documentation process and requirements to ensure verifiable evidence of product quality
- Ensure audit data are relevant and correct
- Complete all relevant audit forms and forward to proper parties in a timely manner
- Assess and document conformances to quality standards
- Include observation of operation in audit to ensure process and product meet specifications, when appropriate
- Participate in audits in accordance with company and other required schedules and procedures
- Participate in ongoing audits to optimize the outcomes of corrective actions

Check and document calibration of gauges and other data collection equipment (6%)

- Describe inspection equipment calibration standards and requirements
- Follow calibration schedule according to specifications
- Check instrument certification by reviewing documentation and observing during use
- Recalibrate instruments out of calibration or refer to appropriate parties for recalibration repairs

Suggest continuous improvements (11%)

- Explain concepts of Lean Manufacturing
- Describe Total Quality Management (TQM)
- Recognize potential improvements through observation and data analysis
- Include measurable and data-driven benefits to the company, customers and employees in suggestions
- Describe roles and responsibilities for quality in an organization
- Make suggestions according to proper procedures and documentation
- Review all relevant data before making suggestions

Inspect materials and product/process at all stages to ensure they meet specifications (16%)

- Perform sampling and inspection according to schedule and procedures
- Select and use correct inspection tools and procedures
- Verify calibration of testing equipment
- Inspect materials against specifications
- Identify products, processes and materials that do not meet specifications
- Verify implementation of corrective actions through spot-checks
- Document and report inspection results to correct parties

Document the results of quality tests (7%)

- Check data forms to ensure that they are complete and accurate
- Evaluate and interpret information
- Identify and report inaccuracies in quality data and develop responses to correct them
- Forward data to correct parties
- Select and use correct analytical tools, including statistical process controls (SPC)
- Store reports for the specified time frames

Communicate quality problems (9%)

- Explain the importance of knowing when to stop process to prevent production of defective product
- Review quality problems with production operators and supervisors

- Communicate quality problems to appropriate parties
- Document quality problems according to established processes
- Summarize and report defect trends to appropriate parties
- Explain follow-up and reporting documentation procedures to ensure proper communications

Take corrective actions to restore or maintain quality (7%)

- Identify appropriate corrective actions and obtain approvals when needed
- Make clear, concise, data-supported recommendations for action
- Make recommendations to the appropriate parties
- Make adjustments in a timely manner to eliminate deviations and bring process back into control
- Document adjustments and follow-up product quality checks in correct format
- Implement corrective action/quality improvements in standardized manner

Record process outcomes and trends (12%)

- Describe the use of statistical quality tools (e.g., Root Cause Failure Analyses and Pareto charts) to reach accurate decisions about quality data
- Maintain records on quality processes
- Chart outcomes of quality processes according to appropriate methods and standards
- Report quality process performance data to appropriate parties in a timely manner
- Examine previous documentation on similar process issues to identify possible solutions

Identify fundamentals of blueprint reading (11%)

- Identify product features from a multi-view drawing
- Identify dimensions and tolerances of an object from a multi-view drawing
- Visualize objects from a multi-view drawing
- Read and interpret dimensions of an object in a technical drawing
- Identify geometric dimensioning and assembly tolerances on a drawing
- Recognize functions of sectional drawings
- Interpret assembly drawings

Use common measurement systems and precision measurement tools (11%)

- Use and convert U.S. measurement and standard international metric systems
- Measure parts using a machinist's rule and tape measure
- Measure parts using a dial and digital calipers
- Measure parts using a digital or Vernier micrometer
- Measure parts using a dial indicator
- Measure data from a digital gauge using a computer

Manufacturing Processes & Production Content Area Weighting

The following shows the relative importance of each content domain on the certification exam. When preparing for the exam, candidates should spend proportionately more time studying the content domains that are more heavily weighted.

Identify customer needs (9.5%)

- Recognize the different and common needs of internal and external customers
- Maintain customer contact about product aspects and printed specifications to ensure understanding of needs
- Ensure customer specifications are up to date
- Communicate customer needs to others including shift-to-shift, co-workers and managers
- Address issues preventing customer needs from being met
- Define principles and practice of Just-in-time (JIT) inventory control

Production Equipment Operation (15.5%)

- Explain machinery operation, set up and testing
- Describe emergency shutdown of production machines
- Describe common types of mechanisms used in machines
- Describe ways in which force and torque are used in machine operations
- Explain impact of friction on machine operation and methods
- Explain use of cams
- Define ways in which machines use pulley and gear drives
- Define basic machine tooling
- Describe basic casting, molding and stamping processes
- Describe computer numerically controlled (CNC) equipment
- Describe Human Machine Interface (HMI)
- Describe lasers in relationship to production equipment

Determine resources available for the production process(9.5%)

- Check raw materials against work orders
- Check tools and equipment against work orders
- Communicate discrepancies to the proper parties
- Describe equipment capabilities to maximize productivity
- Ensure that necessary resources are available at workstation
- Schedule workers with appropriate skills according to production needs
- Describe Artificial Intelligence (AI)
- Describe Additive Manufacturing (AM) or 3D Printing
- Describe Nanomanufacturing
- Explain Mechatronics

Set up and verify equipment for the production process (12.5%)

- Make proper repairs and adjustments to production equipment prior to putting into service
- Ensure set-up meets process requirements and product specifications
- Describe lubricants and coolants to make the proper selection
- Set up, program and operate a computerized control process
- Ensure first piece or production run meets specifications
- Document set-up procedures to ensure repeatability
- Ensure set-up meets ergonomic and other relevant health, safety and environmental standards
- Ensure set up meets equipment specifications
- Describe the operation of automation equipment
- Describe Augmented Reality (AR)

Set team production goals (6%)

- Describe principles of Lean Manufacturing and High-Performance Work Organizations
- Set team goals that are specific, measurable, achievable, relevant and time-bound
- Align team goals with customer and business needs
- Ensure team goals focus the team in order to meet team objectives
- Document team goals and communicate them to all parties

Make job assignments (4%)

- Ensure job assignments match skills with the production work to be done
- Ensure job assignments maximize the use of available skills
- Ensure workers are notified of job assignments effectively

Coordinate workflow with team members and other work groups (9.5%)

- Describe lead-time required for a production plan
- Meet production schedules
- Notify team members of schedule requirements in a timely manner
- Ensure production workflow runs efficiently
- Describe types of automated material handling equipment
- Minimize downtime
- Work with others to facilitate effective workflow
- Participate in meetings and problem-solving groups

Communicate production and material requirements and product specifications (8%)

- Ensure communication reflects knowledge of production requirements, levels and product specifications
- Ensure communication reflects knowledge of material specifications and delivery issues and schedules
- Ensure communication demonstrates knowledge of customer and business production needs
- Describe various materials used in production
- Describe Advanced Materials
- Ensure communication is clear and relevant to production and products
- Track and document communications, as appropriate

Perform, monitor and document the process to make the product (9.5%)

- Describe Data Analytics
- Monitor process control data to ensure that the manufacturing process is meeting product specifications
- Ensure manufacturing process cycle time meets customer and business needs
- Ensure product meets customer specifications
- Label products appropriately for compliance/non-compliance
- Perform production operations in a manner that fully complies with all health, safety, and environmental policies and practices
- Describe the Industrial Internet of Things (IIOT)

Document product and process compliance with customer requirements (6%)

- Complete documentation of compliance legibly
- Write documentation of compliance in the appropriate format and store correctly
- Forward documentation of compliance to the proper parties
- Complete documentation and obtain "sign off"
- Label products appropriately for compliance/non-compliance

Prepare final product for shipping or distribution (10%)

- Ensure packaging materials meet packaging and shipping specifications, including proper labeling and safety requirements
- Describe barcodes and their use
- Ensure completed documentation of customer packaging and shipping instructions accompany product to next destination
- Communicate product availability to the proper parties in a timely manner
- Check product and all relevant information, such as quantity, destination and packaging instruction, against the work order
- Store or stage product for shipping
- Follow all laws and regulations with regard to labeling, packaging and transport
- Follow material handling procedures to prevent product damage

Maintenance Awareness Content Area Weighting

The following shows the relative importance of each content domain on the certification exam. When preparing for the exam, candidates should spend proportionately more time studying the content domains that are more heavily weighted.

Perform preventive maintenance and routine repair (28%)

- Explain principles of Total Productive Maintenance (TPM)
- Monitor preventive maintenance schedule
- Follow preventive maintenance schedule
- Document preventive maintenance in a timely manner
- Communicate repair needs to the correct parties using correct procedures and forms
- Explain the most common causes of failure of equipment to diagnose problem quickly
- Check any necessary repair work through follow up
- Ensure necessary supplies are available to perform preventive maintenance
- Communicate preventive maintenance schedules, documentation, equipment needs and outstanding repairs from shift-to-shift, to team members, to managers and to others as required
- Follow all safety procedures when performing repairs
- Recognize potential maintenance issues with robotics and machine automation systems, including vision, inputs/outputs, end-of-arm tool, sensors, cabling, conveyance

Monitor indicators to ensure correct operations (24%)

- Compare current equipment performance to optimal equipment operations regularly
- Explain what equipment alarms mean
- Investigate abnormal equipment conditions
- Correct abnormal equipment conditions in a timely manner
- Monitor equipment to ensure that corrective action solved the problem
- Describe the use of sensors with production equipment
- Document equipment repair history
- Explain the use of PC Ethernet
- Describe Programmable Logic Controllers (PLC)
- Describe the basic operations of industrial robots
- Describe the use of Autonomous Robots

Perform all housekeeping to maintain production schedule (18%)

- Store tools in proper locations and integrate a system for organizing spaces so work can be performed efficiently, effectively and safely (such as 5S or 6S)
- Store materials in a safe manner
- Identify and promptly report unsafe conditions
- Take corrective action to address unsafe conditions
- Ensure workstation is clean and clear of safety hazards
- Pass scheduled housekeeping inspections
- Organize workstation to maximize efficiency

Recognize potential maintenance issues with basic production systems, including knowledge of when to inform maintenance personnel about problems with (30%)

- Electrical systems
- Pneumatic and vacuum systems
- Hydraulic systems
- Machine automation systems
- Lubrication processes
- Bearings and couplings
- Belts and chain drives

- Explain proper adjustment of chain sag, including knowledge of when to inform maintenance personnel
- Variable Frequency Drives (VFD)
- High vacuum systems
- Laser systems
- Welding

Green Production Content Area Weighting

The following shows the relative importance of each content domain on the certification exam. When preparing for the exam, candidates should spend proportionately more time studying the content domains that are more heavily weighted.

Train workers in environmental issues (13%)

- Include basic characteristics of a “green” manufacturing environment, including new trends and their impact on production workers, the company and society in workforce training
- Include the benefits of workplace environmental assurance programs to the worker, the company and society in workforce training
- Participate in environmental training for employees both at time of hire and on a recurrent basis
- Document required environmental training
- Participate in environmental training courses regarding the latest technology advancements
- Incorporate input from instructors and the results of course evaluations into routine updates of environmental training courses

Implement and promote environmental programs, projects, policies or procedures (12%)

- Document regulatory compliance
- Ensure company, local, state and federal environmental policies and procedures are communicated and posted as required
- Identify and report practices inconsistent with established environmental policies and procedures
- Report violations
- Ensure materials supporting environmental assurance programs are written consistent with needs of the intended audience
- Keep environmental assurance materials on file and readily accessible

Conduct environmental incident and hazard investigations (10%)

- Investigate environmental incidents and hazards, including near misses
- Document environmental investigation findings
- Review all environmental investigations and audits and assign corrective actions
- Check and implement prescribed actions to correct environmental problems

Conduct preventive environmental inspections (10%)

- Identify, report and document conditions that present a threat to the environment
- Identify, report and monitor potential environmental hazards in the work area
- Take corrective action to eliminate potential hazards
- Gather environmental documentation required from workers is gathered and ensure policies are followed
- Ensure inspections and audits include all relevant and required environmental laws and regulations

Monitor environmental aspects at each stage of production (16%)

- Environmental issues involved in production processes are recognized
- Identify and monitor relevant environmentally significant aspects in the production process for each stage of production to determine whether practical environmental improvements can be made
- Program equipment to control and monitor the environmental impact of production processes at each stage
- Monitor environmental indicators and gauges according to established procedures and

- use computers and/or other instruments to inspect and analyze results
- Monitor consumption and conservation of resources throughout the production process
- Monitor environmentally impactful agents in the production process are to reduce environmental impact
- Monitor and evaluate energy use, areas of energy waste and emissions leakage in industrial facilities and production processes
- Identify and evaluate opportunities for enhancing energy-efficiency and reducing energy- related carbon emissions

Implement continuous improvement in environmental assurance practices (7%)

- Prioritize and inspect root causes or problems according to established hierarchy
- Maintain worker knowledge of policies and procedures for environmental issues
- Participate in meetings with all relevant groups about environmental assurance programs and developments
- Make suggestions to management for improvement in environmentally related practices

Use advanced materials in production to reduce weight and increase life (18%)

- Use designated equipment to monitor, measure and handle advanced materials
- Take and document measures to ensure cost-effective production line energy efficiency
- Read and interpret instruments to ensure required controls, including Personal Protective Equipment (PPE)
- Use environmental controls/levels required for production with advanced materials
- Adhere to environmental and quality requirements of advanced materials
- Handle advanced materials, surplus and waste according to established requirements to minimize waste
- Identify opportunities to reduce materials and volume of waste

Reprocess materials by recycling and reuse throughout product life cycle to optimize waste reduction (13%)

- Sort waste and used or rejected materials to determine which should go to re-cycling and which can be reused or repurposed inside the company
- Place waste designated for recycling into prescribed containers
- Coordinate recycling activities with contractors or other third-party representatives
- Code and label materials designated for reuse or repurpose
- Assess rejected products to determine whether the product should be repaired, reused or recycled

CPT SAMPLE QUESTIONS

The following questions are provided for your reference when preparing to take a CPT assessment. These questions will not appear on any CPT assessment. Answers to the sample assessment questions are located at the end of this section.

1. A process to verify actual inventory on hand on a continuous basis throughout the year is
 - a. Annual physical inventory
 - b. Cycle count
 - c. Barcode tracking system
 - d. Inventory intake check
2. A worker must lift a box weighing 12 pounds frequently during the day. The company should _____.
 - a. Provide a step ladder
 - b. Do nothing, it is not that heavy
 - c. Arrange to move the box to a comfortable height
 - d. Be sure that the person is tall enough to do the job
3. A lean manufacturing technique that focuses on creating a clean and orderly work area is?
 - a. Poka-Yoka (mistakeproofing)

- b. 5S program
 - c. Jidoka (building quality in)
 - d. Kanban (pull system)
4. Items susceptible to decay or spoilage are_____.
- a. Flammable
 - b. Retardant
 - c. Fragile
 - d. Perishable
5. The size of the drill bit is stamped on the_____.
- a. Lands
 - b. Flutes
 - c. Margin
 - d. Shank
6. Solve for Productivity:
- a. 16.55 pph
 - b. 441 pph
 - c. 16.33 pph
 - d. 78.83 pph
- $T = (H_s \times D) - (H_B \times D)$
 $N = N_P - N_S$
 $P = N/T$

$H_s = 6 \text{ hours/day}$
 $D = 5 \text{ days}$
 $H_B = 0.5 \text{ hours/day}$
 $N_P = 455 \text{ pieces}$
 $N_S = 6$
7. In the 5S lean strategy, what is the first step?
- a. Sustain
 - b. Shine
 - c. Sort
 - d. Standardize
8. What should you do if you notice oil dripping on parts you are producing?
- a. Call a plumber
 - b. Notify your supervisor
 - c. Shut down and fix the leak
 - d. Ignore it and keep running
9. Which document follows a product throughout the manufacturing process?
- a. Material Safety DataSheet
 - b. Bill of Material
 - c. Routing Sheet
 - d. Bill of Lading
10. What document is kept by the trucker and specifies handling and hazardous material information?
- a. Packing Slip
 - b. Bill of Lading
 - c. MSDS
 - d. Shipping Manifest
11. In manufacturing, the main value of data analytics is to uncover critical information to enable more efficient operations on the _____.
- a. Income statement
 - b. Office staff
 - c. Shop floor
 - d. Night shift

12. Autonomous robots are capable of operation _____.
- a. Without human intervention
 - b. With human intervention
 - c. With engineering only
 - d. With Maintenance only

Answer Key

1. b
2. c
3. b
4. d
5. d
6. c
7. c
8. b
9. c
10. d
11. c
12. a

CPT REGISTRATION CHECKLIST

Prior to sitting for an MSSC assessment, all candidates must register with MSSC online at <https://login.msscusa.org>

To avoid potential delays in completing your online registration, use this checklist to carefully review the required information before beginning the registration process.

Have you...

- Read this Candidate Handbook cover-to-cover?
- Arranged for payment of the correct registration and assessment fees?
- Reviewed the MSSC Code of Ethics?

Note: During the registration process, you will be asked to confirm your receipt and conformance to the policies of this Candidate Handbook and receipt and acceptance of the MSSC Code of Ethics. You are responsible for reading these documents and adhering to their requirements.