National Craft Assessment and Certification Program
S P E C I F I C A T I O N S

INDUSTRIAL MAINTENANCE MECHANIC V4
MEIDMT32_04
Released June 2013

Focus Statement
A journey-level Industrial Maintenance Mechanic should be able to:
- Identify basic safety and rigging practices
- Identify tools, equipment and best practices for oxyfuel cutting
- Solve mathematical problems such as area, volume, sine, cosine, hypotenuse and Pythagorean concepts
- Interpret construction drawings
- Identify pumps, drivers, valves and their installation and troubleshooting practices
- Create pipe fittings, perform cutting, treading and joining of piping components
- Perform hydrostatic and pneumatic testing
- Remove, troubleshoot and install bearings and couplings
- Identify components and functions of high and low pressure steam systems
- Lay out and install baseplates and soleplates with proper alignment methods
- Troubleshoot and repair equipment such as gearboxes and pumps

Overview
- Three-hour closed-book examination
- May use a basic function, non-printing calculator
- No extra papers, books, notes, or study materials are allowed
- The minimum passing score is 75
- A corresponding hands-on Performance Verification is available

NCCER Curriculum
All NCCER knowledge assessments are referenced to NCCER's curriculum modules as listed on this specification sheet. You may order modules from Pearson (800.922.0579) or from NCCER's Online Catalog at www.nccer.org.

Assessment Development
All questions are developed and approved by subject matter experts under the direction of NCCER.

Credentials
Upon successful completion of the knowledge assessment, NCCER will send applicable credentials to the assessment center.

Score Report and Training Prescription
Each candidate will have access to their assessment results including their overall score and recommended training.

NCCER Registry
Knowledge assessment results are recorded in NCCER's Registry and become a part of the portable record of an individual's NCCER credentials.

Knowledge Assessment Contents:

Content Domain	Number of Questions
Industrial Maintenance Mechanic Fundamentals (*00101-09) (32102-07) (32104-07) (32204-07)*	16
Rigging & Mobile Equipment (*00106-09) (32112-07) (32111-07)*	12
Math & Measurements *(32106-07) (32201-07) (32301-08) (32302-08)*	16
Construction Drawings *(32107-07) (32402-09)*	8
Valves & Seals *(32109-07) (32205-07) (32206-07) (32308-08)*	16
Bearings & Coupling *(32207-07) (32303-08) (32304-08)*	12
Pumps, Drives, & Plates *(32108-07) (32305-08) (32307-08)*	12
Maintenance and Troubleshooting *(32306-08) (32404-09)(32407-09) (32408-09)*	16
Steam Systems *(32208-07) (32209-07) (32210-07) (32403-09)*	16
Total Number of Questions	**124**

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Learning Objectives related to Assessment:

	Industrial Maintenance Mechanic Fundamentals
Registry ID Number:	**Module Title Objectives:**
00101-09	**Basic Safety**
	Explain OSHA's General Duty Clause and 1926 CFR Subpart C.
	Explain fall protection) ladder) stair) and scaffold procedures and requirements.
	Define safe work procedures to use around electrical hazards.
	Demonstrate the use and care of appropriate personal protective equipment (PPE).
	Explain the importance of hazard communications (HazCom) and Material Data Safety Sheets (MSDSs).
	Identify other construction hazards on your job site) including hazards material exposures) environmental elements) welding and cutting hazards) confined spaces) and fires.
32102-07	**Tools of the Trade**
	Explain the purpose of each of the tools commonly used by industrial maintenance craftworkers.
	Demonstrate the proper use and basic maintenance of selected industrial maintenance tools.
32104-07	**Oxyfuel Cutting**
	State the safety precautions for using oxyfuel equipment.
	Set up oxyfuel cutting equipment.
32204-07	**Introduction to Ferrous Metal Piping Practices**
	Identify the common malleable iron fittings.
	Identify the types of ferrous metal pipes.
	Join lengths of threaded pipe together and install fittings.
	Describe the method used to join grooved piping.
	Describe the main points to consider when installing pipe runs.
	Use and care for pipe threading machines.
	Rigging & Mobile Equipment
Registry ID Number:	**Module Title Objectives:**
00106-09	**Basic Rigging**
	Describe basic inspection techniques and rejections criteria used for slings and hardware.
	Identify and describe the use of slings and common rigging hardware.
	Describe basic hitch configurations and their proper connections.
	Describe basic load-handling safety practices.
32111-07	**Material Handling and Hand Rigging**
	Identify basic rigging and crane safety procedures.
	Use and understand the correct hand signals to guide a crane operator.
	Select) use) and maintain special rigging equipment) including: · Jacks · Block and tackle · Chain hoists

	· Come-alongs
	Tie knots used in rigging.
	Inspect common rigging equipment.
	Identify and describe the uses of common rigging hardware and equipment.
32112-07	**Mobile and Support Equipment**
	Explain the operation and applications of the following motor-driven equipment commonly used in industrial plants: · Portable generators · Air compressors · Aerial lifts · Forklifts · Mobile cranes
	Math & Measurements
Registry ID Number:	**Module Title Objectives:**
32106-07	**Craft-Related Mathematics**
	Identify and explain the use of special measuring devices.
	Use tables of weights and measurements.
	Use formulas to solve basic problems.
	Solve area problems.
	Solve volume problems.
	Solve circumference problems.
	Solve right triangles using the Pythagorean theorem.
32201-07	**Basic Layout**
	Identify layout tools and explain their uses.
	Scribe straight lines.
	Lay out base lines using the arc method.
	Lay out base lines using the 3-4-5 method.
32301-08	**Advanced Trade Math**
	Perform right angle trigonometry.
	Calculate takeouts) using trigonometry.
32302-08	**Precision Measuring Tools**
	Use a level.
	Use calipers.
	Use a micrometer.
	Use speed measurement tools.
	Use a dial indicator.
	Construction Drawings
Registry ID Number:	**Module Title Objectives:**
32107-07	**Construction Drawings**
	Explain the basic layout of a blueprint.
	Describe the information included in the title block of a blueprint.
	Identify common symbols used on blueprints.
	Identify the types of lines used on blueprints

	Understand the use of architect's and engineer's scales.
32402-09	**Advanced Blueprint Reading**
	Identify and explain the parts of a machine drawing.
	Read and interpret P&IDs) GAs) and ISO piping drawings.
	Valves & Seals
Registry ID Number:	**Module Title Objectives:**
32109-07	**Valves**
	Identify types of valves that start and stop flow.
	Identify types of valves that regulate flow.
	Identify valves that regulate the direction of flow.
	Explain valve locations and positions.
32205-07	**Identify) Install) and Maintain Valves**
	Replace valve stem O-rings.
	Replace bonnet gaskets.
	Remove and install threaded valves.
	Repack a valve.
	Remove and install flanged valves.
32206-07	**Hydrostatic and Pneumatic Testing**
	Explain nondestructive examinations (NDE).
	Perform head pressure tests.
	Perform hydrostatic tests.
	Perform pretest requirements.
	Explain how to perform steam blow tests.
	Perform service and flow tests.
32308-08	**Installing Mechanical Seals**
	Identify types of mechanical seals and explain their applications.
	Bearings & Couplings
Registry ID Number:	**Module Title Objectives:**
32207-07	**Introduction to Bearings**
	Identify various types of bearings.
32303-08	**Installing Bearings**
	Remove bearings.
	Troubleshoot bearing failures.
	Install bearings.
32304-08	**Installing Couplings**
	Identify and explain coupling types.
	Install couplings.
	Pumps) Drivers & Plates
Registry ID Number:	**Module Title Objectives:**
32108-07	**Pumps and Drivers**
	Identify and explain centrifugal pumps.

	Identify and explain rotary pumps.
	Identify and explain reciprocating pumps.
	Identify and explain metering pumps.
	Identify types of drivers.
32307-08	**Installing Belt and Chain Drives**
	Identify belt drive types.
	Identify and explain chain drive types.
	Install chain drives.
32305-08	**Setting Baseplates and Prealignment**
	Establish baseplate and soleplate locations.
	Install baseplates and soleplates.
	Field-verify a plate installation
	Identify the proper anchor bolts for installation.
	Maintenance and Troubleshooting
Registry ID Number:	**Module Title Objectives:**
32306-08	**Conventional Alignment**
	Explain types of misalignment.
	Align couplings using feeler gauge) straightedge) and dial indicator methods.
	Identify and eliminate coupling stress.
32404-09	**Reverse Alignment**
	Set up complex reverse dial indicator jigs.
	Explain the conditions that can cause misalignment.
	Perform reverse dial indicator alignment) using a graphical alignment chart and using a mathematical equation.
32407-09	**Troubleshooting and Repairing Pumps**
	Troubleshoot a pump.
	Inspect a pump.
	Remove a pump from the system.
	Reassemble a pump.
32408-09	**Troubleshooting and Repairing Gearboxes**
	Explain how gears operate and identify types of gears.
	Troubleshoot gearboxes.
	Identify types of gearboxes and use diagnostic charts.
	Steam Systems
Registry ID Number:	**Module Title Objectives:**
32208-07	**Low-Pressure Steam Systems**
	Describe the basic steam heating cycle.
	Recognize the components of a basic steam heating system) including steam traps) and describe their function(s).
	Describe the safeguards associated with the operation of a low-pressure steam system.
	Demonstrate how to install troubleshoot) and maintain selected steam traps.
32209-07	**High-Pressure Steam Systems**
	Describe the components and operation of a high-pressure steam system.

32210-07	**Distillation Towers and Vessels**
	Explain the shakeout for a repair job.
	Identify the various types of towers and their components.
	Identify materials) components) and layout of a tray.
	Identify the types of trays and their applications.
	Identify the types of packing and packing materials.
	Discuss the functions of various types of towers.
32403-09	**Compressors and Pneumatic Systems**
	Identify and explain types of compressors.
	Explain the principles of compressor operation.
	Explain compressed-air treatment.
	Identify and explain pneumatic system components and symbols.
	Explain the pneumatic transmission of energy.