



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

**BOILERMAKER – PRESSURE VESSEL V2**

**BLMK34\_02**

*October 2014*

**Focus Statement**

A journey level boilermaker is skilled in all aspects of safe boiler and boiler component assembly and maintenance including welding, pipe fabrication, and stress relieving. A boilermaker is also knowledgeable in oxyfuel cutting, identifying and installing valves, pipe hangers and supports, rigging, and able to read boiler drawings and detail sheets.

**Overview**

- Two-hour closed-book examination
- Permitted to use a basic function, non-printing calculator
- No extra papers, books, notes or study materials are allowed
- Approved reference: *The Pipefitters Blue Book* by W.V. Graves
- The score for this assessment is 75
- A corresponding Performance Verification is available at [nccer.org](http://nccer.org)

**Study Materials**

All NCCER written assessments are referenced to NCCER’s curriculum listed in the content. You may order modules from Pearson (1.800.922.0579) or from NCCER’s Online Catalog at [www.nccer.org](http://www.nccer.org)

**Written Assessment Contents:**

<b>Content Domain</b>	<b>Number of Questions</b>
<b>Boilermaker Fundamentals</b> [34102-10, 34103-10, 34104-10, 34201-11, 34301-11, 34302-11, 34306-11]	29
<b>Cutting Basics</b> [34105-10, 34106-10, 34210-11, 29103-09]	11
<b>Welding Basics</b> [34107-10, 34108-10, 34206-11, 34407-12]	13
<b>Piping, Tubing, and Valves</b> [34202-11, 34203-11, 34205-11, 34207-11, 34208-11, 34303-11, 34308-11, 08402-07]	30
<b>Rigging</b> [15206-07, 34410-12]	6
<b>Construction Drawings</b> [34204-11, 34402-12]	7
<b>Math</b> [34401-12]	4
<b>Total Number of Questions</b>	<b>100</b>

**Assessment Development**

All questions on each assessment have been developed and approved by subject matter experts from the respective craft. Assessment development and administration is under the direction of Prov<sup>TM</sup>, NCCER’s testing partner.

**Credentials**

NCCER will send appropriate credentials (certificate, wallet card and official transcript) to the assessment center upon successful completion of the written assessment.

**Training Prescription Reports**

Each candidate will have access to individual results of the written assessment from Prov’s website at [www.provexam.com](http://www.provexam.com). This training prescription will include the overall score and results by topic area.

**Registry**

Assessment results will be maintained in NCCER’s Registry and become a part of each candidate’s training records. These records are stored and become a portable record of the candidate’s training and assessment achievements.



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**Learning Objectives related to Assessment:**

<b>Module Number:</b>	<b>Objective:</b>
<b>34102-10</b>	<b>Boilermaking Safety</b>
	List the specific hazards associated with the boilermaking field.
	Describe the respiratory hazards encountered by boilermakers.
	Identify the hazards associated with working at heights.
	Describe the equipment used to work at heights and identify the certification requirements needed to operate that equipment.
<b>34103-10</b>	<b>Boilermaking Tools</b>
	List the safety precautions associated with: <ul style="list-style-type: none"> <li>• Hand tools</li> <li>• Electric tools</li> <li>• Pneumatic tools</li> <li>• Hydraulic tools</li> </ul>
	Identify tools used by boilermakers: <ul style="list-style-type: none"> <li>• Hand tools</li> <li>• Electrical tools</li> <li>• Pneumatic tools</li> <li>• Hydraulic tools</li> </ul>
	Select the tools required for given applications.
<b>34104-10</b>	<b>Basic Materials</b>
	Describe the different types of iron and steel.
	Identify codes and markings used in material identification.
<b>34105-10</b>	<b>Oxyfuel Cutting</b>
	State safety precautions associated with oxyfuel cutting.
	Identify and explain oxyfuel equipment components.
	Explain and demonstrate how to set up, light, and adjust oxyfuel equipment.
	Explain and demonstrate how to shut down, disassemble, and change out oxyfuel equipment.
	Describe and demonstrate the steps needed to perform specific oxyfuel cutting tasks: <ul style="list-style-type: none"> <li>• Straight line and square shapes</li> <li>• Piercing and slot cutting</li> <li>• Bevels</li> <li>• Washing</li> </ul>
	Describe the operation of motorized, portable oxyfuel cutting machines.
<b>34106-10</b>	<b>Cutting and Fitting Gaskets</b>
	Identify and explain gasket types.
	Identify and explain gasket materials.
	Lay out and cut gaskets.
<b>34107-10</b>	<b>Base Metal Preparation</b>
<b>34108-10</b>	<b>Welding Basics</b>
	Identify the different welding processes and welding equipment commonly used in boiler work.
	Set up a shield-gas purge on a pipe to be welded.
	Identify the specialized personal protective equipment needed when performing welding and demonstrate the ability to use this equipment properly.
	Identify the specific safety hazards associated with welding and cutting in a boiler environment.
	Identify the types of welding joints, their critical dimensions, and their applications.
	Identify the different code requirements that apply to the construction and maintenance of boilers.
	Explain the different qualification and certification requirements that apply to welders working on a

	boiler.
	Identify welding rods and/or filler metals by their markings.
<b>34201-10</b>	<b>Boiler Design and Components</b>
	Explain the different boiler configurations.
	Explain the different boiler applications.
	Identify boiler components.
	Explain different boiler component functions.
<b>34202-10</b>	<b>Identifying and Installing Valves</b>
	Identify types of valves that start and stop flow.
	Identify types of valves that regulate flow.
	Identify types of valves that relieve pressure.
	Identify types of valves that regulate the direction of flow.
	Interpret valve markings and nameplate information.
<b>34203-10</b>	<b>Pipe Hangers and Supports</b>
	Identify types of pipe hangers and supports.
	Identify and interpret pipe support drawings and symbols.
	Determine field placement of hangers.
	Identify and install concrete fasteners.
	Identify and explain the types of variable spring can supports.
	Identify and explain the types of constant spring can supports.
	Explain how to install spring can supports.
	Explain how to maintain spring can supports.
<b>34204-10</b>	<b>Drawings and Detail Sheets</b>
	Identify parts of drawings.
	Identify types of drawings.
	Interpret drawing indexes and line lists.
<b>34205-10</b>	<b>Fasteners and Anchors</b>
	Identify and explain the use of threaded fasteners.
	Identify and explain the use of non-threaded fasteners.
	Identify and explain the use of anchors.
<b>34206-10</b>	<b>Welding Symbols</b>
	Identify and explain the various parts of a welding symbol.
<b>34207-10</b>	<b>Socket Weld Pipe Fabrication</b>
	Identify and explain socket weld fittings.
	Read and interpret socket weld piping drawings.
	Determine pipe lengths between socket weld fittings.
<b>34208-10</b>	<b>Butt Weld Pipe Fabrication</b>
	Identify butt weld piping materials and fittings.
	Read and interpret butt weld piping drawings.
	Determine pipe lengths between fittings.
<b>34210-10</b>	<b>Air Carbon Arc Cutting and Gouging</b>
	Identify and explain the air carbon arc cutting (CAC-A) process and equipment.
<b>29103-09</b>	<b>Plasma Arc Cutting</b>
	Select the correct amperage and gas pressures or flow rates for the types and thickness of metal to be cut.
<b>34301-12</b>	<b>Boiler Pressure Components</b>
	Identify the pressure components of a boiler and their locations.
	Explain the procedures required to repair the pressure components of a boiler.
<b>34302-12</b>	<b>Boiler Nonpressure Components</b>
	Identify the nonpressure components of a boiler and their locations.
	Explain the procedures required to repair the nonpressure components of a boiler.
<b>34306-12</b>	<b>Boiler Auxiliaries</b>
	Identify and describe airflow systems.

	Explain how solid fuels (coal, biomass, and trash) are used to fire furnaces.
	Explain how a semi-solid fuel, such as black liquor, is used to fire furnaces.
	Describe ash removal systems and their maintenance.
	Explain the equipment used in environmental protection.
	Identify and describe a feedwater system and blow down tank.
<b>34303-12</b>	<b>Advanced Tube Work</b>
	Explain the method for identifying problem tubes.
	Describe the method for extracting tubes.
	Describe the method for rolling tubes.
	Explain the method for plugging tubes.
<b>34308-12</b>	<b>Testing Piping Systems and Equipment</b>
	List pretest requirements.
	Describe service and flow tests.
	Explain head pressure tests.
	Describe hydrostatic tests.
	Explain how to perform steam blow tests.
<b>15206-07</b>	<b>Rigging</b>
	Identify and describe the uses of common rigging hardware and equipment.
	Inspect common rigging equipment.
	Identify special rigging equipment, including: <ul style="list-style-type: none"> <li>• Chain hoists</li> <li>• Come-alongs</li> <li>• Jacks</li> <li>• Tugger</li> </ul>
	Identify knots used in rigging.
	Identify the correct hand signals to guide a crane operator.
	Identify basic rigging and crane safety procedures.
	Explain load balancing.
<b>34401-12</b>	<b>Advanced Trade Math</b>
	Use tables of equivalents.
	Use unit conversion tables.
	Perform right angle trigonometry.
	Calculate weights of objects.
	Calculate takeouts using trigonometry.
<b>34410-12</b>	<b>Advanced Rigging</b>
	Explain how cribbing is used to support loads.
	Describe how grip hoists and skids are used to move loads laterally.
<b>34402-12</b>	<b>Advanced Boilermaking Construction Drawings</b>
	Identify symbols and abbreviations on piping and instrumentation drawings (P&IDs).
	Identify piping arrangement drawings.
	Read and interpret the following: <ul style="list-style-type: none"> <li>• GPS coordinates, control points, and elevation</li> <li>• P&amp;IDs, plan views, and section views</li> <li>• Isometric drawings</li> <li>• Spool drawings taken from isometric drawings</li> <li>• Boiler plan views, section views, and details</li> </ul>
<b>08402-07</b>	<b>Advanced Pipe Fabrication</b>
	Calculate simple piping offsets.
	Calculate three-line, 45-degree, unequal-spread offsets around a vessel.
	Calculate three-line, 45-degree, unequal-spread offsets.
	Layout three- and four-piece mitered turns.
	Layout and fabricate a fishmouth.
	Layout and fabricate a wye.

<b>34407-12</b>	<b>Quality Assurance</b>
	Identify and explain weld imperfections and their causes.
	Identify and explain nondestructive examination practices.