

Massachusetts CTE Teacher Testing Program Stationary Engineering Content Outline

Written and Performance Exam General Overview

- The intent of this exam is to assess the candidate's ability to teach the skills found in the Massachusetts Technical Education Framework.
- The written exam is a state-developed exam aligned to the frameworks which can be accessed [here](#). The performance exam is a NOCTI-developed teacher test and has been determined by DESE to align to the state frameworks.
- Many questions and tasks require a synthesis of knowledge based on experience in the field and may not be found in any book.
- Use this exam outline and the Massachusetts Technical Education Framework to focus your preparation for the exams.
- Candidates are encouraged to prepare for their written exam by reviewing textbooks and reference material which have been listed as part of this exam outline. These resources can be found using online search tools, online vendors, and websites.

Written Exam

- Number of Questions: 100
- Administration Time: 3 hours
- Passing Score: 70.0%
- Administration Method: Remote Proctored Online Testing Session

Written Exam Content Coverage

10%	<i>Safety and Health</i>
25%	<i>Fundamentals of Stationary Engineering</i>
5%	<i>Health and Energy</i>
4%	<i>Chapter 46 Massachusetts General Laws and the A. SME Code</i>
10%	<i>Related Fundamental Mathematics</i>
25%	<i>Fundamentals of Boiler Operations</i>
10%	<i>Joining and Assembling Piping and Associated Accessories</i>
6%	<i>Mechanic Drive Systems</i>
5%	<i>Fundamentals of Electricity Systems</i>

Written Exam Reference Materials (Reference Current Edition)

- **Boiler Operators Workbook** by Dean R. Wilson (American Technical Publishers)
- **Boiler Operators Exam Preparation Guide** by Theodore B. Sauselin (McGraw-Hill)
- **Stationary Engineering** by Harold J. Frost, and Daryl R. Frederick, and M. Steingress (American Technical Publishers)

Materials Needed for the Written Exam

- A four-function calculator is included in the online testing system. No other calculators are permitted.
- Scrap paper and pencil/pen are permitted.

Written Exam Sample Items

Each question on the exam consists of one incomplete sentence or question followed by four choices. Some items reference an image or diagram. A few sample items are included below; the correct answer is designated with an asterisk (*).

A steam pressure gauge is calibrated in:

- a. btu's per pound.
- b. pounds per cubic inch.
- c. inches per temperature increase.
- d. pounds per square inch. (*)

A direct cause of over-heating of the boiler tubes is:

- a. soot formation.
- b. over-firing.
- c. insufficient air.
- d. scale formation on the tubes. (*)

NOCTI Performance Exam

- Administration Time: 3 hours and 40 minutes
- Passing Score: 70.0%
- Administration Method: Onsite at a DESE approved Massachusetts Area Testing Center (MATC) location. Candidates must register and schedule their exam session through NOCTI.

Performance Exam Content Coverage

14% Identify Boiler Fittings

Participant will identify all labeled parts of the boiler.

21% Perform Work on Steam and Water Systems

The participant will repair and rebuild a steam trap as per standard operating procedures.

27% Maintain Boiler Water Level

Participant will start the boiler feedwater pump to maintain water level and perform a bottom boiler blowdown.

- 7% Perform the Duties and Functions of an Auxiliary Equipment Operator**
Participant will remove and clean the oil system strainer in accordance with safety and maintenance procedures.
- 21% Perform Maintenance Functions**
Participant will remove, clean, and reinstall the fuel burner gun, then replace the gauge glass following standard safety and maintenance procedures.
- 10% Safety**
Participant will follow all facility safety procedures and use appropriate PPE while performing assigned tasks.

Performance Exam Requirements

Candidate Supplied

Candidates must bring all appropriate Personal Protective Equipment (PPE), attire/uniform, and any other safety items as is routinely expected to be used by an employee in the related industry. If the candidate does not bring what is needed to safely complete all jobs on the exam as required in the workplace, the testing session will need to be rescheduled at the candidate's expense.

Site Supplied

Additional equipment and supplies needed to complete the jobs on the performance test will be provided by the testing site. It is also the testing site's responsibility to provide exam assistants to serve as patients, customers, or other roles required for the exam.

Performance Exam Site Requirements

Testing Sites may have individual requirements based on location and any relevant and current guidance from the Center for Disease Control and Prevention (CDC)