



the pressure equipment safety authority

REFERENCE SYLLABUS

For

SPECIAL BOILER OPERATOR'S

**CERTIFICATE of COMPETENCY
EXAMINATION**

AB-57

Edition 1, Revision 1, 2017-09

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EXAMINATION

GENERAL INFORMATION

Introduction:

As provided for under the Power Engineers Regulation, the Administrator in the pressure equipment discipline has established this Syllabus to identify the examination subjects for the Special Boiler Operator's Certificate of Competency examination.

The requirements to qualify for a Special Boiler Operator's Examination are outlined in Section 22 of the Power Engineers Regulation.

Requirements to challenge the examination are:

Previous Certificate: none
Education Prerequisites: none
Operating Experience: must be currently employed in the operation of a power plant not exceeding 250kW

Application to Undertake Examination:

A candidate must submit an application and the prescribed fee at least twenty-one (21) days before the date of examination.

Examination Instructions:

The examination consists of one (1) examination paper with 50 multiple-choice questions, 1 ½ hours duration.

To pass a Special Boiler Operator's Certificate of Competency examination, a candidate must obtain at least 65% of the total marks allotted.

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Materials available to prepare for examination:

- The Safety Codes Act and Regulations under the Safety Codes Act
- Boiler Operation and Maintenance Manuals
- Manufacturer's operation manuals such as:
 - Cleaver Brooks Boiler room Guide
 - Fulton Tubeless Boiler Guide
- Course materials such as:
 - PanGlobal Special Boiler Operator Course
- Handbook of Formulae and Physical Constants, Steam Tables and Refrigeration Tables are normally provided
- A non-technical English language dictionary
- Pens and pencils
- Non-programmable calculator

Note:

- The candidate must provide picture ID to the Examiner prior to the examination.
- No cell phone or any electronic communication devices are allowed to be brought into the examination room.
- The items referenced above must be shown to the Examiner for approval.
- No other reference material is allowed.
- The information in the 1983 Edition of the ASME Boiler and Pressure Vessel Code Academic Extract is outdated. Using this 1983 Edition of the ASME Extract for any power engineering examination is not recommended. Besides using the 2007 Edition of the ASME Academic Extract and Supplement, candidates may use the current edition of the ASME Code.

1. **Knowledge of the Safety Codes Act and regulations under the Safety Codes Act as they apply to the operation of a small power plant:**
 - a. Safety Codes Act
Sections: 1(e)(v)(w)(x)(y)(bb), 5, 34, 35, 41, 42, 43, 47, 48, 59, 67, 68, 69
 - b. Power Engineers Regulation
Sections: 1(a)(b)(e)(f)(i)(o), 2(5) & (9), 5, 6, 9(11), 12, 22, 27, 28
 - c. Pressure Equipment Safety Regulation
Sections: 1(c)(d)(h)(i)(k)(x), 33, 35, 36, 37, 38, 39, 40
 - d. Pressure Welders Regulation
Sections: 2

2. **Understand the difference in types of small power boilers:**
 - a. Firetube and tubeless type boilers
 - b. Electrode and immersion type electric boilers

3. **Boiler fittings:**
 - a. Knowledge of how fittings are installed in order to comply with the Regulations.
 - b. Knowledge of construction and testing of gauge glass and water column.
 - c. Knowledge of safety valve components, operation and testing.
 - d. Understand the purpose and function of all boiler fittings.

4. **Boiler controls and safety devices:**

- a. Knowledge of feedwater control.
- b. Knowledge of steam pressure control.
- c. Basic understanding of an automatic programmed combustion control on a packaged type boiler.
- d. Understand the purpose and testing of boiler safety devices.
 - i. Low water fuel cut off.
 - ii. Low air pressure fuel cut off.
 - iii. High and low gas pressure fuel cut offs.
 - iv. High steam pressure fuel cut off.
 - v. Flame failure detectors.

5. **Combustion:**

- a. Knowledge of draft equipment and control.
- b. Basic theory of combustion.
- c. Causes and prevention of furnace explosions.
- d. Necessity of good air supply to boiler room.

6. **Operation and maintenance of boilers:**

- a. Preparing a boiler for operation.
- b. Start up and shut down procedures
- c. Knowledge of thermal shock and water hammer.
- d. Routine operation and checks.
- e. Response to emergency conditions.
- f. Cleaning and preparing a boiler for inspection.
- g. Causes and prevention of pressure-side explosions.
- h. Routine maintenance and inspection.

7. **Basic knowledge of water treatment:**
- a. Water and its impurities.
 - b. Understanding of water pH.
 - c. Boiler water corrosion.
 - d. Boiler water conditioning.
 - e. Boiler water problems – sludge, scale and foaming.
8. **Fire prevention and plant safety:**
- a. Classifications of fires.
 - b. Types of fire fighting equipment.
 - c. General plant safety and housekeeping.