



## LIMITED POWER ENGINEER'S (TRACTION) SYLLABUS

### GENERAL INFORMATION

This Syllabus is intended to assist candidates in their preparation for writing the examination. It contains the recommended body of knowledge required. It is strongly advised that, before undertaking this Examination, the candidate completes an appropriate study course and is familiar with the operation and maintenance of steam traction engines in general. The Western Development Museum offers courses to this extent.

### EXAMINATION INFORMATION

- Exam Type:** 75 question multiple choice  
**Writing Time:** 1.5 hrs  
**Exam Materials:** *The Boiler and Pressure Vessel Act, 1999*  
*The Boiler and Pressure Vessel Regulations (effective Jan 1, 2007)*  
*CSA B51-03 Boiler, Pressure Vessel and Pressure Piping Code*  
*Non programmable calculator*  
**Passing Grade:** 65%

To apply to write this examination the following forms must be filled in as complete as possible and submitted to the ministry with the fee required 21 days prior to the scheduled sitting.

- ***LIB-2010 Application for Power Engineering Exams***
- ***LIB-0003 Client Authorization Payment Form***

The most current and up to date forms can be found on the ministries website at the link below:

<http://www.cps.gov.sk.ca/Boiler-and-Pressure-Vessel-Safety-forms>

The forms and payment can be faxed, mailed, or dropped off in person to the addresses below. If mailing please ensure it's received by our offices 21 days prior to the scheduled sitting.

Manager of Examination & Certification  
Boiler and Pressure Vessel Safety  
330 – 1855 Victoria Avenue  
REGINA SK S4P 3T2

Manager of Examination & Certification  
Boiler and Pressure Vessel Safety  
952 – 122 3<sup>rd</sup> Avenue N  
SASKATOON SK S4P 3T2

Please be aware that candidates failing to obtain a passing grade will be required to wait 30 days before they will be eligible to reapply for examination.



## SYLLABUS INFORMATION

### ***The Boiler and Pressure Vessel Act & Regulations and Reference Codes***

1. A general knowledge of *The Boiler and Pressure Vessel Act and Regulations*.
2. Operator staffing requirements for traction engines.
3. Duties of an operator or owner as specified by *The Boiler and Pressure Vessel Act*
4. An awareness of the purpose and importance of the CSA and ASME Codes.

### ***Boiler Principles and Thermodynamics***

1. Knowledge of and conversion ability for the Fahrenheit and Celsius temperature scales.
2. Heat characteristics and methods of heat transmission (radiation; conduction; convection; sensible and latent heat; vaporization).
3. Properties of steam and water (relationship of pressure to boiling point; expansion properties of steam).
4. Temperature measurement (thermometer types).

### ***Boiler Design***

1. Boiler terminology (defining common boiler terms)
2. Various boiler types: their advantages and disadvantages (fire tube, water tube, scotch, HRT)
3. Common locomotive boiler makes (Case; Reeves; Huber; Minneapolis)

### ***Construction, Materials and Parts***

1. Boiler plate and riveted joints (tensile strengths of plate, types of riveted joints and their strength).
2. Locomotive boiler parts (barrel; heads; dome; firebox; crown sheet; water legs; stays; tube sheets; tubes; dry pipe).
3. Engine parts and terms (fly wheel; crank shaft; piston; cylinder; steam chest and valves; governor; lap; head; dead centre; cross head; connecting rod; compensating, reversing, and differential gears; friction clutch).

### ***Fuels and Combustion***

1. Various fuels (coal; wood; straw; special firing applications).
2. Special combustion components (spark arrester; special grates; fire brick arch).
3. Firing techniques (fire door closed; coal and wood burning draft control).

### ***Boiler Operation and Maintenance***

1. Start up and shut down procedures (starting the fire; condensation problems during start up).
2. Abnormal conditions (low water; safety valve seized open or closed; priming or foaming; explosions).
3. Boiler cleaning, inspections and prolonged shut down (fireside and waterside cleaning; hydrostatic tests).
4. Chemical feeder types.
5. Engine adjustments (valve setting methods; knocking causes and remedies).
6. Boiler repairs (replacement of tubes; stay repair or replacement; piping repair).



***Feedwater System/Pumps and Injectors***

1. Feedwater system components (steam and water supply line; feedwater line; pump or injector).
2. Pump types and terms (simplex; duplex; cross-head; gear).
3. Injectors (principle of operation; parts).
4. Operation problems (causes of injector or pump malfunction).

***Lubrication and Packing***

1. Repacking of glands (proper alignment of components; correct packing tightness).
2. Lubrication of bearings (frequency; overheating; adjustments).
3. Lubrication types and application methods (gravity drip oiler; oil and grease cups; hydrostatic lubricators)

***Miscellaneous Items***

1. Whistle signals
2. Operating the engine on inclined surfaces.

***End***

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