Boiler & Pressure Vessel

Syllabus

for

Greenhouse Boiler Operator

Certificate of Qualification Examination

Prerequisites to obtain a Greenhouse Boiler Operator Certificate (GBO)

An applicant for a greenhouse boiler operator certificate of qualification must

(a) be employed at, and have experience in the operation of, a greenhouse plant for a period of not less than 30 days,

(b) have successfully completed a greenhouse boiler operator's course that has been approved by a provincial safety manager,

(c) have passed the greenhouse boiler operator certificate of qualification examination, and

(d) demonstrate to a safety officer a thorough knowledge of the
  (i) operation of the plant in which the applicant is employed, and
  (ii) duties and responsibilities of a plant operator.

Greenhouse Plant

A greenhouse plant is

(a) a plant named on a greenhouse boiler operator's certificate of qualification, and

(b) a low temperature low pressure fluid plant that operates at a temperature not exceeding 100oC at a maximum gauge pressure of 206 kPa and does not exceed 1 000 m2 of boiler capacity.

Restrictions on Greenhouse Boiler Operator Certificate

A greenhouse boiler operator certificate of qualification is valid only for the time that the individual named on the certificate of qualification is employed at the plant named on the certificate of qualification and for the plant capacity stated on the certificate of qualification.

Subject Areas of study

Each of the 10 subsections is weighted at approximately 10%.

1. B.C. Boiler and Pressure Vessel Safety Legislation:
   - 1.1 *Safety Standards Act* and applicable regulation;
   - 1.2 Responsibilities of a **GBO** certificate holder;
   - 1.3 Responsibilities of a plant safety committee;
   - 1.4 Horticulture boiler plant safety procedures;
   - 1.5 Reporting of accidents and incidents;
   - 1.6 CSA B51 general code knowledge; and
   - 1.7 Log books and records, why signed and dated, and their use.

2. Thermodynamic principles of horticultural boilers:
   - 2.1 Types of greenhouse heating systems;
   - 2.2 Types of boilers;
   - 2.3 Boiler energy sources;
   - 2.4 Transfer of heat energy
   - 2.5 Temperature and heat measurements and calculations; and
   - 2.6 Boiling point and applied pressure.

3. Definition of boiler equipment terms:
   - 3.1 Hot water boiler components;
   - 3.2 Steam boiler components; and
   - 3.3 Switches, valves and boiler safety equipment.

4. Functional aspects of horticultural boiler design:
   - 4.1 Boiler functions;
   - 4.2 Types of boilers;
   - 4.3 Materials used in boiler construction; and
   - 4.4 Capacity and operating ranges of boilers.

5. Horticultural fire-tube boilers:
   - 5.1 Manufacturers and
   - 5.2 Boiler structure

6. Purpose and operation of basic fittings on horticultural boilers
   - 6.1 Boiler fittings required by boiler and gas codes;
   - 6.2 Pressure gauges;
   - 6.3 Thermometers;
   - 6.4 Relief valves.

7. Fuels and combustion process:
   - 7.1 Fuels used in horticultural boilers;
   - 7.2 Combustion process, efficiency and safety; and
   - 7.3 Boiler efficiency.

8. Operation and testing of horticultural boilers and combustion controls:
   - 8.1 Low-water fuel cut-offs;
   - 8.2 Temperature controls;
   - 8.3 Flame safeguard devices;
   - 8.4 Sequence of flame safeguard operation; and
   - 8.5 Gas burners and regulators.

9. Operation and maintenance of horticultural boilers
    - 9.1 Routine operation and initial start-up;
    - 9.2 Treatment of boiler water;
    - 9.3 Heating and ventilation; and
    - 9.4 Pumps.

10. Plant safety and horticulture boiler room piping:
    - 10.1 Piping systems;
    - 10.2 Expansion tanks; and
    - 10.3 Safety Procedures.