TECHNICAL SAFETY BC

BOILERS, PRESSURE VESSELS, AND REFRIGERATION

Boiler Plant Registration

Self-Assessment Guide

Date: November 1, 2023

Technical Safety BC is an independent, self-funded organization mandated to oversee the safe installation and operation of technical systems and equipment.

In addition to issuing permits, licences, and certificates, we work with industry to reduce safety risks through assessment, education and outreach, enforcement, and research.

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Disclaimer:

Please note that references to the legislation, codes, directives, safety orders, and web pages throughout this document may not reflect the most recent versions available.

Therefore, the user should make sure that references are current and relevant to any situation that they are dealing with.

The latest version of this document is available in PDF format on the Technical Safety BC website: https://www.technicalsafetybc.ca/ , Toll free: 1.866.566.7233

TECHNICAL SAFETY BC

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1. Introduction

This boiler plant registration self-assessment guide has been developed to assist plant owners in evaluating their systems and equipment to determine whether registration is required under section 62.1 of the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation.

Additionally, this guide provides information on how to apply for a boiler plant operating permit and what details are required if it is determined that registration is required for the type and size of plant.

2. Overview

What is a boiler plant?

A “plant” is defined as a boiler, or assembly of boilers (and any ancillary vessels) connected to a common heating, steam, or power system through a single header. A plant can be as small as a single boiler or can be made up of an array of boilers and pressure equipment on a premise.

When is a boiler plant operating permit required?

Owners of the following boiler plant classifications are required to obtain a boiler plant operating permit in accordance with section 62.1 of the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation:

- 1st, 2nd, 3rd, 4th and 5th class plants
- Oil well plants

This permit is separate from the individual boiler operating permit(s) for specific equipment, as it encompasses considerations for the entire plant. The permit is required for all plants, including those designated as a “special status plant”.

What are the benefits of obtaining a boiler plant operating permit?

Boiler plant operating permits will help those who operate plants:

- Gain confirmation of compliance;
- Gain knowledge of required plant operator qualifications;
- More effectively oversee their regulated boiler equipment; and
- Track a power engineers’ firing time (hours of professional work) in the plants they operate.

Boiler plant operating permits also help Technical Safety BC:

- Understand the connected set of boiler equipment as a system;
- Better assess areas of risk; and
- Clarify plant classification, staffing requirements, and roles and responsibilities with owners, users, and individuals who oversee plant operations.

3. Boiler Plant Types and Classification

The following boiler plant types and sizes require registration under section 62.1 of the Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation. Once the boiler plant type has been determined, you can use the flowcharts in section 5 to determine the plant classification based on the plants total heating surface area.

Plant types in which steam or vapour is generated:

- High Pressure Steam Plant exceeding 10 m² heating surface area.
- Steam Heating Plant exceeding 30 m² heating surface area.
- Oil Well Plant exceeding 10 m² heating surface area.
- Unfired Plant exceeding 150 m² heating surface area.

Plant types in which water or an aqueous solution is heated:

- High Temperature, High Pressure Fluid Plant exceeding 10 m² heating surface area.
- Fluid Heating Plant exceeding 150 m² heating surface area.
- Low Temperature, Low Pressure Fluid Plant exceeding 300 m² heating surface area.
- Unfired Plant exceeding 150 m² heating surface area.

Plant types in which a liquid hydrocarbon, hot oil, or other thermal fluid is heated:

- High Pressure Thermal Fluid Plant exceeding 10 m² heating surface area.
- Low Pressure Thermal Fluid Plant exceeding 150 m² heating surface area.
- Unfired Plant exceeding 150 m² heating surface area.

4. Self-Assessment Process

The first step in determining whether a boiler plant operating permit is required for your facility is to determine the plant type and classification. This self-assessment tool has been designed to walk you through the process of determining your boiler plant type and classification.

There are four primary pieces of information you must locate to determine your boiler plant type and classification:

1. What type of boilers do you have operating in your plant?
    a. **Steam boiler(s)** – a boiler in which steam or other vapour may be generated.
    b. **Water heating boiler(s)** – a boiler in which water or an aqueous solution may be heated.
    c. **Thermal fluid boiler(s)** – a boiler in which a liquid hydrocarbon, hot oil, or other thermal fluid other than water is heated with or without the occurrence of vaporization.

2. Are the boilers connected to a common header?

    If your plant contains more than one boiler, you will need to determine if the boilers are connected to a common header or if they, or any combination of the boilers, are operating on separate headers.

    A header is a central piping system that connects multiple boiler units. A header transfers a heat transfer medium or fluid (e.g., water, steam, oil, etc.) typically via pipe(s), between one or more boilers and one or more points where the heat is required. A header can connect a single boiler to a single point where heat is needed. Alternatively, if the capacity of a single boiler

cannot provide enough heat transfer medium at the desired temperature and pressure, it may be necessary to connect multiple boilers to the same header.

Regardless of the type of boilers operating in your plant, you can determine if your boilers are operating on the same header by determining whether the boilers' piping systems are interconnected.

- If the boilers are connected to a common header, then the total heating surface area of all interconnected boilers should be added together to determine the plant classification.
- If one or more of the boilers are operating on separate headers, then each separate system should be assessed independently and only the heating surface areas of the boilers connected to common headers will be added together to determine the plant classification.

For more information regarding boiler/header configuration including examples, see our Boiler Plant Classification & Eligibility webpage.

3. What is the pressure and/or temperature the boiler(s) is operating at?

    a. **Steam boiler** – determine the maximum operating pressure of the steam boiler(s) in pounds per square inch (PSI) or kilopascals (kPa). This can be achieved by locating the boiler(s) pressure relief device and recording the relief device set pressure.

    b. **Water heating boiler** – determine the maximum operating pressure of the water heating boiler(s) in pounds per square inch (PSI) or kilopascals (kPa). This can be achieved by locating the boiler(s) pressure relief device and recording the relief device set pressure.

    Additionally, determine the maximum operating temperature of the water heating boiler(s) in degrees Fahrenheit or Celsius. This can be done by locating the boilers high-temperature limit controls and recording the set temperatures.

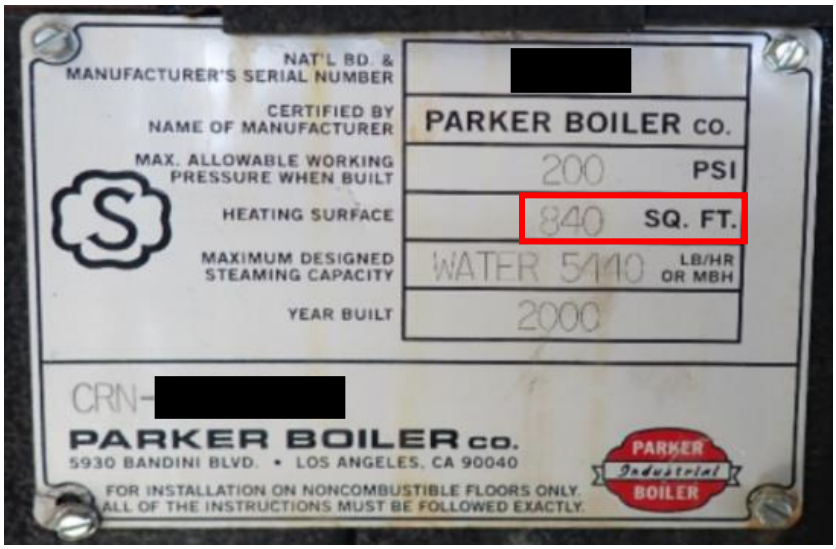
    c. **Thermal fluid boiler** – determine the maximum operating temperature of the thermal fluid boiler(s) in degrees Fahrenheit or Celsius. This can be done by locating the boilers high-temperature limit controls and recording the set temperatures.

    Additionally, for thermal fluid boilers only, you will need to determine the thermal fluids boiling point. This will be required to determine the appropriate plant type. This information can be found on the Safety Data Sheet or the Manufacturer's Technical Specification for the thermal fluid.

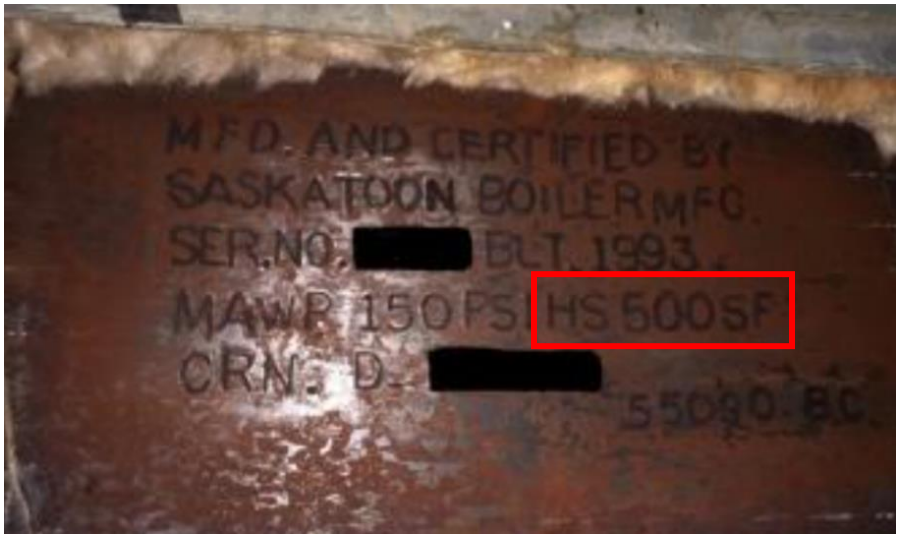
4. What is the total combined "heating surface area" of all boilers connected to the same header?

    Heating surface area (HS) is a measure of the physical surface area in square feet (SF/ft^2) or square meters (SM/m^2) of a boiler or pressure vessel that transfers heat to the heat medium / fluid. Each boilers heating surface area can typically be located on the manufacturer's data plate, the manufacturer's data report, or the ASME certification stamping. Below are examples of manufacturer and ASME nameplates:

Manufacturer's data plate (HS 840 SQ. FT.):



ASME certification stamping (HS 500 SQ. FT.):



Once you have located these four primary details, you can use this information to determine your plant type and classification using the flowcharts in section 5 or the calculator in section 6.

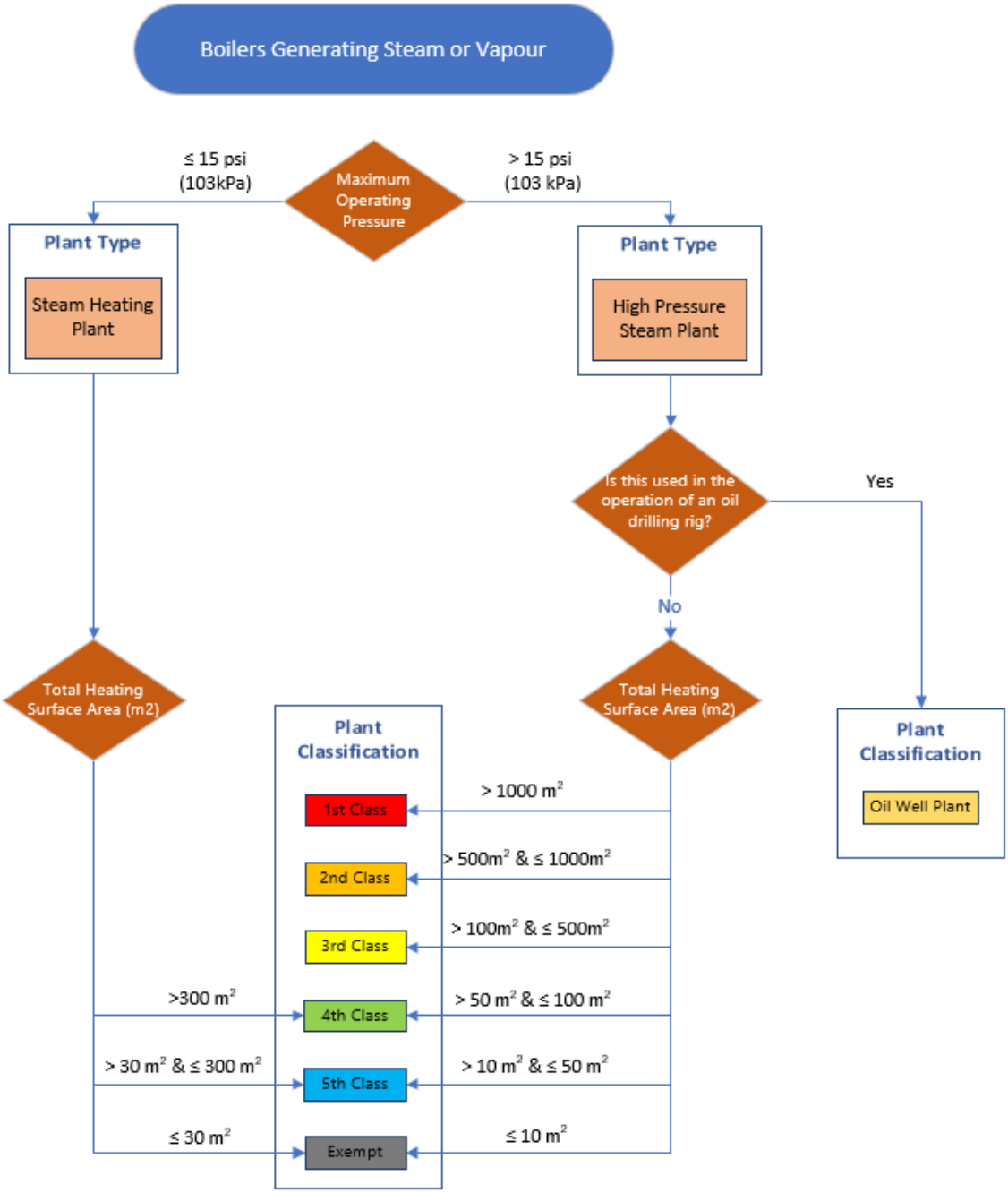
Alternatively, if you are unable to locate these details on your own, you can contact a licensed boiler contractor to assist in assessing your boiler plant.

5. Plant Classification Flowcharts

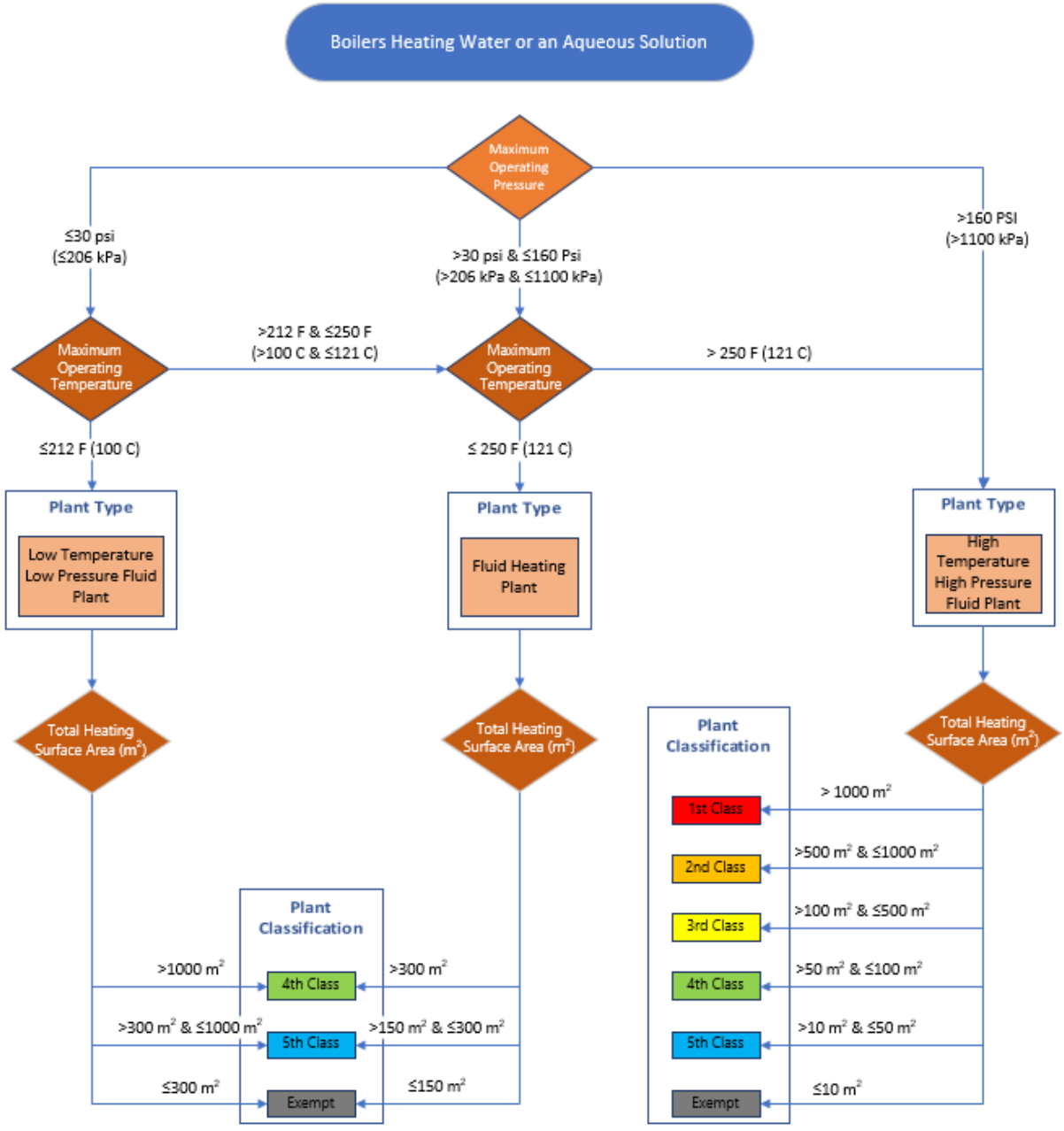
The three flowcharts below can be used to determine the overall plant classification for your facility:

- See flowchart #1 for steam boilers
- See flowchart #2 for water heating boilers
- See flowchart #3 for thermal fluid boilers

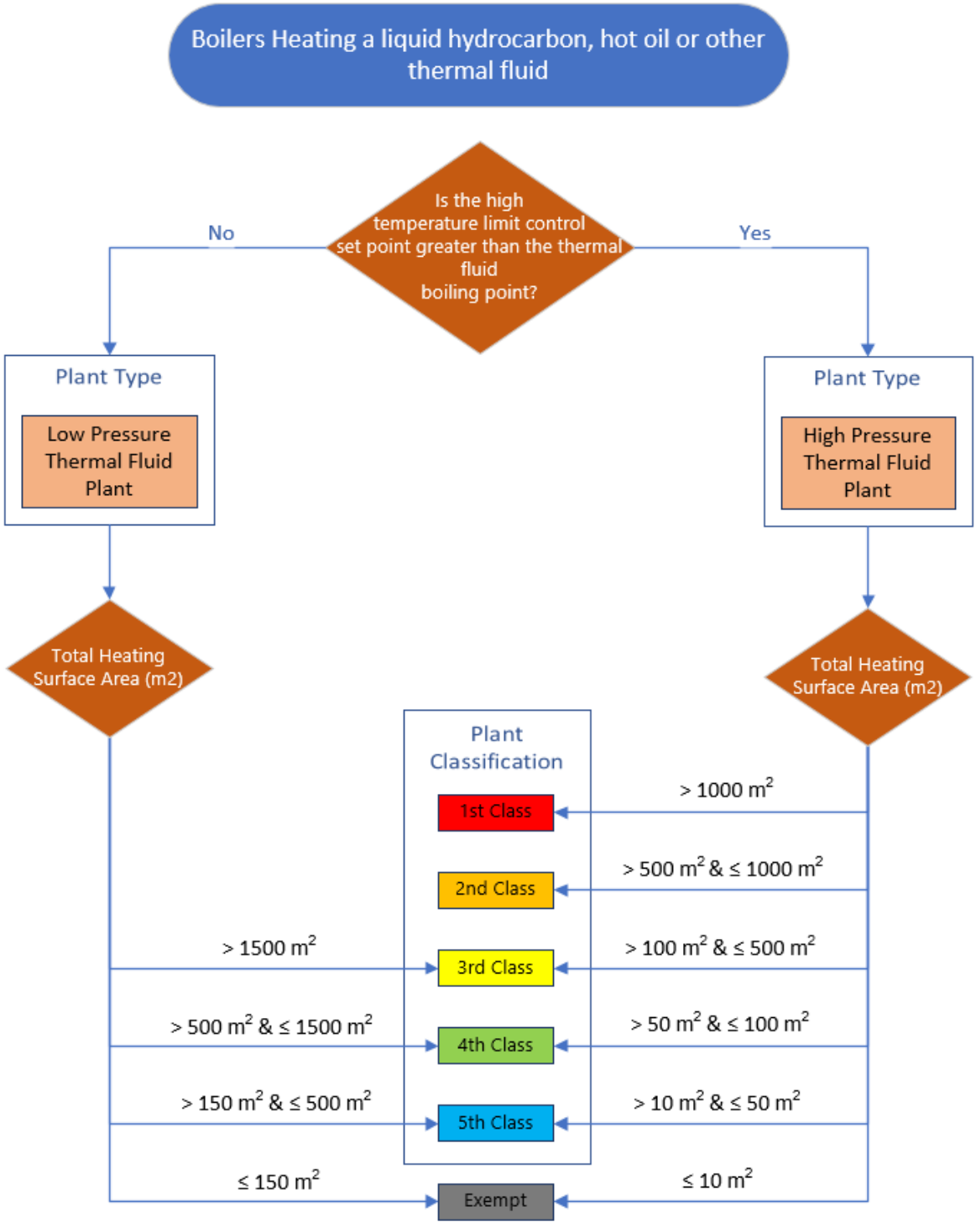
Flowchart #1 – Steam Boilers



Flowchart #2 – Water Heating Boilers



Flowchart #3 – Thermal Fluid Boilers



6. Plant Type and Classification Calculator

In addition to the above flowcharts, the plant type and classification calculator can also be used to determine your plant type and classification based on the maximum temperatures and pressures your boiler system is operating at, and the total heating surface area of all boilers connected to the same header.

To use the calculator, open the linked Excel file and enter the applicable temperatures (°F), pressures (psi) and heating surface area (m^2) to determine your plant type and classification.

7. Boiler Plant Application and Registration

Once you have completed the self-assessment process, you will then know the plant type and plant classification for each separate header or "boiler system" located at your facility and can determine whether an application for a boiler plant operating permit is required.

- If your assessment determined that all headers located at your facility have a plant classification of "exempt", then a boiler plant operating permit is not required for your facility.
- If your assessment determined that one or more of the headers located at your facility fall into one of the below classifications, then a boiler plant operating permit is required for your plant.
    - 1st Class
    - 2nd Class
    - 3rd Class
    - 4th Class
    - 5th Class
    - Oil Well Plant

How to apply for a boiler plant operating permit:

There are two ways plant owners can apply for their boiler plant operating permit(s):

- Complete and submit the Boiler Plant Operating Permit Application Form 1688 to boilerplantreg@technicalsafetybc.ca.
- Log into your client portal account and register your plant from the unit list. For more information on how to register through the online client portal, follow the self-registration guide on our webpage.

As a part of the application submission or online registration, plant owners must also submit supporting documentation to verify the plant type and classification. For each boiler associated with your plant, the following information must be submitted with the application or online registration:

- Pictures of each manufacturer's nameplate and ASME stamping.
- If photos of the ASME stamping are not available, the Manufacturers Data Report (MDR) may be submitted in lieu.