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## CAUTION

Previous issues of The Pressure News may contain information which is outdated or no longer valid. Please be cautious when using information from old articles.

## EXEMPTIONS FOR THERMAL LIQUID HEATING SYSTEMS

The Pressure Equipment Exemption Order was amended effective January 1<sup>st</sup>, 2020 to include new partial exemptions for thermal liquid heating systems installed in chemical and natural gas processing plants and oil refineries and which meet the exemption criteria specified in the Pressure Equipment Exemption Order. It is important to note that in both cases, there are still important regulatory requirements that apply to such systems, including that owners are responsible to ensure that persons operating the equipment are competent.

In order to promote consistency, ABSA worked along with the Pressure Equipment Sub-council of the Safety Codes Council and the Public Safety Division of Alberta Municipal Affairs to develop *AB-537, Thermal Liquid Heating System (TLHS) Requirements*. This document was declared in force under Information Bulletin IB20-004 and is available on our website.

AB-537 is intended to provide owners with guidance on requirements for design, fabrication, installation, operation, and maintenance of thermal liquid heating systems, both for equipment covered by the new partial exemptions and equipment not covered by them. It also helps users by providing guidance in classifying equipment and in determining whether the partial exemptions apply. ❖

## CODE CASE REQUIRED FOR THE USE OF ASME B16.5-2017

ASME Section VIII-1, Section VIII-2, and Section VIII-3 allow users to make use of standard ASME B16.5 flanges at the pressure/temperature ratings prescribed by B16.5. Each of these codes contains a table which prescribes the year-edition of ASME B16.5 that is required to be used for code construction.

It has been noted that the latest 2019 editions of each of these codes require the use of the 2013 edition of ASME B16.5, and were not updated to require the 2017 edition of the flange standard. This implies that when building equipment to these codes, manufacturers need to use flanges which are certified to the previous 2013 edition of ASME B16.5, rather than the most recent 2017 edition.

ASME has published Code Case 2955, which permits the use of the 2017 edition of ASME B16.5 for code construction. It should be noted that for construction to the 2019 edition of ASME Section VIII-1, VIII-2, or VIII-3, this code case is required to be used to justify the use of flanges certified to the 2017 edition of ASME B16.5, in lieu of the 2013 edition that is otherwise made mandatory by those documents. As indicated in the code case, the code case number is required to be marked on the Manufacturer's Data Report for any such equipment. ❖

## ABSA: 25+ YEARS OF SAFETY

Effective April 1, 1995, Alberta's pressure equipment safety program and services were delegated by the provincial government to be administered by Alberta Boilers Safety Association (ABSA), and April 1, 2020 marks our 25<sup>th</sup> anniversary. The following is a chronology of significant events demonstrating some of the changes that have occurred along the way:

- 1897** - The first steam boilers ordinance was passed at the legislative session of the Northwest Territories, which included present-day Alberta. It is generally accepted that the Boiler Explosion Act, passed in Great Britain in 1882, was the basis for Alberta's legislation.
- 1900** - Public Works employed 3 inspectors who conducted 186 boiler and 509 vessel inspections, and issued 478 certificates permitting their operation.
- 1905** - Alberta, previously a part of the Northwest Territories, became a province.
- 1909** - A set of rules for the construction and inspection of steam boilers was formulated for use in Alberta. These new regulations introduced the concept of design survey, along with the requirement that an 'Affidavit of Construction' be issued by the manufacturer to confirm adherence to the regulations.
- 1912** - 3 Ford Roadster automobiles were purchased to aid inspectors in reducing the number of boilers awaiting inspection. In some areas, horse teams were still being used due to the inaccessibility of the roads.
- 1920** - The first Canadian Registration Number (CRN) was issued for a 40 HP locomotive boiler, designed and built by the Waterous Engine Works Company.
- 1923** - The Boilers Branch was transferred from Public Works to the Bureau of Labour. Inspectors' duties were expanded to include inspections to be carried out under the Factories Act and the Theatres Act. They were also responsible for conducting examinations for projectionists.
- 1929** - Inspectors were given additional responsibilities for refrigeration plants and certifying pressure welders.
- 1937** - 241 designs were surveyed. A total of 5,610 inspections were conducted on 4,127 separate vessels. Only 3,373 vessels were issued certificates.
- 1949** - A growing group of 16 inspectors conducted 8,149 inspections on 6,938 vessels. 1,386 power engineering certificates were issued, and 413 designs surveyed.
- 1960** - The industry continued to grow: 2,002 designs were submitted for approval and registration.
- 1970** - Design survey began to use a mechanical calculator (computer) on a time-share basis, and was able to process 3,633 designs without needing to increase staff.
- 1981** - 42,004 inspections were conducted, and more than 10,000 pressure welder examinations were administered.
- 1995** - Alberta Boilers Safety Association (ABSA) was formed, and many of the former Government of Alberta Boilers Branch employees transferred to ABSA.
- 1996** - ABSA launched its first internet webpage, establishing a new channel for communication with its stakeholders.
- 2002** - ABSA launched the three-day Pressure Equipment Safety Legislation seminar to introduce the general legal requirements pertaining to pressure equipment safety in Alberta.
- 2005** - Manufacturing shops in Alberta completed construction on more than 25,000 pressure vessels; at this time, there were more than 500,000 operating pressure vessels in Alberta, and more than 18,000 certified power engineers.
- 2006** - ABSA's head office relocated to its present location in the Edmonton Research Park.
- 2016** - ABSA began to accept some types of design submissions electronically.

As can be seen, ABSA's programs and services have grown significantly over the years, from its initial establishment as a branch of government in the early 20<sup>th</sup> century, to its transition into an independent not-for-profit delegated administrative organization and the continued implementation of its pressure equipment safety programs more than one hundred years later. ABSA currently employs 150 people, and continues to rely on the support it has earned from industry, both in terms of its support for ABSA's role in the province, and in terms of industry's own active and continued involvement on the front lines of pressure equipment safety. ❖

## DESIGN REGISTRATION NUMBERS: CRNs, ALDs, AND ALTs

In Alberta, the Safety Codes Act and Pressure Equipment Safety Regulation lay out the basic legal requirements for design registration of pressure equipment, establishing rules for submission of design drawings and supporting documents in order for an Alberta registration number to be issued. While the Alberta legislation refers to the issued number simply as a 'registration number', it refers further to CSA B51, which provides for a harmonized numbering system for design registrations across Canada, introducing the term Canadian Registration Number, or 'CRN'.

There are some cases that a registration number needs to be issued for use in Alberta which does not fit within CSA B51's definition of a CRN. These numbers are called ALDs, for Alberta Limited Design, and given 'ALD' as a prefix. ALDs are issued with the intent of keeping the registration number outside the scope of CSA B51's definition of a CRN, although it should be noted that CSA B51 requirements still generally apply to the registered equipment—only the registration number itself is outside of its scope. Some of the cases in which ALDs may be required include:

- Equipment constructed to ASME Section VIII-2, which requires that it suit a User's Design Specification that is specific to the end user, location of installation, and intended application
- Limit to use by a single end user, because the end user's acceptance of an unusual design method was required
- Limit to use by a single end user, because an unusual maintenance or monitoring commitment was required
- Special design or construction considerations need to be drawn to the Authorized Inspector's attention at the time of installation, repair, or alteration
- The design relies on a variance or other concept that is specific to Alberta law which other provinces may not recognize

The 2019 edition of CSA B51 introduced a new type of design registration number, known as an 'alternative' or 'ALT' CRN. When a design uses "allowable alternatives to prescriptive rules" from the ASME code that are not otherwise required to be recorded on the Manufacturer's Data Report (MDR), paragraph 4.3.5 of CSA B51 requires that the CRN be prefixed with 'ALT', and paragraph 4.6.6 requires that the affected components then be noted on the MDR. The criteria for issuing an 'ALT' CRN can therefore be broken down as follows:

1. The design uses allowable alternatives to prescriptive rules, and
2. The specific components on which those rules are used are not otherwise required to be indicated on the MDR.

CSA B51's new alternative CRN provides for a type of registration number that is in some ways similar to an 'ALD', but with a more specific intended application, and which will be recognized by other Canadian jurisdictions.

Typical examples of cases where an 'ALT' CRN may be required include the use of code appendices, which sometimes provide alternatives to basic code rules, and the use of code cases. An interesting example can be considered for the use of ASME Section VIII-1, Appendix 46. If there is no available design approach prescribed by the code, then Appendix 46 can be used as permitted by U-2(g), allowing the designer to refer to ASME Section VIII-2 for design rules. In this case, it is not being used as an alternative to a prescriptive code rule, and the design doesn't meet the CSA B51 criteria for issuing an 'ALT' CRN. Conversely, subparagraph UG-16(a) also allows use of this appendix in lieu of existing prescriptive design rules. In this case, since it *is* being used as an alternative to prescriptive rules, and since Appendix 46 does not itself require its use to be recorded on the MDR, it meets the CSA B51 criteria for requiring an 'ALT' CRN. CSA B51 then also requires the use of the appendix to be recorded on the MDR, with an indication of which pressure components are affected.

Code cases often provide alternatives to prescriptive code rules as well, and so often meet the first criteria given by CSA B51 for requiring an 'ALT' CRN. The second condition needs to be considered more carefully: although code cases generally require that their use be indicated on the MDR, they don't always require that the MDR indicate which components are affected. The deciding factor in whether an 'ALT' CRN will be required will often then be whether the code case requires the MDR to clearly indicate which parts are affected by its use. An example that can be considered is Code Case 2260, which permits an alternative design formula to be used to determine the required thickness of an ellipsoidal head on a Section VIII-1 vessel. The code case requires its use to be indicated on the MDR, but does not require that the MDR indicate which heads are affected; CSA B51 would therefore require that an 'ALT' CRN be issued, and that the affected components be identified on the MDR. ❖

## AUTHORIZED ACCESS TO CODES AND STANDARDS

An organization performing work under a quality management system (QMS) as required by the Pressure Equipment Safety Regulation is required to possess or have authorized access to all of the codes and standards that pertain to its work. Photocopies and other unauthorized copies of codes and standards are not permitted, and organizations are expected to adhere to all applicable copyright laws. Documents that are kept in electronic format are acceptable as long as they are readily accessible, but they need to be used under appropriate licensing arrangements – several commercial subscription services are available which make authorized copies of the documents available electronically. When digital documents are used, an organization's legitimate use of electronic copies of codes and standards can often be discerned by watermark identification placed on the bottom or side of each page by the licensed distributor.

Copyright law gives the owner of the copyright significant control over how they can allow their protected works to be used. In many cases, for technical codes and standards, sharing of hard-copy or digital documents that are subject to copyright is not permitted by licensing agreements, other than by an organization that is specifically licensed to do so by the copyright owner. Notably, these limitations apply to technical codes and standards published by the American Society of Mechanical Engineers (ASME): organizations making use of these publications need their own licensed copies to be available on an as-needed basis; temporarily borrowing even an original copy of a document from another organization is not allowed, unless the lending organization is specifically licensed to distribute it in this way. Adherence to these rules is checked periodically at the time of audit.

In Alberta, all organizations that work with pressure equipment are required to have an up-to-date copy of Alberta's Safety Codes Act and the associated regulations, including the Pressure Equipment Safety Regulation, the Pressure Equipment Exemption Order, the Pressure Welders Regulation, and the Administrative Items Regulation, in addition to whichever adopted codes and standards pertain more specifically to the organization's line of work. In each case, organizations are required to have a copy of the current mandatory edition of each required document, though it is recommended that newer published editions be purchased or licensed soon after they are made available and before their use becomes mandatory. Depending on the nature and requirements of their individual work, some organizations need to also retain copies of older editions of certain documents.

The following can serve as a general guide as to which documents are required, depending on the type of quality management system held by an organization:

AQP-1000-Series Quality Management Systems: Organizations authorized to manufacture boilers and pressure vessels are required to have current copies of ASME Section I, Section IV, and Section VIII Divisions 1, 2, and 3, as applicable to the equipment they are authorized to work with, along with copies each part of ASME Section II, Section IX, and Section V, CSA B51, and any applicable component standards.

AQP-2000-Series Quality Management Systems: Organizations authorized to construct, repair, and alter pressure piping are required to have copies of ASME B31.1, ASME B31.3, ASME B31.5, ASME B31.9, and CSA Z662, as applicable to the scope of activities permitted by certificate of authorization permit. Copies are also required of CSA B51, ASME Section V and Section IX, and any applicable component standards.

AQP-3000-Series Quality Management Systems: Organizations authorized to perform repairs on boilers and pressure vessels are required to have copies of ASME Section I, Section IV, Section VIII Divisions 1, 2, and 3, as applicable to the equipment they are authorized to work with, along with copies of ASME Section V, Section IX, each part of Section II, and copies of CSA B51, the NB-23 National Board Inspection Code, and any applicable component standards.

AQP-5000-Series Quality Management Systems: Organizations authorized to construct, repair, and alter fittings are required to have copies of the ASME, ASTM, and ANSI standards applicable to their work, and of CSA B51. If fittings are of welded construction or require non-destructive examination, copies are required to be available of ASME Section IX and Section V, as well.

ASVS-Series Quality Management Systems: Organizations authorized to service pressure relief valves are required to have copies of the NB-23 National Board Inspection Code, and of ASME Section I, Section IV, and Section VIII Division 1 as applicable to the activities permitted by their certificate of authorization permit.

AOQP-Series Quality Management Systems: Organizations authorized to conduct welder testing are required to have copies available of ASME Section II-C and Section IX.

AQP-8000 and -9000-Series Quality Management Systems: Organizations authorized to conduct integrity assessments of pressure equipment are required to have copies of the NB-23 National Board Inspection Code, applicable API standards such as API 510 and API 570, and the sections of the ASME Boiler and Pressure Vessel Code applicable to the equipment they are authorized to work with. If welded repairs are inspected and certified, a copy of ASME Section IX is also required. ❖

## ABSA RESPONSE TO COVID-19 CRISIS

The world is facing a public health scenario that is unprecedented in our lifetimes, with extraordinary measures being taken across the province to prevent the spread of the highly contagious and potentially fatal respiratory illness known as COVID-19.

In order to protect our staff and the public during this time, ABSA is taking steps to support social distancing to reduce the spread of this virus and its impact in our communities. The vast majority of ABSA staff are working remotely from home, with only essential staff present at ABSA's physical locations. ABSA staff have remote access to their email and telephones, and can be contacted in the usual manner. As this situation continues to evolve, our response to the crisis will be subject to change. More detailed information about our response to the situation will be made available on our website, and in information bulletins, such as the recently published [IB20-006](#).

Although all ABSA offices are closed to the public for the time being and some services are being reduced, ABSA is continuing to deliver its mandate of ensuring public safety through the delivery of its safety programs. Both the Government of Alberta and ABSA's Board of Directors have been advised of the measures we are taking, and are supportive of our response. ❖

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## POWER ENGINEERING SURVEY RESULTS UPDATE

In August of 2018, ABSA began to conduct a survey of power engineers registered in Alberta. The power engineers who were surveyed were asked to provide information regarding their employment status. The results of the survey have provided an overview of current employment trends in Alberta and have provided a clearer picture of what the demand is for power engineers in the province.

To date, 54% of all registered Alberta power engineers have completed the survey. Of those surveyed, 43.7% are employed in Alberta and are employed in positions that require, by the regulation, certification in Alberta. 16.3% of those surveyed, who are employed in Alberta, are employed in positions for which their employer requires a power engineering certificate that is not required by the regulation. 39.9% of the power engineers who have taken the survey are not employed in Alberta or are employed in a position not specifically related to power engineering.

The results of the survey have helped address concerns from industry regarding a possible shortage of certified power engineers in Alberta. The results of the survey will also continue to assist with the further development of the power engineering certification program. ❖

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