A quarterly publication brought to you by ABSA, the pressure equipment safety authority.

PRESSURE NEWS

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ABSA: In This Issue

ABSA BOARD MEMBER ANNOUNCEMENT

ABSA is pleased to announce a new member to our Board of Directors, Ms. Joy Romero. Ms. Romero has been appointed to sit as the Oil & Gas industry representative. Her first three-year term on ABSA's Board will commence July 2024.

Ms. Romero is a metallurgical engineer currently employed by Canadian Natural Resources Limited as Executive Advisor, Innovation. She has previously held Vice President roles in bitumen production and Innovation & Technology.

With over 30 years of experience in the energy sector, Ms. Romero is deeply involved in advancing technology in the Oil & Gas industry. She currently sits as President of the Clean Resources Innovation Network (CRIN), Vice Chair of the Petroleum Technology Alliance of Canada (PTAC), and member Lead for the Pathways Alliance Net Zero Technology Development Plan.

We look forward to Ms. Romero's contribution to ABSA's strategic leadership and governance.

> **"With over 30 years of experience in the energy sector, Ms. Romero is deeply involved in advancing technology in the Oil & Gas industry."**

WHAT'S NEW: CPECS – NEW EXAMINATIONS & CERTIFICATION PLATFORM

As a step towards harmonization among jurisdictions across Canada, ABSA is currently developing a new Examinations & Certifications platform that will replace the current platform used for Power Engineer Certification in Alberta. The new platform, CPECS (Canadian Power Engineer Certification System), will have an updated interface and offer expanded online features which will enable greater ease in the certification of Power Engineers and in the future, transferability across provinces.

EXPANDED ONLINE CAPABILITIES

In addition to the online features that the current platform offers, CPECS will have additional self-serve, online capabilities. Clients will be able to monitor the status of requests and track their progress in the certification process.

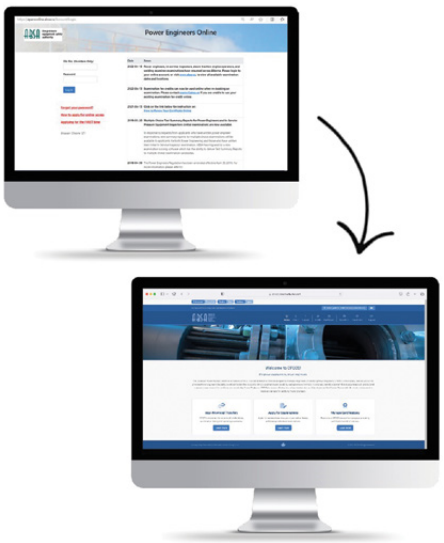
Features of CPECS include:

- Account registration,
- Submit initial application to qualify to write,
- Submit supporting documents to earn and maintain certification,
- Upload documents at any point in time,
- View upcoming exam sessions and reminders in profile,
- Access account information including all historical financial transactions and past receipts,
- Direct communication with your jurisdiction, and
- Stay notified for upcoming events.

A STEP TOWARDS HARMONIZATION

ABSA continues to strive towards the advancement of harmonization across Canada. In the establishment of standards for pressure equipment safety programs, both Alberta (ABSA) and Saskatchewan (TSASK) pressure equipment safety authorities will be transitioning to CPECS, which has the potential to serve all jurisdictions across Canada.

> **"CPECS will have additional self-serve, online capabilities. Clients will be able to monitor the status of requests and track their progress in the certification process."**



Ongoing updates regarding the launch of **CPECS** will be posted to ABSA's website at **www.absa.ca**.

ABOUT AB-500 DOCUMENTS

ABSA publishes and maintains a series of technical documents pertaining to various aspects of the design, manufacturing, and use of pressure equipment in Alberta; these are known as AB-500 series documents. Equipment owners and manufacturers in Alberta are familiar with several AB-500 documents that pertain to their line of work. This article explains the process how AB-500 documents are developed and classified.

THE PROCESS BEHIND DEVELOPING AN AB-500 DOCUMENT

Development of an AB-500 document is initiated when a specific need is recognized by ABSA or voiced by industry. The goal of creating an AB-500 document is to comprehensively address the subject matter while remaining relevant and practical. Creation of the document involves a development team consisting of the Administrator, ABSA technical managers, subject-matter experts, and interested parties (such as government and industry group representatives). Input is gathered and validated by the development team, followed by development of the document to include subject-matter material deemed necessary. Prior to publication, the document is reviewed extensively by ABSA technical staff and interested parties. When the document is published, an Information Bulletin is issued by the Administrator, and the document is posted to ABSA's website. After publication, the document is scheduled to be reviewed and reaffirmed by the expected reaffirmation dates indicated in the documents.

> **"Development of an AB-500 document is initiated when a specific need is recognized by ABSA or voiced by industry."**

THE TWO GROUPS OF AB-500 DOCUMENTS

AB-500 documents can be categorized in one of two groups: "Requirements" and "Guidelines" documents:

1

"Requirements" Documents

The purpose of "Requirements" documents is to clarify requirements in pressure equipment discipline established in the Safety Codes Act and Regulations. The regulations often specify that an aspect of a design or operation must "be satisfactory to the Administrator". AB-500-series requirements documents serve to clarify what is understood to be satisfactory to the Administrator. For example, AB-532 *Design Registration Requirements for Application-Specific Pneumatic Test Procedure,* clarifies the Administrator's requirements for design registration documents when an application-specific pneumatic test is to be conducted in Alberta on a new or repaired pressure vessel or pressure piping system, which is otherwise prohibited by the Pressure Equipment Safety Regulation.

2

"Guidelines" Documents

The purpose of "Guidelines" documents is to provide discussion and outline good practices to assist interested parties in meeting their legal obligations, rather than presenting or clarifying requirements. "Guidelines" document intend to provide additional information, they are not intended to be presented as official interpretations of legislation or adopted codes. For example, AB-529 *Pressure Equipment Exemption Order User Guide* provides a section-by-section breakdown and discussion of the Pressure Equipment Exemption Order. The purpose of the AB-529 document is to provide a better understanding of the intent and use of the *Pressure Equipment Exemption Order* and the User Guide cannot override legislation.

HOW AN AB-500 DOCUMENT IS CLASSIFIED AS A "REQUIREMENTS" OR "GUIDELINES

For each new AB-500-series document, ABSA validates the AB-500 document annually for the first three years, and every five years thereafter. For example, AB-520 *Finite Element Analysis (FEA) Guidelines* was repurposed from a requirements document to a guidelines document. AB-520 was initially issued as a requirements document in 2009 since there were no specific requirements in CSA B51 or codes of construction on how to use FEA to support pressure equipment designs at the time. However, the 2014 edition of CSA B51 introduced Clause 4.1.10 and Normative Annex J which outlined requirements that were very similar to the requirements in the first publication of AB-520. To avoid overlap, Edition 2 of the AB-520 was developed and repurposed into a guideline document in 2023.

ABSA's goal is to maintain and to continuously improve these documents as they are reaffirmed, and changes are made to regulations and adopted codes and standards.

> **"For each new AB-500-series document, ABSA validates the AB-500 document annually for the first three years, and every five years thereafter."**

Have Feedback on an AB-500 Document?

Publication of these documents often includes contact information in the 'Foreword' section, inviting feedback relating to the content. Feedback related to documents that do not specifically provide contact information can be directed to any ABSA representative and will be redirected appropriately.

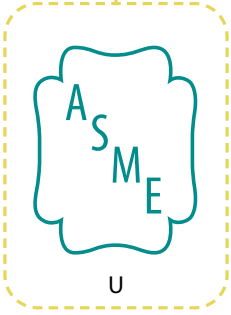
To view ABSA's AB-500-series documents, please visit ABSA's website at **www.absa.ca** under 'Forms & Publications.'

UNDERSTANDING THE MARKING & DOCUMENTATION REQUIREMENTS FOR ASME BPVC SECTION VIII-1 PRESSURE VESSEL PARTS

There are many different considerations for Manufacturers when pressure parts are required. The 2023 Edition of ASME Section VIII-1 introduced U-2(j), which requires that Manufacturer of the completed vessel shall establish the construction requirements for subcontracted parts.

These requirements include, but are not limited to, design responsibility, pressure testing, impact testing, postweld heat treatment (PWHT), extent and method of non-destructive examination (NDE), and the Code Edition used for fabrication. Information detailed in the vessel Manufacturer's QC Manual will be communicated to the part Manufacturer. To avoid confusion, the requirements documentation should be as specific as possible, and Manufacturers should have a good understanding of the marking and documentation requirements for parts.

To be removed when Manufacturer is a non-ASME Certificate Holder or when the Certification Mark is not required.



Here is an example of a typical scenario:

Company A has subcontracted Company B to fabricate a welded shell and two welded nozzles. Both companies have an ASME Certificate of Authorization for Section VIII Division 1.

Each of these parts are to be individually certified by Company B and shall be marked with the ASME certification mark above the "U" designator and the word "PART" as per UG-116(h)(1)(-a)(-1). The "PRT VIII-1" designator, referenced in UG-116(h)(1)(-a)(-2), is new, and is strictly for Manufacturers that only build parts and can be applied by a company that holds this ASME Certificate of Authorization.

Company A has specified the requirements to Company B with a fabrication drawing and a purchase order as per their QC Manual. The design is the responsibility of Company A, who also has a Canadian Registration Number (CRN) for the vessel. Pressure testing and PWHT is not required. The materials are exempt from impact testing at the stated minimum design metal temperature (MDMT). Welding procedures and production welds are exempt from impact testing as per the appropriate Code clause.

Based on the information provided, each part will be examined by Company B and inspected by their Authorized Inspector (AI). Each part will be assigned an individual serial number and marked as specified in UG-116(h) with verification of these markings by the AI. Parts will be documented on a Manufacturers Partial Data Report (U-2 or U-2A) by Company B. Individual parts will be included on one Manufacturers Partial Data Report with the corresponding serial numbers recorded and the extent of examination and inspection specified. The "Remarks" section of the Manufacturers Partial Data Report will be used to record additional information for individual parts when more space is needed. Because Company A is responsible for the design of these parts, Company B will specify in the "Remarks" section "User Specified Part, No Design Performed" per UG-120(c).

> **"In Alberta, parts that are furnished without the ASME Certification Mark can be recorded on an AB-25 Manufacturers Data Report indicated as a "Partial".**

In this scenario, if the ASME Certification Mark was not required by Company A, it would not be applied to the parts or the completed vessel. In Alberta, parts that are furnished without the ASME Certification Mark can be recorded on an AB-25 Manufacturers Data Report indicated as a "Partial". All UG-116(h) markings remain the same with the exception of the ASME Certification Mark and designator.

THE CRUCIAL ROLE NON-DESTRUCTIVE EXAMINATIONS PLAY

In industries where the integrity of pressure equipment directly impacts the safety of the public, thorough inspection becomes paramount. Non-destructive Examinations (NDE) play a crucial role in this process as it allows for meticulous inspection of pressure equipment without compromising the mechanical properties of the metal.

While visual inspection is fundamental to finding surface irregularities, corrosion, and other visible defects, NDE offers additional benefits that complement and enhance safety measures. Here are several key reasons why NDE is required, despite the availability of a visual inspection:

- As mentioned previously, visual inspection is limited to surface-level examination. NDE methods, such as ultrasonic or radiography testing, provide the capability to penetrate materials and unveil hidden discontinuities that might not be visible externally.
- NDE allows for non-intrusive testing, preserving the original state of the material while providing detailed insights into its condition.
- NDE techniques can detect defects at an early stage, preventing potential catastrophic failures. Visual inspection alone may not identify issues until they are more advanced, leading to a higher risk of unexpected equipment failures.
- NDE methods provide quantitative data about the size, shape, and location of defects, allowing for a more accurate assessment of the material. Visual inspection relies on qualitative observations, and NDE offers a more precise analysis.

MOST COMMON NDE METHODS

A quick overview on a few most common NDE methods in the industry:

1. **Ultrasonic Testing (UT):** This technique uses high-frequency sound waves to detect internal flaws or discontinuities within a material. It is particularly effective for identifying defects like cracks, voids, or thickness variations.
2. **Radiographic Testing (RT):** X-rays or gamma rays are used to examine the internal structure of materials. This is done by penetrating radiation into materials and recording media to produce an image. This method is valuable for detecting internal defects or inconsistencies in metals and/or welds.
3. **Magnetic Particle Testing (MT or MPI):** This method involves applying magnetic field to a ferromagnetic material and then introducing iron particles. Discontinuities in the surface or sub-surface of the material cause the particles to cluster, highlighting the potential defects.
4. **Dye Penetrant Testing (PT or LPI):** This process works on the principle of Capillary Action. A liquid dye is applied to the surface of the material being tested; and after a penetration period, excess dye is removed. A developer is then applied, revealing surface-breaking discontinuities.

A COMPLEMENTARY APPROACH

In summary, while visual inspection is an essential part of maintenance and inspection procedures, the complementary use of NDE enhances the overall effectiveness of safety measures by providing a more in-depth and reliable assessment of materials and components. In addition, interpreting the NDE results requires expertise, which is why it is crucial to hire a competent person who possesses the necessary knowledge, skills, and experience to perform these evaluations correctly. When an examiner or a person performing these inspections is employed by NDE contractors who perform ultrasonic thickness examinations, magnetic particle examinations, or dye penetrant examinations of in-service pressure equipment, the individual must hold a level I or II CGSB or SNT certification.

> "Interpreting the NDE results requires expertise, which is why it is crucial to hire a competent person who possesses the necessary knowledge, skills, and experience."

ABSA OFFICES

For general inquiries: **generalinq@absa.ca**

Edmonton Head Office
9410 - 20 Avenue,
Edmonton, AB T6N 0A4

Tel (780) 437-9100
(780) 433-0281
Fax (780) 437-7787

Calgary
Deerfoot Atria South
Calgary, AB T2E 7H7

Tel (403) 291-7070
Fax (403) 291-4545

Red Deer
304, 4406 Gaetz Avenue,
Red Deer, AB T4N 3Z6

Tel (403) 341-6677
Fax (403) 341-3377

Grande Prairie
203, 10109 - 97 Avenue
Grande Prairie, AB T8V 0N5

Tel (780) 538-9922
Fax (780) 538-9400

Fort McMurray
39C Suncor Energy Industrial Campus, Keyano College
Fort McMurray, AB T9H 4B8

Tel (780) 714-3067
Fax (780) 714-2380