

Demystifying Canadian Registration CRN



Pressure Vessel Engineering

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Introduction

- Pressure Vessel Engineering
 - Canadian firm, located in Waterloo, ON
 - Customers from around the world
 - Industries include oil & gas, water filtration, food & beverage, pharmaceutical
 - Specialize in CRN registrations
 - Other services include Finite Element Analysis (FEA), Code Calculations, Pipe Stress Analysis, Drawings

Steve Munn
President



Pressure Vessel Engineering

National Board (NB) vs CRN Registration



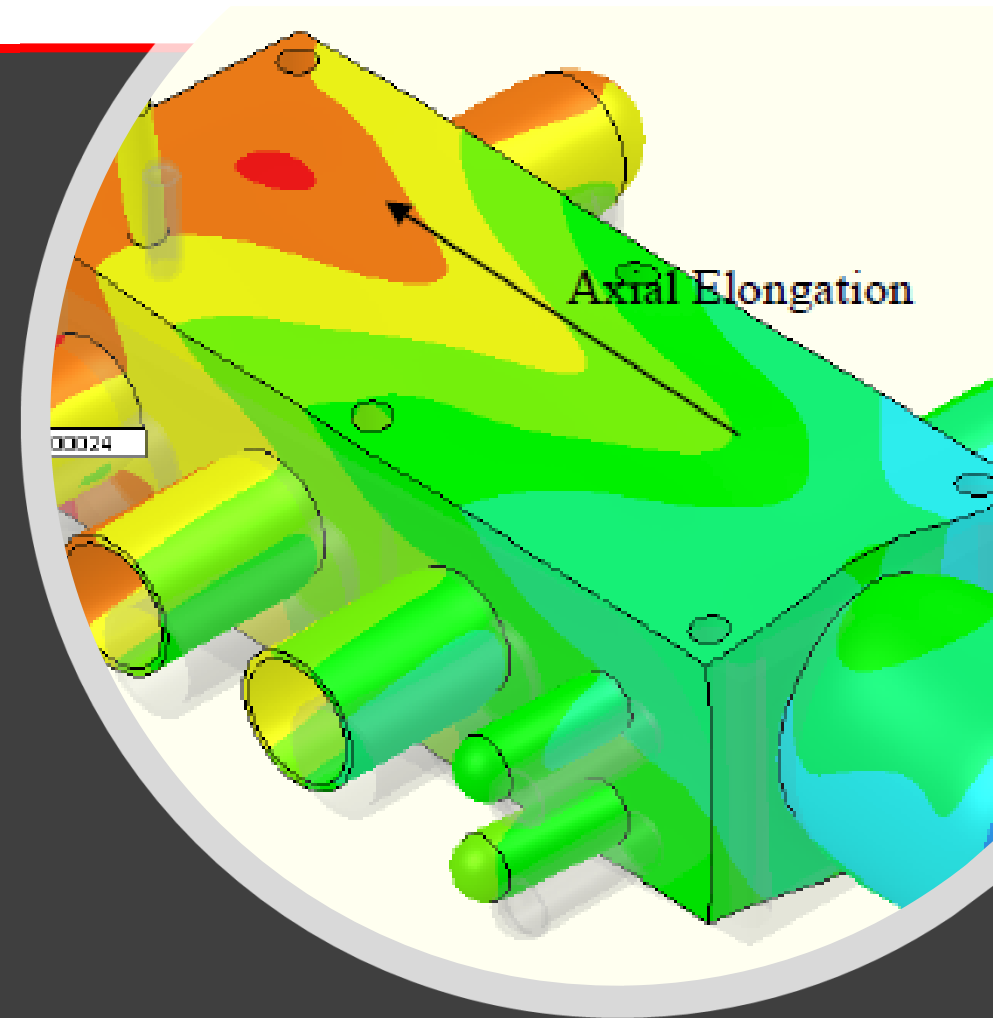
Types of Design Registration

- Pressure Vessel, Boiler, Heat Exchanger, Autoclave
- Fitting
- Used Equipment
- Piping



Design Validation Methods

- ASME calculations
 - Preferred method
- Burst test
 - Used when ASME calculations are not sufficient for the geometry
 - Must be witnessed and the report signed off by a National Board inspector
- Finite Element Analysis (FEA)
 - Used when a burst test is undesirable due to size or value of part
 - Provincial guidelines for the structure of the report must be followed



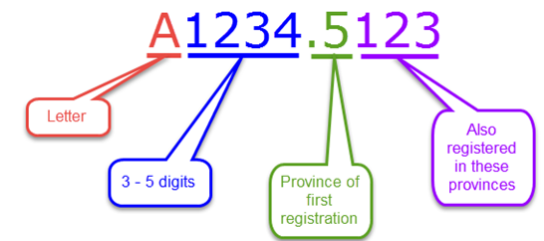
Pressure Vessels

- Small vessels must be registered in Canada when used in a piping system, even when registration isn't required in the USA
 - Do I have a vessel or a fitting?
<https://www.pveng.com/do-i-have-a-vessel-or-a-category-h-fitting/>
 - <6" in USA, National Board (NB) registration not required
 - Canada – registration to Section VIII is required
- National Board registration is still required for every province except ON
- Registration process is similar to NB
 - Drawings, calculations, submission forms
- Some provinces require a P.E. stamp



Vessel CRN Numbers

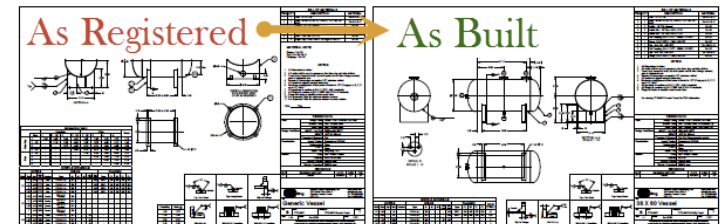
- A CRN is for a specific design. It can be used for one or multiple vessels of the same design
- Does not expire unless a new code edition creates new requirements
- CRN on nameplate



- | | |
|----------------------|-----------------------------|
| 1 - British Columbia | 7 - New Brunswick |
| 2 - Alberta | 8 - Nova Scotia |
| 3 - Saskatchewan | 9 - Prince Edward Island |
| 4 - Manitoba | 0 - Newfoundland & Labrador |
| 5 - Ontario | Y - Yukon Territory |
| 6 - Quebec | 7 - Northwest Territories |
| | N - Nunavut |

Generic Registration of Vessels

- One registration can cover multiple designs
- Must have the same diameter, design conditions and material type.
 - Carbon is considered one material, Stainless another (eg: can have 304 & 316)
- Size and location of nozzles can change without updating CRN
 - All sizes must be included in the initial registration



Fittings

- Valves, flanges, pipe fittings, strainers, filters, etc...
- Small fittings do not require registration in the USA, but they do in Canada when used in piping systems. Some on vessels as well
- Statutory Declaration removes the requirement for an authorized inspector (legal document provides self regulation)
- Valid QC certificate is required (ISO, ASME)
- Catalog registrations are possible
 - One CRN for each Category of Fitting
- Only logo is required on component



Fitting CRN Numbers

- 0B0232.5C
- Design valid for 10 years
- Renewal required after 10 years or a design change
- Category H is made up of registered parts, but the assembly must also be registered
- Only need logo on part
- Provincial exemptions
 - A, B, C & G in BC, SK & MB
 - A, B & C (used in piping systems only) in QB

CSA B51-14 Table 1: Categories of Fittings

Category	Type of Fitting
A	Pipe fittings, including couplings, tees, elbows, wyes, plugs, unions, pipe caps, and reducers
B	All flanges
C	All line valves
D	All types of expansion joints, flexible connections, and hose assemblies
E	Strainers, filters, separators, and steam traps
F	Measuring devices, including pressure gauges, level gauges, sight glasses, levels, and pressure transmitters
G	Certified capacity-rated pressure relief devices acceptable as primary overpressure protection on boilers, pressure vessels and pressure piping, and fusible plugs
H	Pressure-retaining components that do not fall into Categories A to G

Piping

- Registered by address of installation. Each different address requires a new CRN.
- Made up of a collection of registered fittings and vessels as well as calculated components like pipe.
- Each province has their own unique requirements.
 - <https://www.pveng.com/home/canadian-registration-number-crn/piping-registration/>
- Typically >1.5 cu.ft. = piping system
 - Under 1.5 cu.ft. is considered a fitting (Category H piping assembly)



How to find registered products

CRN Approved

- ACI Central Registration Directory
 - www.acicrn.com
- ABSA Design Registration Directory
 - <https://www.absa.ca/directories/registered-design-crn-directory/>
- PVEng (fittings only)
 - <https://pveng.com/home/canadian-registration-number-crn/products-with-crns/>

Challenges

- Submissions are required for each jurisdiction (province)
- Navigating each jurisdiction's unique rules
- Each reviewer within a jurisdiction may have their own requirements
- Timelines vary widely
 - Start early (one year before expiration of a fitting CRN)
- Knowing all the little bits of important information that can make your submission process go smoothly
 - FEA report formats, burst test requirements (time, cost & logistics), what worked 10 years ago for the initial registration is not accepted anymore



Harmonization

- Testing is under way.
 - Submit your design to a web portal
 - One of the requested provinces will perform the initial review
 - Other provinces will have a defined time to add questions
 - One set of questions will return to submitter
 - Acceptance for all requested provinces will be granted at once
- ISO Statement of Conformance to replace Statutory Declaration
 - Eliminates the need to have notarized documents, making the process e-submission friendly



Conclusion

- The CRN process evolves each year
- More information is available on our website
 - www.pveng.com

Contact Information

Steve Munn
smm@pveng.com

519-880-9808 x225

Ray Stroud
rds@pveng.com

519-880-9808 x235



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