

# Appendix U: Training and Qualification Review of Persons Involved with Refrigeration Systems

Technical Safety BC conducted an assessment of the training materials of different qualifications and the basic qualification program structures that are typically involved with refrigeration systems. A summary table is provided in Table U-1.

The technical qualifications (refrigeration mechanic, power engineer or professional engineer) contain a very large component of experience described as time involved with work associated with their qualification. The quality of that experience/exposure varies which can yield varying degrees of capability.

Capabilities beyond the classroom trained skills is not controlled or influenced by the basic qualification structure or experience requirements. Supplemental designations may be available through company programs, industry associations or training providers to recognize additional capabilities.

Refrigeration system mechanical and operation work as well as refrigeration equipment owner duties are defined in the [Safety Standards Act](#) and [Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation](#) and are required to be performed by a person holding the associated qualification and in the manner specified for the work. Engineering work is defined by the [Engineers and Geoscientists Act of BC](#) and is required to be performed by a Professional Engineer holding the appropriate professional designation and specialty. This work is controlled as a result of the potential consequences associated with and resulting from the work, ensuring a minimum skill is applied to the work being performed.

Qualification	Education / Classroom Training			Minimum Experience for Certificate (or permit)
	General	Condition/Risk Assessment	Maintenance and Management	
Owner	None Required	None	None	None
Refrigeration Operator	10 day course that covers refrigeration theory, system configurations, components, operating considerations.	Basic system troubleshooting is covered for aspects that relate to work that the refrigeration operator is permitted to complete.	Maintenance awareness instruction relating to basic troubleshooting and maintenance tasks on anticipated operating issues within the scope of instruction. Maintenance planning training consists of a few pages describing general suggested daily, weekly, monthly and annual tasks.	6 months employment in a facility assisting with the operation of a recognized refrigeration system.
Refrigeration Mechanic	five-year program that consists of 840 hours of in-class education and 7,840 apprenticeship experience hours specific to refrigeration systems and components.	Troubleshooting and correction of common or anticipated component and system problems.	Maintenance instruction on performing troubleshooting, repair and replacement tasks within scope of training.	7,840 apprenticeship working hours
4th Class Power Engineer	38 week program covering boilers, pressure vessels, refrigeration basics and energy plant operation and maintenance tasks.		No instruction is provided relating to maintenance strategies, theories or program development and management.	6 months of experience relevant to the qualification or 18 months experience relevant to industry.
Professional Engineer (Mechanical)	8 year program that involves 4 years of classroom training with 4 years' experience under the supervision of a professional engineer.	Training on identification of factors that affect performance and strength. Estimating factors of safety, potential scenarios and likelihood of occurrence.	Introduction to reliability engineering, maintenance theories, strategies and performance	4 years of relevant engineering experience supervised by professional engineers.
Maintenance Management Professional	195 hours of training	none	covers essential elements of maintenance programs: strategies, tactics, financial and human resources, life-cycle management.	none, this program is intended to supplement other technical qualifications.
In-Service Pressure Equipment Inspector (National Board)	2-week training course covering duties, responsibilities, non-destructive examination, safety controls.	course objective includes an understanding of conditions causing deterioration and failure as well as condition of controls and safety devices	None. Qualification is aimed at inspection and conditions of in-service vessels. Effects of service and maintenance are an inspection focus.	Three years of work experience associated with pressure vessels (design, construction, repair, quality control, NDE, operation or inspection)

**Table U-1:** Summary of Qualifications Associated with Refrigeration System Management