



Note:* Pursuant to section 2(2)(r) of the Pressure Equipment Exemption Order (AR 56/2006), the Pressure Equipment Safety Regulation, the Pressure Welders Regulation and the Power Engineers Regulation do not apply to refrigeration systems if:

"2(2)(r) a pressure piping system and the machinery and equipment ancillary to the pressure piping system, if the machinery and equipment (i) vaporize, compress and liquefy refrigerants in the refrigerating cycle, and (ii) have a refrigerating capacity not exceeding 10.5 kilowatts" (~3 tons of refrigeration);

*Reporting accidents and unsafe conditions is required as per the Safety Codes Act Section 59

This form shall be completed (page 1 and 2) in DUPLICATE and submitted to the ABSA Safety Codes Officer in accordance with the referenced standard in Section 6(b) of the Pressure Equipment Safety Regulation for the purpose of verified compliance. Signed copy shall be returned to submitter upon completion and acceptance of form.

- 1. Ultimate Owner (Name and Address)
2. Location of Plant (Sec., TWP, Rge.)
3. Refrigeration system prime mover nameplate rating : kW (CSA B52 5.2)

Choose one of the following:
[] If prime mover nameplate rating is > 125 kW, registration of piping IS required. (CSA B52 - 5.2 & IB11-004) (mandatory design registration for piping systems > 500 liters), (PESR 14)
[] If prime mover nameplate rating is <=125 kW and tested and certified to by an approved laboratory registration of piping is NOT required.

- 4. Plant previously registered under PP -
5. Prime Contractor Ref. or Job No. (Company Name and Address)
6. Pressure Piping to comply with the Code: [] B31.5 [] B31.3 (Edition/Addenda)
7. Are all fittings suitable for the specific design service conditions? [] Yes
Are all fittings (except for hose assemblies) registered with ABSA? [] Yes [] Pending
Are all hose assemblies manufactured to RMA IP-2 or registered with ABSA? [] Yes
8. Are all pressure vessels registered with ABSA? [] Yes
9. Piping Construction forms (AB-83 and AB-83F) shall be reviewed with an ABSA SCO and signatures applied where necessary? [] Yes

FOR ABSA USE ONLY: Report received by ABSA SCO Date :

Supplementary Information

The following supplementary pages contain useful information and are intended to provide guidance regarding the requirements set forth in CSA B52 – *Mechanical Refrigeration Systems*. CSA B52 has been adopted by legislation in Alberta and is enforced by more than one jurisdictional authority. The authority of ABSA’s enforcement is limited to the pressure equipment and related components. Other jurisdictional authorities must be consulted for the respective items within the limits of their enforcement (e.g. building, gas & plumbing, electrical etc.). Owners and operators of mechanical refrigeration systems are encouraged to contact their local municipality for guidance or other local requirements.

The information provided on the following pages is for helpful reference only and is not a complete listing of all requirements contained in CSA B52. Decisions must be based upon the original copies of the applicable Regulations, Codes and Standards. Unless otherwise stated, all CSA B52 Mechanical Refrigeration Codes references are from the 2013 edition. ABSA assumes no responsibility and makes no guarantee for the use of these supplementary pages.

Contact Information

For further information regarding the prevailing Jurisdiction for the different disciplines please refer to Information Bulletin [IB17-022 Authority Having Jurisdiction for CSA B52](#) which may be found on the ABSA website www.absa.ca

Discipline	Jurisdiction	Contact Information
Pressure Equipment (heat exchangers, piping, boilers, evaporators etc.)	ABSA	9410 20th Avenue NW, Edmonton, Alberta T6N 0A4 (780) 437-9100 or generalinq@absa.ca
Building	Respective local authorities (e.g. municipalities, accredited corporations etc.)	Alberta Municipal Affair’s Communication Inquiry Centre 1-866-421-6929 or ma.safety.services.m@gov.ab.ca .
Electrical		
Gas & Plumbing		

Mechanical Room Requirements

Refrigerant Name: _____

1. Determine Occupancy Classification (B52 - 4.2)

- a. The building is used for: _____
- b. The occupancy is classified as (choose one only):
 - Institutional
 - Public Assembly
 - Residential
 - Commercial
 - Industrial
 - Mixed

2. Determine System Classification (B52 - 4.3)

- a. The system type is (choose one only):
 - Direct
 - Double Direct
 - Volatile Direct
 - Indirect
- b. The system leakage probability is:
 - High-probability
 - Low-probability

3. Determine Refrigerant Safety Classification (B52 - 4.4)
(from Table 1 or ASHRAE 34 Safety Group)

- a. The refrigerant classification from Table 1 is (choose one only):

<input type="checkbox"/> A1	<input type="checkbox"/> B1
<input type="checkbox"/> A2	<input type="checkbox"/> B2
<input type="checkbox"/> A3	<input type="checkbox"/> B3

4. Determine System Application Requirements (B52 - 4.5.1)

- a. Determine which system application rules apply from Table 2 with regard to the refrigerant group, the system leakage possibly and the occupancy classification.
- b. After obtaining the applicable indicated parenthesized letter(s) from Table 2 refer to clause 4.5.2, System Application Rules to apply the applicable rule(s) to determine if and what type of machinery room is required.
- c. When a machinery room is required, complete ventilation requirements.

5. Determine Amount of Refrigerant Permitted (B52 - 4.5.2)

- a. Occupied space internal volume _____ m³
- b. Quantity of refrigerant per occupied space from Table 1 _____ kg/m³
- c. Quantity of refrigerant allowed for this occupied space internal volume _____ kg
This amount is calculated by multiplying the internal volume of occupancy (m³) by the quantity of refrigerant per occupied space (kg/m³)
- d. Amount of refrigerant in system allowed from Table 2 _____ kg
(must be less than 5 c.)

6. Determine Machinery Room Mechanical Ventilation Requirements (B52 - 6.2.5.5)

Leaks or Ruptures : Calculate the ventilation required to exhaust the refrigerant charge due to leaks or ruptures (clause 6.2.5.5.1).

Q = required air flow (L/s), G = mass of refrigerant (kg)

- a. Charge is ≤ 7000 kg: $Q = 70 \times G^{0.5}$ Q = _____ (L/s)
- b. Charge is > 7000 kg: $Q = 16 \times G^{2/3}$ Q = _____ (L/s)
- c. Actual airflow (from engineering plans) = _____ (L/s)

Minimum Ventilation: Calculate the minimum ventilation required to provide a minimum flow of fresh air (clause 6.2.5.5.2)

Use the **larger of**:

- a. 2.54 L/s/m² of machinery room area = _____ (L/s)
or
- b. The volume required to prevent a maximum temperature rise above ambient greater than 10°C, based on all of the heat-producing machinery in the room.
Information required to make this determination is supplied by the designer. The information can be found in ASHRAE handbooks and similar publications.

7. Determine Natural Ventilation Requirements (if applicable) (B52 - 6.2.5.6)

- a. Calculate the area of opening(s) required when conditions of clause 6.2.5.6 are met.
 $F = \text{free area opening (m}^2\text{)}$,
 $G = \text{mass of refrigerant (kg)}$
 $F = 0.138G^{0.5}$
 $F = \text{_____ m}^2$
- b. Actual area of all openings (length x height) = _____ m²

General CSA B52 Requirements for Mechanical Refrigeration Systems

CSA B52 Reference Clause	Clause Summary	Verification <i>Initial/Date/ Company</i>
4.2 <i>Occupancy Classification</i>	Refrigeration system locations shall be classified under occupancy classifications that take into consideration the ability of people to respond to potential exposure to refrigerant.	
4.3 <i>Refrigeration System Classification and Leakage Probability</i>	Refrigeration system types are classified by the methods employed for extracting or delivering heat, as specified in Clauses 4.3.1.2 and 4.3.1.3.	
4.4 <i>Refrigerant Classification</i>	The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) classifies refrigerants into safety groups and are adopted by CSA B52. Those classifications shall be used to classify the refrigerant used in system.	
4.5.2 <i>System Application Requirements</i>	System application requirements shall be determined in accordance with Table 2 and based on the occupancy, leakage probability, and refrigerant classifications specified in Clauses 4.2, 4.3.2, and 4.4, respectively.	
5.11.1 <i>Signage</i>	Each refrigeration system will have a permanent sign which is secured readily accessible and legible. The sign shall indicate: <ul style="list-style-type: none"> <input type="checkbox"/> name and address of installer <input type="checkbox"/> refrigerant type <input type="checkbox"/> lubricant type and amount <input type="checkbox"/> refrigerant weight <input type="checkbox"/> field test pressures applied <input type="checkbox"/> refrigerant capacity at design <input type="checkbox"/> prime mover rating (kW) 	
5.11.3 <i>Signage for Systems exceeding 45 kg of Refrigerant</i>	In addition systems containing more than 45 kg of refrigerant shall be provided with durable signs with letters not less than 13 mm. The signs shall indicate: <ul style="list-style-type: none"> <input type="checkbox"/> the main electrical disconnect <input type="checkbox"/> remote control switch(es) <input type="checkbox"/> pressure-limiting device(s) <input type="checkbox"/> each pressure vessel <input type="checkbox"/> the main shut off to each vessel <input type="checkbox"/> refrigerant piping indicating high-side or low-side, liquid or vapour 	

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5.11.5 <i>Posting of Instructions</i>	<p>It shall be the duty of the owner of a refrigeration system or systems with a prime mover or movers having a capacity exceeding 125 kW to place in a conspicuous location and as near as practicable to the refrigerant compressor(s) a card giving directions for operating the system, including precautions to be observed in case of breakdown or leakage, as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> the contact number of the appropriate first-response organization for an emergency situation <input type="checkbox"/> instructions for shutting down the system in case of emergency <input type="checkbox"/> the name, address, and day and night contact numbers for obtaining service; and the name, address, and telephone number of the nearest regulatory authority, and instructions to notify the authority immediately in case of emergency <p><i>NOTE: Consideration should be given to preparing an emergency evacuation plan for those installations for which a plan is deemed appropriate.</i></p>	
6.2.2 <i>Doors</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Machinery room doors open outward, are self-closing, tight fitting, and do not open to a public corridor or any room used for assembly <input type="checkbox"/> There shall be no openings that will permit passage of escaping refrigerant to other parts of the building. 	
6.2.3 <i>Refrigerant Vapour Detector for Refrigerants Other Than Ammonia</i>	<ul style="list-style-type: none"> <input type="checkbox"/> A refrigerant vapour detector shall be located in an area where refrigerant from a leak is most likely to concentrate and shall be actuated at a value not greater than the corresponding Threshold Limit Value (TLV) – Time-Weighted Average (TWA) or a consistent toxicity measure <input type="checkbox"/> The sensors, when activated, shall sound a sufficiently audible alarm; and initiate mechanical ventilation – Ammonia Vapour Detection requirements are detailed in Section 6.3 	
6.2.4.1 <i>Explosion Protection</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Except as permitted by Clause 6.2.4.3, no open flames or apparatus to produce an open flame shall be installed in a machinery room 	
6.2.5 <i>Ventilation</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Machinery rooms shall be ventilated to the outdoors by a mechanical ventilation system 	
6.2.5.4 <i>Fan Switches</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Readily accessible independent fan switches shall be installed inside and outside the machinery room <input type="checkbox"/> Fan switches located outside the machinery room shall be capable of starting but not stopping the ventilation 	
6.2.5.5.2 <i>Minimum Ventilation</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Whenever the refrigeration system is operating or whenever the room is occupied, a sufficient part of the mechanical ventilation shall be operated to provide normal volumes equal to the greater of the following: 2.54 L/s/m² of machinery room area; or the volume required to prevent a maximum temperature rise above ambient greater than 10 °C, based on all of the heat-producing machinery in the room 	
6.2.5.7 <i>Minimum Temperature</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Supplementary heating shall be provided to maintain a minimum machinery room temperature of 5 °C where damage could result at temperatures below freezing 	

<p>CSA B52 Reference Clause</p>	<p>Clause Summary</p>	<p>Verification Initial/Date/ Company</p>
<p>6.3 <i>Class T Machinery Rooms</i></p>	<p>Class T machinery rooms shall meet the following requirements in addition to those specified in Clause 6.2.</p> <ul style="list-style-type: none"> ❑ There shall be no flame-producing device or hot surface over 427°C permanently installed in the room ❑ The room shall have at least one exit door that opens directly to the outer air. Other exits communicating with the building shall be permitted, but shall be through a vestibule equipped with approved self-closing, tightfitting fire doors ❑ The machinery room envelope, including any vestibule, shall be of tight construction; the machinery room envelope, including any vestibule, shall have not less than one-hour fire-resistive construction ❑ All pipes piercing the interior walls, ceiling, or floor of a shall be tightly sealed to the walls, ceiling, or floor through which they pass ❑ Air ducts shall be of tight construction and shall have no openings in such rooms; remote pilot control of the mechanical equipment in the machinery room shall be located immediately outside the machinery room and shall be provided solely for shutting down the equipment in an emergency ❑ Ventilation fans shall have a control switch on a separate circuit located immediately outside of the machinery room, and shall be permitted to run as long as power is available; all locations shall be equipped with a vapour detector that shall automatically start the ventilation system and actuate an alarm at the lowest practical detection levels not exceeding 300 ppm for ammonia; the vapour detector shall also initiate a supervised alarm so that corrective action can be initiated. 	
<p>6.10 <i>Emergency Discharge</i></p>	<ul style="list-style-type: none"> ❑ In the design of the refrigeration system, consideration shall be given to the provision of an emergency discharge system (see Annex B & IB15-004) ❑ Systems designed for operation over 103 kPa and containing 182 kg or more of Group A1 or 91 kg or more of all other refrigerants shall be constructed so that, in an emergency, the refrigerant can be safely and rapidly discharged into the atmosphere ❑ An emergency switch to stop the refrigeration equipment shall be provided alongside the emergency valve. ❑ No valve shall be installed between the vessel and the emergency discharge valve ❑ The emergency valve shall not be smaller than the emergency line ❑ The emergency valve shall be installed in a glass-fronted box that is painted bright red and placed outside the building in a location where it cannot be operated by anyone other than the plant operator, a firefighter, or a person who could be called on to open the valve in an emergency. The valve shall be located at least 2.3 m above finished grade, except as permitted by the regulatory authority 	

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7.1 <i>Overpressure Protection</i>	<ul style="list-style-type: none"> ❑ Pressure vessels shall be provided with pressure-relief protection in accordance with rules specified in paragraphs UG-125 to UG- 134, Section VIII, Division 1, of the ASME <i>Boiler and Pressure Vessel Code</i>, with such modifications as are necessary for control of refrigerants. ❑ If a pressure-relief valve is used under the conditions specified in Clause 7.1.3.1, a relief device system consisting of a pressure-relief valve, in parallel with a second pressure-relief valve, as described in Clause 7.3.1.2, shall be provided on pressure vessels with an internal gross volume of 0.28 m³ or more. Each pressure-relief valve shall have sufficient capacity to prevent the pressure in the pressure vessel from rising more than 10% above the setting of the pressure-relief valve. Dual pressure-relief valves shall be installed with a three-way valve to allow testing or repair. ❑ Pressure-relief devices shall discharge to the outside of the building, as required by Clause 7.3.6.1.2, on any system containing <ul style="list-style-type: none"> a) a Group A3 or B3 refrigerant; b) more than 3 kg of a Group A2, B1, or B2 refrigerant; or c) more than 50 kg of a Group A1 refrigerant. <p>The discharge termination shall be fashioned in a manner that prevents direct spray of discharged refrigerant on personnel in the vicinity, and shall prevent foreign material or debris from entering the discharge piping. Discharge piping shall allow for drainage of rain and snow and shall be adequately braced.</p> ❑ The discharge to the atmosphere shall be not less than 4.6 m above the adjoining ground level or accessible roof level and not less than 7.6 m from any window, ventilation opening, or exit in any building unless venting is in accordance with Clause 7.3.6.1.3(b). Discharge piping connected to the discharge side of a fusible plug or rupture member shall be equipped to prevent plugging of the piping in the event that the fusible plug or rupture member functions. ❑ Ammonia from pressure-relief valves shall be discharged into one or more of the following: <ul style="list-style-type: none"> a) the atmosphere, as specified in Clauses 7.3.6.1.1 and 7.3.6.1.2; b) a tank containing 8 kg of water for each kilogram of ammonia that will be released in 1 h from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure-relief device shall distribute ammonia in the bottom of the tank but not lower than 10 m below the maximum liquid level. The tank shall contain the water and ammonia without overflowing; or c) another treatment system that meets the requirements of the regulatory authority. 	
8.1 <i>Charging and Withdrawal of Refrigerants</i>	<ul style="list-style-type: none"> ❑ No service containers shall be left connected to a system, except while refrigerant is being charged or withdrawn. 	
8.3 <i>Refrigerant Storage</i>	<ul style="list-style-type: none"> ❑ Refrigerant, in addition to that in the system, shall be stored only in a machinery room. Such refrigerant shall not exceed a maximum limit of 136 kg and shall be stored in acceptable storage containers. Storage of the refrigerant in any other room shall first be approved by the regulatory authority having jurisdiction. 	

CSA B52 Reference Clause	Clause Summary	Verification Initial/Date/ Company
8.4 <i>Maintenance</i>	<p>The following minimum maintenance requirements shall be met:</p> <ul style="list-style-type: none"> ❑ Pressure relief valves shall be replaced or recertified at intervals no longer than five years. Recertification of relief valves shall be conducted in accordance with the requirements of the regulatory authority having jurisdiction. ❑ Pressure-limiting devices shall be tested at least once every 12 months for set point accuracy and for their ability to properly stop the affected equipment. ❑ Other safety devices shall be tested at least once every 12 months for set point accuracy and for their ability to properly stop the affected equipment. ❑ Permanent space leak detectors shall be tested for function at the specified refrigerant concentration in accordance with the manufacturer's instructions. The maximum interval between tests shall not exceed one year; the leak detector, in the simulated leak test, shall initiate an audible and visible alarm and begin ventilation at a rate not less than that specified in Clause 6.2.5.5. Failure of any of the three functions shall require corrective action. ❑ All safety-related maintenance recommendations by the equipment manufacturer(s) shall be followed ❑ All power and control electrical terminations shall be checked at least once every 12 months and tightened if necessary. ❑ At the end of each test, a tag noting the test date and the tester's name shall be affixed to the tested components. 	
9.1.1 <i>Protective Equipment</i>	<ul style="list-style-type: none"> ❑ The owner of a refrigeration system shall supply and maintain for its employees the personal protective equipment required to ensure the safety of personnel that may be exposed to hazards associated with the refrigeration system. <p><i>NOTE:</i> <i>The Alberta Occupational Health and Safety Regulation (AR 62/2003) mandates that safety training must be provided to all personnel involved with the operation and maintenance of the equipment.</i></p>	
9.1.2 <i>Service Personnel</i>	<ul style="list-style-type: none"> ❑ Installation and service personnel working on a refrigeration system shall be equipped, on arrival at the premises, with the personal protective equipment required by the jurisdiction where the system is located. 	

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