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Building Operators Association of

# Canada

Official Publication of the Building Operators Association (Calgary)

January 2022



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## Important Phone Numbers

Emergency	911
Alberta Boiler Association	403 291 7070
Alberta Labour (Emergency)	403 297 2222
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City Of Calgary (All Departments)	311
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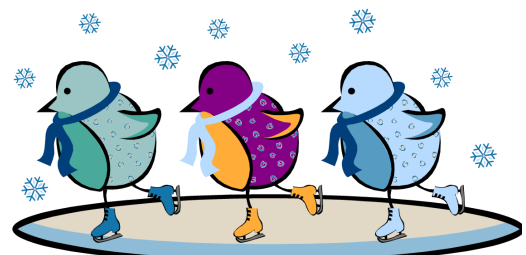
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Front cover by Aram and Megan



# President's Message



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Calgary, AB T2P 4J5  
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## **I hope this message finds you and yours well and in good health**

We welcome the new year with hopeful expectations. We have learned more of how our buildings operate over the last two years than we have in the last five. I believe that it is getting better. That this will be a good year and that the two years that shook us will have made us stronger and better for that experience. We have learned the importance of correct ventilation in our facilities, that filtration is important not only in clearing the path the air takes but the need to monitor the pressure drops and change the filters as required. That looking what happens in the off hours of our facilities is just as important as in the occupied hours. We have learned how to keep our facilities clean for our customers and co-workers. We have learned to do a lot with a little.

Our guest Speaker this month, Erich Binder will speak on Operating buildings in cold climate. Erich is a distinguished lecturer with ASHRAE, and a fellow Calgarian, has kindly offered to provide us with a presentation and discussion on Cold Climate Building Design. Please go to the BOA Site and select to register to attend the webinar. [Boacalgary.com](http://Boacalgary.com)

BOMA is still accepting registration to the February 5<sup>th</sup> Class Power Engineering Class. Contact the BOMA office at 403-237-0559 As the class is taught remote there is no need to live in Calgary to take the course.

So, take care of yourselves and please, be kind to one another.

Smiles))

With kind regards,

Les Anderson PE, RPA



**zoom**

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**MEETING ON TUESDAY JANUARY 11 2022 AT 5PM**





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## TEST YOUR OPERATOR IQ!



Are you equally adept at troubleshooting problems in the boardroom and the boiler room? As the resident facility guru, there's a lot riding on whether or not you know the difference between sounds control and a sound investment.

Try our monthly Operator IQ challenge...answers on page 16

### 1. A blow-off tank is used to:

- a. lower the dissolved solids in the water
- b. lower the pH of the water
- c. prevent damage to the sewer
- d. keep the condensate hot
- e. to prevent sludge from entering the boiler



### 2. A boiler blow down system on a high pressure boiler is equipped with slow and fast opening valves. The quick opening valve is placed:

- a. closest to the boiler and opened first
- b. furthest from the boiler and opened first
- c. closest to the boiler and opened last
- d. furthest from the boiler and opened last
- e. on the blow off tank

### 3. A continuous blow-off is:

- a. used to reduce the dissolved gases in the boiler
- b. installed in the steam drum
- c. used on every boiler
- d. installed in the lower drum
- e. used to reduce sludge

### 4. A steam boiler is blown down in order to:

- a. clean the soot and carbon out of the firebox and tubes
- b. lower the operating water level in the boiler
- c. discharge sediment and scale forming matter from the boiler
- d. test the rated relieving capacity of the safety valves fitted to the boiler
- e. locate the steam level

### 5. According to the CSA B-51 Code a blow-off tank is necessary to:

- a. prevent high temperature and pressure in the sewer
- b. prevent blowing off too quickly
- c. remove sludge from blow-off water
- d. prevent overflowing the sewer
- e. reduce the boiler water velocity





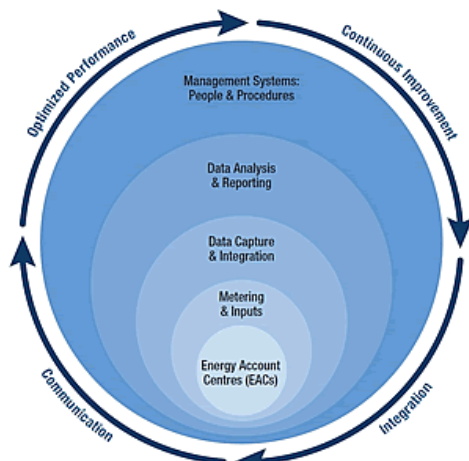
# BENEFITS OF ENERGY MANAGEMENT INFORMATION SYSTEMS (EMIS)

Energy Management Information Systems (EMIS) are a tool to facilitate the Energy Manager save on utility expenses and improve productivity. EMIS helps Property Owners and Property Managers attain consistent savings year after year by benchmarking and tracking consumption. Leveraging EMIS is also a way for organizations to be more environmentally friendly.

## WHAT IS AN EMIS?

The Energy Management Information System (EMIS) consists of Hardware (Meters & Data Collection Units) for data capture, Software, and Algorithms for analysis and reporting. EMIS tracks the use of resources such as Thermal Energy, Water, and Electricity in specific areas of consumption like; lighting, heating, ventilation, air conditioning (HVAC), and other mechanical systems in buildings.

While there are a lot of software systems available in the market, it is important to understand



<https://www.nrcan.gc.ca/>

that the effectiveness of these software and reporting systems relies on a strong foundation, that is the hardware or the submetering system.

The benefits of Energy Management Information Systems include:

## PROMOTE OPERATIONAL EFFICIENCIES

Many organizations use EMIS to record and analyze energy consumption data with the aim to reduce energy costs. Energy Management Information Systems provide companies the tools to visualize and compare their building performance over time to improve their long-term profits and reduce risks.

EMIS can help organizations determine where energy is being overused or wasted. Energy use is monitored and tracked, allowing for a clear understanding of use patterns and for finding outliers in consumption or abnormal performance in the building.

## SAVE ENERGY

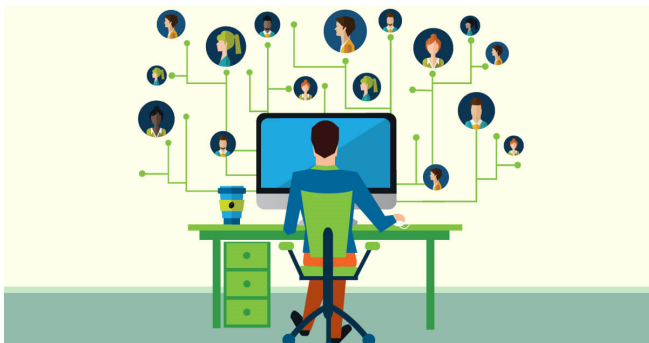
The research paper; "Proving the Business Case for Building Analytics" prepared by the Lawrence Berkeley National Laboratory, demonstrated how EMIS allows

*Continued on page 8...*

organizations to stay informed about their utility costs, their equipment performance, and by using this tool to achieve energy savings. An EMIS can provide real-time alerts when there is a spike in energy use, or demand to allow energy curtailing or demand shifting by modifying the scheduling of the HVAC equipment. The system enables organizations to track data over time to assess performance improvements or declines in specific areas of the building whether by occupant or by type of system over time.

### MONITOR PERFORMANCE & TRACK KEY METRICS

EMIS also helps organizations monitor and track energy, and perform Monitoring Based Commissioning of the building to determine if equipment degradation exists, if the equipment is running excessively, or out of schedule, if certain overrides exist and need to be altered, and where they stand concerning industry standards. Energy audits using the data provided by Energy Management Information Systems are simpler and easier to perform because they offer a clear picture of an organization's current standing compared to previous



performance levels.

### MANAGE SERVICES REMOTELY

In addition to being used by managers on-site, Energy Management Information Systems that locate or operate on the cloud, allow specialists to monitor energy usage from an off-site location. Energy managers can monitor data and receive alerts on their mobile phone, tablet, or at home when working remotely, allowing for more efficient management of resources. Making it easier to identify performance outliers to implement changes needed to achieve energy goals.



### REDUCE CARBON FOOTPRINT

Energy Management Information Systems also help companies identify the right targets where they should focus their efforts to maximize the return of their investment in the promotion of energy and resource conservation, a needed strategy today to mitigate climate change.

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The moment you realize "2022" is pronounced "2020 too"





# Types of Check Valves (Non Return Valve) NRV

**Types of Check Valves (Non Return Valve):** There are many kinds of check valves having variable body configurations. The subsequent are some normally used kinds of check valves.

## 1. Swing Check Valve

In swing check valves, the disc is unguided once it moves to completely open position or to completely closed position. Many alternative disc and seat designs are accessible to satisfy needs of variable applications. Soft-seated— swing check valves give improved leak tightness compared to metal-to metal seating surfaces. Combination seats consisting of a metal seat ring with resilient insert additionally provide higher leak tight characteristics. The seating angle, the angle between the seat and therefore the

vertical plane, might vary from zero to forty-five degrees. Vertical seats have a zero angle. Larger seat angles cut back the disc travel, leading to fast closing, therefore minimizing the chance of loud noise.

Sometimes the seat angles are within the range of five to seven degrees.

## 2. Lift Check Valve

Lift check valves are significantly custom-made for high-pressure service wherever speed of flow is high. In lift check valves, the piston disc is accurately target-hunting by long contact and an in depth sliding work

with the peerless targeted dash pot. The walls of the piston and dash pot are of roughly equal thickness. Giant steam jackets are placed outside of the dash pot and within the piston to eliminate sticking out due to differential enlargement. The seat ring is of a barrel sort design of significant uniform crosswise. It's commonly screwed in and seal welded. The flow gap is full port size.

The seat design of a lift-check valve is comparable to a globe valve. The disc is typically within the type of a piston or a ball. The ball-lift check valves are employed in extremely viscous fluid service. These check valves have superior leak-tight feature to those of swing check valves.

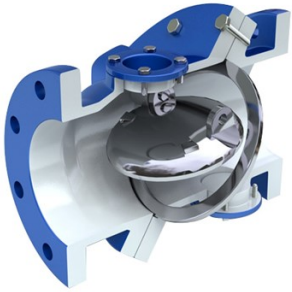
The piston kind lift check valves have an inclination to stick within the open position once service fluid has sediment treed on top of the piston. Giant lift check valves are equipped an equalizer line between the chamber on top of the disc and therefore the downstream aspect of the valve.

## 3. Tilting Disc Check Valve

The tilting-disc check valve is intended to overcome a number of the weaknesses inherent in typical swing check valves. A mix of design options allows the valve to open absolutely and stay steady at lower flow velocities and to shut quickly upon stop of forward flow. The dome-shaped disc floats within the flow



with fluid on each bottom and high of its surfaces, therefore its minimum dash pot impact. It performs well in pulsing, turbulent, and high-speed flows. These attributes prolong the valve's lift and cut back flow-induced dynamic masses on the piping system.



#### 4. Folding Disc Check Valves

This valve is additionally named as double-disc or split disc check valve. It's factory-made in wafer body pattern and is out there with soft or exhausting seats. It's extremely popular in low



pressure liquid and gas field services. Its light weight compact construction makes it a preferred check valve once area and convenience are necessary.



#### 5. Vertical or In-Line Check Valve

These valves are offered in 2 configurations: in-line ball check and totally guided disc with soft or hard seats. In-line ball check valves will be utilized in each vertical and horizontal line. The totally guided disc inline check valves should be supplied with a spring-

assist closure once employed in horizontal lines. In vertical lines, the guided disc in-line check valves might or might not be supplied with spring-assist closure. The spring-assist closure not solely assists in closing the valve quickly; it minimizes the chance of loud noise by preventing flow reversal.

They can be utilized in applications having pulsing flows, like in a discharge line of a reciprocating compressor. As a result of their compact in size, they're ideal for application in tight areas.

#### 6. Stop Check Valve

A stop check valve will either be used as a one-way check valve or as an isolation (stop) valve sort of a gate or globe valve. Throughout traditional operation of a system, these valves are used as an everyday check valve; but, once required, these valves may be closed with the assistance of a screw-down stem that isn't mounted to the valve disc. The stem, once totally screwed down, holds the free-floating disc against the valve seat, even as in a gate or a globe valve. These valves are accessible in tee-pattern, Wye-pattern, angle-



pattern, and inclined pattern. The swing-and-piston lift-disc style check valves are normally used as stop check valves.

*Article reprinted with permission*

# KenKen Puzzle

How to solve the KenKen puzzle:

(Answers on page 16)

- Fill in the numbers from 1 –6
- Do not repeat the number in any row or column
- The numbers in each heavily outlined set of squares, called cages, must combine (in any order) to produce the target number in the top corner using the mathematical operation indicated
- Cages with just one square should be filled in with the target number in the top corner
- A number can be repeated within a cage as long as it is in the same row or column

3	2 ÷		120 ×		
5 -	13 +		3 +		10 ×
		2 ÷	30 ×	4	
11 +	1				5 +
	20 ×		3 -		
	3 -		1	2 ÷	



View of Sanson's Peak Weather Station, Banff, from Sulphur Mountain (Monika Bhandari)

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# Warming up to patio heaters: what people need to know to stay safe this winter season

This winter, many British Columbians will once again reunite with family and friends as they restart social plans or partake in holiday celebrations. Whether out of preference or necessity, some British Columbians will turn to outdoor gatherings — staying cozy in backyards or outdoor patios with the help of patio heaters.

Although they can help keep the cold at bay, it is important to properly use these heaters to avoid potential fire and carbon monoxide (CO) hazards. One of the many safe ways to fuel patio heaters is by propane. It is important to remember that propane requires air to burn efficiently, otherwise incomplete combustion may occur. CO is produced when there is insufficient air for propane combustion.



So before you make plans to stay warm outside this winter, make sure you've got the knowledge you need to stay safe. With the help of the Canadian Propane Association, Technical Safety BC has compiled some important patio heater safety tips for British Columbians:

## 1. Only operate patio heaters outdoors

Patio heaters are intended for outdoor use only. Never use a patio heater inside your home — including the garage — to avoid any safety risks, like fire and rapid-onset CO exposure.

## 2. Never use patio heaters in an enclosed space

Enclosed spaces include a four-wall tent. In order to use patio heaters safely, there must be adequate ventilation and spacing around the heater.

To avoid potential risks, consider the following: if you're placing your heater under an open tent, is it too close to the tent ceiling? Is the heater too close to something combustible, like an umbrella or tablecloth? Your heater's manual will tell you what's best practice for staying safe.

## 3. Do not store propane cylinders indoors

Propane cylinders must be stored upright and safeguarded with protection that is tamper-proof and can withstand vehicle impact, such as a locked cage or secured fenced-in area such as a backyard. A cylinder is considered to be in storage when not connected to an appliance.

## 4. Follow the safety instructions in your device's manual

The manufacturer's instructions provided with your patio heater will tell you everything you need to know about your specific model.

## 5. Never place a patio heater where it blocks an exit

Keep your heater out of the way. Be mindful not to place it where it will block firefighting equipment like fire hydrants, extinguishers, or safety exits.

## 6. Get your propane cylinders inspected and requalified every ten years

Propane cylinders must be inspected and requalified

every ten years. In Canada, it's against the law to fill an expired or damaged cylinder. To find a registered cylinder requalifier in your area, check out Transport Canada's list of authorized recertification facilities.

### 7. Ensure your heater is placed on an even solid surface

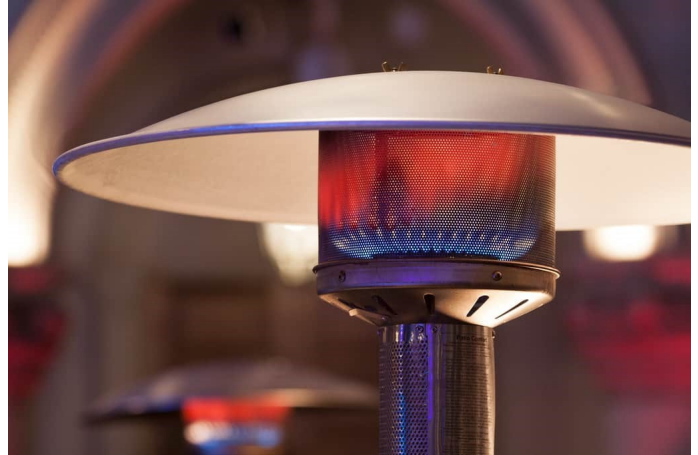
Your heater should be placed on a stable, level, and solid surface. This way, your heater will not accidentally tip over and cause damage or create safety hazards. If the heater needs to be moved, always disconnect the cylinder first. *Never* move a lit heater.

If you're planning to use a patio heater this winter, keep these safety tips in mind. And remember that your patio heater's manual should always be your go-to source for information if you're ever unsure about your heater's specifications.

If you work in BC's restaurant or film industry, now is also a great time to remind your coworkers to follow these safety tips when using any propane-fuelled heating device. Check to see if the heaters owned by

your workplace are being stored, operated, and maintained safely.

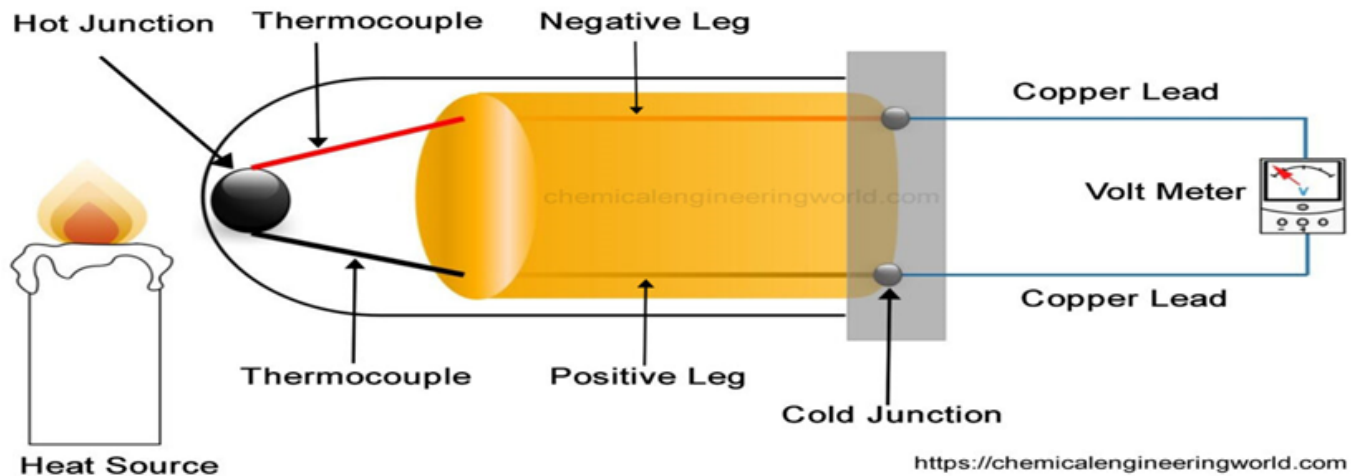
Want to know more about CO? Check out Technical Safety BC's guide to CO safety in the home. You can also read more about patio heater safety with the Canadian Propane Association's tip sheet.



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# Thermocouple Working and Types



A thermocouple is a device which is used to measure temperature. It is essentially one of the temperature measurement sensors. It is used in all the industries where the control of temperature or heat flow is required for the processes. Hence it is used in chemical, process, oil and gas, metal extraction, petroleum, petrochemical, pharmaceuticals, cement, glass, ceramics, power generation, paper and pulp and many more industries. They are also used in regular everyday appliances like stove, toasters, furnace etc.

The thermocouples consists of two metal wires, both the wires are dissimilar in nature. They are joined by a thermocouple thermometer at the other end.

## Working of Thermocouple

The dissimilar metal wires in the thermocouple are joined to form a junction. Joining them completes a thermoelectric circuit. When the temperature at the junction will increase then a

current is produced. The junction at which temperature increases is called the hot junction and there is one more junction at the other end called cold junction. The cold junction will also have a certain temperature. Essentially there is a temperature difference in the circuit. The heat flows from the hot side to the cold side, at an atomic scale the charge carriers also diffuse from hot end to cold end. It means the temperature difference has created a voltage in the circuit. The relationship between voltage and temperature difference can be quantified and the thermocouple calibrated for use.

## Types of Thermocouples

Thermocouples come in various forms and in numerous varieties. The varieties are so large that appropriate thermocouples have to be selected for a particular application. The most common type of thermocouple are type K, J, T and E. All these common thermocouples have a standard accuracy and all are made of base metals.

### Type K thermocouple:

The material of construction of such thermocouples



are either Nickel-Chromium or Nickel-Alumel. It is the most common thermocouple used because it is inexpensive, reliable, accurate, also has a wide temperature range.

**Type J thermocouple:**

The material of construction of such thermocouples are Iron or Constantan. It is the next common thermocouple after type K. It is also inexpensive and reliable but it has a relatively shorter temperature range and life span.

**Type T thermocouple:**

The material of construction is Copper or Constantan. It is a very stable thermocouple, it is made to be used in low temperature applications.

**Type E thermocouple:**

The material of construction is Nickel-Chromium or Constantan. This thermocouple is preferred in applications which demand a better accuracy compared to type K or J at moderate conditions.

## Advantages of Thermocouple

They are quite simple in construction, have low cost and are quite durable in nature. They offer wide range of temperature measurement. They have a fast response time of measurement.

## Disadvantages of Thermocouple

The underlying relationship between variables is not linear. It is non-linear in nature. It requires reference and recalibration is difficult. It is quite susceptible to electromagnetic interference and radio frequency interference.



“

Let our New Year's resolution be this: We will be there for one another as fellow members of humanity, in the finest sense of the word.

GÖRAN PERSSON

PureWow

**BOA**  
Building Operators Association of  
**Canada**  
Tradeshow  
**POSTPONED**  
UNTIL  
**May 2022**

# 5th Class Power Engineering Course



## The Online BOMA 5th Class Power Engineering Course:

- Will begin in Feb (exact date TBA) and will take place every Tuesday and Thursday evenings from 5-8pm.
- The course will be held online only using Zoom.
- The fee for enrollment will cover the cost of the 150 hour course, textbooks, and BOMA certificate upon completion  
*\*please note this does not include the ABSA exam\**
- The total cost including GST is \$2,199.75
- *\*No prerequisites are required for the course\**

New to the industry? If you are looking to become a building operator, then we recommend taking the Building Operator Level 3 online course. Visit our website for more info: <https://boma.ca/courses-list/building-operator-program/>

If you need further information please contact [info@boma.ca](mailto:info@boma.ca)

## Kenken Puzzle Answer

<sup>3</sup> 3	<sup>2÷</sup> 2	1	<sup>120×</sup> 4	5	6
<sup>5-</sup> 6	<sup>13+</sup> 3	4	<sup>3+</sup> 2	1	<sup>10×</sup> 5
1	6	<sup>2÷</sup> 3	<sup>30×</sup> 5	<sup>4</sup> 4	2
<sup>11+</sup> 5	<sup>1</sup> 1	6	3	2	<sup>5+</sup> 4
2	<sup>20×</sup> 4	5	<sup>3-</sup> 6	3	1
4	<sup>3-</sup> 5	2	<sup>1</sup> 1	<sup>2÷</sup> 6	3



## TEST YOUR OPERATOR IQ ANSWERS

Answers: 1) c 2) a 3) b 4) c 5) a



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## December Meeting Minutes



No minutes recorded for this month

### **JOIN US: TUESDAY JANUARY 11, 2022 AT 5PM FOR OUR VIRTUAL MONTHLY MEETING**

Title & Brief: Cold Climate Building Design  
Erich Binder President, Erich Binder Consulting Limited



Erich Binder is an independent engineering consultant with an extensive experience in the sustainable design of Commercial, Institutional, Industrial, & Cold Climate, Heating Ventilation & Air Conditioning (HVAC), Plumbing, Fire Suppression & Specialty Mechanical Systems engineering.

Winter is a fact of life here in Canada. There is a lot of speculation on the future of design and operation of occupied buildings, and to be able to run optimally in cold climates. Cold Climate Design is a timely subject discussed by a Canadian subject matter expert.

Buildings in cold climates, arctic and subarctic climates face unique challenges; not only the cold, but also remoteness, limited utilities, permafrost, and extreme temperature shifts.

Built structures must meet these challenges while maintaining occupant comfort and, if possible, minimizing impact on the environment.

Harmonizing human comfort with the climatic realities of these environments can be a delicate balancing act. Strategic design is key to building, commissioning, and operating efficient and long-lasting cold-climate structures.

This unified guide to cold-climate design provides expert knowledge on the issues commonly faced in arctic and subarctic climates.

In addition to cold-climate considerations in HVAC calculations and system design, this book's chapters cover sustainability, controls, building design, and commissioning, all from this distinctive climatic perspective.

The book also includes an appendix with seven case studies of buildings located in cold and extreme cold climates.

These buildings are leaders in their field with regard to both efficiency and cold-climate design.

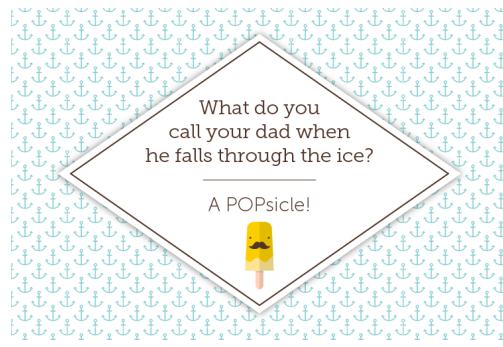
Aimed at each member of the building team, from the designer and architect to the commissioning authority, Cold-Climate Buildings Design Guide will serve as a valuable resource from the initial planning to completion of cold-climate buildings.

[Click on the link to register for the BOA Monthly Meeting](#)





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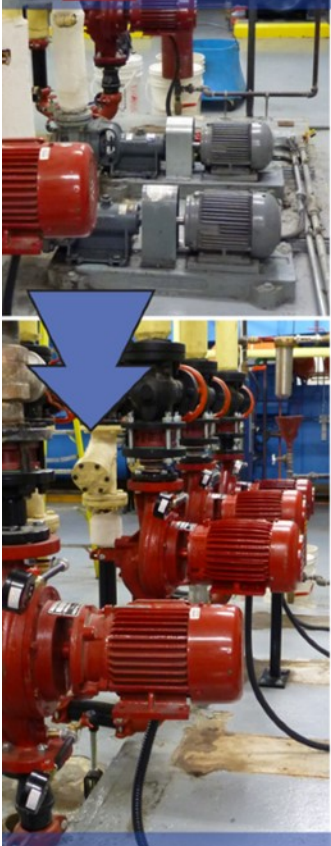
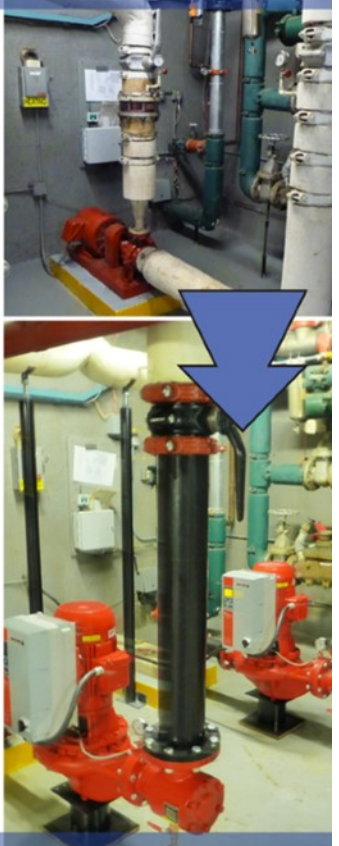




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