

BOA

Building Operators Association of

Canada

Official Publication of the Building Operators Association (Calgary)

June 2021



NEED POWER?

GENTECH FIELD SERVICES IS A TURNKEY POWER GENERATOR COMPANY SERVING CALGARY AND SURROUNDING AREAS. THE GENTECH FIELD SERVICES TEAM SPECIALIZES IN LIFE SAFETY EQUIPMENT FOR COMMERCIAL BUILDINGS AND ON CONSTRUCTION SITES. WE PROVIDE SCHEDULED AND EMERGENCY SERVICE FOR ALL COMMERCIAL DIESEL GENERATORS AND FIRE PUMPS. CONTACT US TODAY TO SCHEDULE A SERVICE OR FOR AN ESTIMATE ON A NEW OR USED GENERATOR.

OUR TURNKEY INSTALL SOLUTIONS INCLUDE:

RENTALS

PRODUCTS

ENGINEERING

SERVICE



GENTECH
FIELD SERVICES

Authorized dealer for &

240023 Frontier Crescent
Rocky View County T1X 0W5
587 349 3500
service@gentechfieldservices.com
www.gentechfieldservices.com



REGENCY CLEANING SERVICES

Janitorial Services
Window Cleaning
Pressure Washing
Specialty Services
Carpet & Upholstery
Move In / Out Cleaning
Floor Care & Maintenance
Post Construction Cleaning

PH: 403-520-7788 | FAX: 403-663-9911

info@regencycleaning.ca
www.regencycleaning.ca



BOULDER MECHANICAL

CONTRACTORS LTD

Complete Boiler Services
Air Handling Units
HVAC, Plumbing, Refrigeration
Electrical
Building Automation
Gas Detection Testing & Service
Preventative Maintenance & Emergency Service
Retrofit / Replacement
General Contracting

*Your partner in building
maintenance and service!*

Bay #6 6420 79th Ave SE Calgary, Alberta T3M 2B8
P: 403-230-5519 F: 403-230-5529 E-mail: j.harding@bouldermechanical.net

What's Inside?

Executive & Committees	3
Important Phone Numbers	3
Presidents Message	4
Test Your Operator IQ	6
Revenue Metering Basics	7
The Difference Between ASHRAE level 1, 2 & 3	9
KenKen Puzzle	11
Refrigerant & Oil Relationships Miscibility	12
KenKen Puzzle & Test Your Operator IQ Answers	15
What are ZEV's?	17
May Meeting Minutes & June Guest Speaker	17
Advertising Rates	19
BOA Calgary Sponsors	19
Advertisers Directory	20

Front Cover: Centre Street Bridge Lion, courtesy of The City of Calgary: <https://www.calgary.ca/csp/recreation/public-art/rotary-park-centre-street-bridge-lion.html>

Important Phone Numbers

Emergency	911
Alberta Boiler Association	403 291 7070
Alberta Labour (Emergency)	403 297 2222
Buried Utility Locations	1 800 242 3447
City Of Calgary (All Departments)	311
Dangerous Goods Incidents	1 800 272 9600
Environmental Emergency	1 800 222 6514
Poison Centre	403 670 1414
Weather Information (24hr)	403 299 7878

Executive & Committees

President	president@boacalgary.com
Les Anderson	C: 403 921 0648
Vice President	vice.president@boacalgary.com
Mark Arton	(c) 403-305-7029
Associate Vice President	associate.vice.president@boacalgary.com
Vacant	
Chairman	chairman@boacalgary.com
Mark Arton	(c) 403-305-7029
Treasurer	treasurer@boacalgary.com
Carrissa Speager	(c) 403-969-0329
Secretary	secretary@boacalgary.com
Monika Bhandari	(c) 403-470-4169
Education Committee	
Shaun McLean	education@boacalgary.com
Membership Committee	
VACANT	membership@boacalgary.com
Promotions Committee	
VACANT	promotions@boacalgary.com
Activities Committee	
Samson Isawode	403-874-0850
Technical Concerns	
Kyle D' Agostino	technical@boacalgary.com
Webmaster	
Les Anderson	webmaster@boacalgary.com



**SPROUSE
FIRE & SAFETY**
Serving Commercial, Residential & Contractors Since 1963
Fire & Safety Equipment Specialists
Toll Free: 855.337.7776
1323 9 Avenue SE 14825 Yellowhead Trail 5329 72 Ave SE
Calgary, AB Edmonton, AB Calgary, AB
www.SprouseFire.com info@SprouseFire.com
100% Alberta Owned



John Rutherford
* Boiler Service * Consults * Parts * Upgrades *
Quality Combustion & Controls Ltd
834, 3545 - 32 Ave NE, Calgary AB T1Y 6M6
Ph (403) 936-0065 Fx (403) 936-0061
jrutherford@Qualityco.ca Qualityco.ca

President's Message



I hope this message finds you and yours well and in good health

Spring is here and we have or are prepared our building for their Summer start ups. Last month we missed not having our guy Miguel Parobec of Gentech Field Services speak on Emergency generator service and maintenance. We did however have Mark Arton bring in Ainsworth to speak on what's new in large water chillers. They spoke on innovations within the industry and how that can apply to Buildings today. It was a timely seminar as we are bringing our chillers back online for the season. Some of the topics we presented to the membership are so large and complex that we never have enough time to cover all we need to know on the topics presented. An example is the one above that there is so much to learn. That you can invite the teams we present to speak to you individually or we can continue on the topics and drill down on other aspects on the subject.

Alberta Chief Power Engineers Education Committee put on a webinar last month, approximately 60 minutes in length. Dr Mark Kolodziej gave a presentation, his topic, "Does training automatically mean competency?" It was an interesting event, insightful, BOA recorded it and placed it on our website under meetings. Please review it at your leisure and please make comments to me of your thoughts.

The Building Operators Association is and has always been a "not for profit association" We are made up for the most part volunteers of which I am one, but we do have monthly expenses that we have to cover. For the most



part the expenses are paid by the Building Operators paying the annual dues. The \$60 dollars is what we use to produce the magazine to hold meetings and maintain our association expenses. We understand times are difficult for a lot of people, however, I hope we bring value to the membership. Our treasurer, Carrissa has sent to the members an invoice for the annual dues. She usually sends out a reminder a few weeks later but the executives agree we would forgo the reminder because times are tough, I do hope that if you can afford the cost of membership that you will pay it. We have made it quite easy using PayPal is simple and convenient. We are not in dire straights yet but we do rely heavily on your dollars. Please believe me when I say we spend it thriftily and frugally. We are accountable for every dollar spent. So, if you see the invoice, please pay it. If you have misplaced it, you can go to the website, under the membership link, it can easily be renewed.

BOMA Calgary has sent the memo that there will be another class for the Building Operator 5TH class beginning again in September 2021. It is still not clear if it will again be a virtual event or if it will be held live, in the classroom. Stay tuned.

Take care of yourselves and please be kind to one another.

With kind regards,

Les Anderson PE, RPA

JOIN US! 

FOR OUR VIRTUAL BOA MONTHLY

MEETING ON TUESDAY JUNE 8, 2021 AT

5PM



Clean Air Matters

We spend about 90% of our time indoors, and it has never been more important to ensure we have clean, healthy indoor environments.

For over 50 years, BGE's approach has focused on people, as we strive to provide optimal air quality through proactive, integrative advisory services and quality products you can trust.

BGECleanAir.com

Edmonton Calgary Vancouver Fort McMurray Prince George Regina Saskatoon Winnipeg



DCS AGENCY LTD.

Manufacturer's Representatives for:

- Xylem / Bell & Gossett
- Watts Water Technologies / Watts Radiant
- Watts / Powers Mixing & Electronics
- Tekmar Control Systems
- American Standard Brands
- Clemmer Technologies
- Laars Boilers
- De Dietrich Boilers
- Gastite Flexible Gas Piping
- Sisco P/T Plugs
- WGI Western Gauge & Instrument
- Griswold Flow Control Valves
- Metraflex Pipe Connectors
- Rinnai

Alan Proctor Shawn Oakley Greg Smith
#7, 6130 - 4 Street S.E., Calgary, AB. T2H 2B6
Tel: (403) 253-6808 Fax: (403) 259-8331
www.dcsalesltd.com



Alberta Diesel Dialysis

Ensuring the Best fuel quality at the Most critical time



Mobile Fuel Polishing Services
Permanent Automated Polishing Systems
Western Canada Distributor for Refuel Systems
403 813 9999
AlbertaDieselDialysis@gmail.com
www.AlbertaDieselDialysis.com

TEST YOUR OPERATOR IQ!

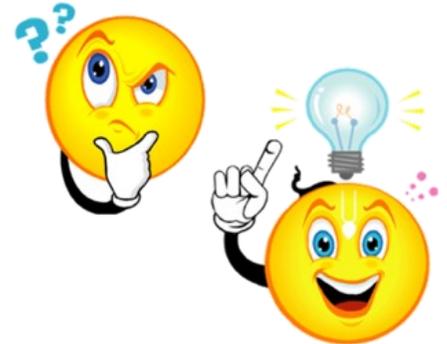


Are you equally adept at troubleshooting problems in the boardroom and the boiler room? As the resident facility guru, there's a lot riding on whether or not you know the difference between sounds control and a sound investment.

Try our monthly Operator IQ challenge...answers on page 15

1. **A depth type oil filter consists of:**

- a) columns of compressed paper
- b) pleat-folded papers
- c) loosely packed fibrous material
- d) absorbent substances



2. **A form of lubrication which requires continual motion of a shaft or surface is:**

- a) boundary lubrication
- b) alemite fitting lubrication
- c) forced lubrication
- d) zerk fitting lubrication
- e) fluid film lubrication

3. **A is thrust bearing which does not utilize the oil wedge principle of lubrication the:**

- a) Mitchell type
- b) collar type
- c) flotation type
- d) Kingsbury type
- e) vertical type

4. **A journal bearing:**

- a) controls thrust movement
- b) does not require lubrication
- c) improves suction pressure
- d) does not require a housing
- e) supports a shaft

5. **A large journal bearing which is running hotter than normal can be cooled by:**

- a) direct application of cool water
- b) loosening the bearing caps
- c) decreasing the viscosity of the oil by cooling it
- d) adding pour point depressant to the oil
- e) using CO₂ vapor



REVENUE METERING BASICS

BY ALBERTO QUIROZ OF INTELLIMETER CANADA

WHAT IS REVENUE METERING

Revenue metering is measuring the usage of a specific utility service like, electricity, water, gas, heat or other.

Not all the metering devices used to measure the basis of a charge for the supply of these resources can be called "revenue meter". Only approved devices that meet local regulations can be considered revenue meters.

Sub-metering or apportionment metering device used to determine costs for the supply of electricity, water, heat or gas to individual users in a multiple-unit complex is also regulated in some jurisdictions and measuring devices need approval to be considered revenue meters.

Metering devices used strictly for "non-billing" applications like energy management, or other purposes like LEED or WELL are at times called "check" meters, because their purpose will not be cost recovery and no financial transaction will take place using the readings from the device to measure in regulated jurisdictions.

WHY SHOULD I SUB-METER?

Sub-metering enables tenants and owners of buildings (central services) to calculate their own energy or water consumption and cost. Additionally multiple studies have demonstrated that buildings that are sub-metered are more efficient than those that are not.

WHY SHOULD I OWN DIGITAL METERS?

Digital meters enable:

- Interval reporting allowing for accurate demand cal-

culations in 5, 15, 30 and 60 minute intervals to enable electricity users to manage and schedule their own consumption

- Identifying time periods during the day such as work days or weekend
- Improved accuracy for longer periods of time



WHO OWNS THIS DATA?

This is important matter to consider, some companies lease the sub-metering system retaining ownership of the metered data during the duration of the lease. In other cases the owner buys the sub-metering system, securing this way the ownership of the data, and still keeping the ability to sub-contract or assign the sub-metering and billing to a third party.

In either case, as a consumer having accessibility to the data is important. Therefore selecting a **sub-metering supplier** that can provide this access in real time is recommended.

COMPONENTS OF REVENUE METERING

Government regulations and security requirements vary in every jurisdiction and also depend on the local utilities commission if exist in general most meters must incorporate some types of se-

Continued on page 8...

curity systems.

- Traditional anti-tamper mechanical seals found on the meter
- A password-based security system for when meter values can be reset

A hardware-based security system that prevents alteration of revenue amounts after the meter is locked

HOW CAN I CONNECT A DIGITAL METER?

As long as the installation takes place "behind the meter", that is down stream from where the main utility meter is, and upstream from the first outlet of the unit to meter it should be fine, as long as the installation is performed by a certified professional and it meets all the applicable local codes.

The primary purpose of a revenue meter is to provide the most accurate measurements for a fair financial transaction. These accuracy standards are within industry-accepted limits for accuracy within a defined range of operating conditions. Industry-accepted accuracy limits are set by International and national standards and recognized or adopted by local jurisdictions. They are meant to provide a leveled playing field to protect the consumer and to the provider.

Article reprinted with permission

CPG CUSTOM POWER GENERATION

CANADA'S LARGEST
BLUE STAR
POWER SYSTEMS DISTRIBUTOR

Western Canada's Premier Supplier
of Stand-by, Prime & CHP systems

24/7 Parts and Service Support

Emergency Generator Repair

Planned Generator
Maintenance Programs

On Site Fuel Testing & Polishing

100% CANADIAN OWNED AND OPERATED!

2G Authorized Sales Distributor & Service Provider

CALGARY - EDMONTON - VANCOUVER
24HR: 855-948-8810 / CUSTOMPOWER.CA

SURE[®]
PRINT & COPY CENTRE AVENIDA

WE PRINT EVERYTHING!

SIGNS
RETRACTABLE BANNERS
X-BANNERS
SANDWICH BOARDS

& MUCH MORE!

DESIGN
NCR FORMS
MAGAZINES
BUSINESS CARDS
POSTCARDS
CALENDARS
LARGE FORMAT PRINT
LARGE FORMAT SCANS
BLUEPRINTS

501 - 12445 Lake Fraser Drive SE, Calgary, AB T2J 7A4
Phone: 403.254.6922 Email: sure20@surecopy.com
www.sureprintavenida.ca

The Difference Between ASHRAE Level 1, 2 & 3 Energy Audits



An energy audit is the key to a systematic approach to decision-making in the area of energy management. The primary function of an energy audit is to identify all of the energy streams in a facility in order to balance total energy input with energy use. The four main objectives of an energy audit are as follows:

- To establish an energy consumption baseline;
- To quantify energy usage according to its discrete functions;
- To benchmark with similar facilities under similar weather conditions; and
- To identify existing energy cost reduction opportunities.

Before beginning an energy audit for a building or portfolio of buildings, a preliminary energy use analysis must be carried out. This analysis requires access to energy and natural gas consumption and cost data for the last 24-36 months. The purpose of this analysis is to compare the Energy Usage Index (EUI) of each building with the national average and to identify both high and low energy performers. Once the analysis is completed a recommendation is made as to which buildings should be audited first and the type of audits to be carried out.

Energy audits vary in depth, depending on the potential at a specific site for energy and cost reductions and the project parameters set by the client.

As per ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) standards there are three types of audits, outlined below.

ASHRAE Level 1 – Walk-Through Analysis/ Preliminary Audit

The Level 1 audit alternatively is called a simple audit, screening audit or walk-through audit and is the most basic. It involves minimal interviews with site operating personnel, a brief review of facility utility bills and other operating data, and a walk-through of the facility, all geared toward the identification of glaring areas of energy waste or inefficiency. The data compiled is then used for the preliminary energy use analysis and a report detailing low-cost/no-cost measures and potential capital improvements for further study. Typically, a Level 1 audit will only uncover major problem areas. Corrective measures are briefly described, and quick estimates of implementation costs, potential operating cost savings, and simple payback periods are provided. This level of detail, while not sufficient for reaching a final decision on implementing proposed measures, is adequate to prioritize energy efficiency projects and to assess the need for a more detailed audit.

ASHRAE Level 2 – Energy Survey and Analysis

A Level 2 audit includes the preliminary ASHRAE Level 1 analysis, but also includes more detailed energy calculations and financial analysis of proposed energy efficiency measures. The financial analysis or Life Cycle Cost Analysis provides the facility owner with comprehensive understanding of

the financial benefits of implementing specific energy efficiency measures. Utility bills are collected for a 24 to 36 month period to allow the auditor to evaluate the facility’s energy/demand rate structures and energy usage profiles. This type of audit identifies all energy conservation measures appropriate for the facility given its operating parameters. A detailed financial analysis is performed for each measure based on implementation cost estimates, site-specific operating cost savings, and the customer’s investment criteria. Sufficient detail is provided to justify project implementation.

ASHRAE Level 3 – Detailed Analysis of Capital Intensive Modifications

This level of engineering analysis focuses on the potential capital-intensive projects identified in

the Level 2 analysis and involves more detailed field data gathering as well as a more rigorous engineering analysis. It provides detailed project cost and savings calculations with the high level of confidence required for major capital investment decisions. This audit alternatively is called a comprehensive audit, detailed audit, or technical analysis audit. It expands on the Level 2 audit by providing a dynamic model of energy use characteristics of both the existing facility and all energy conservation measures identified. The building model is calibrated using actual utility data to provide a realistic baseline against which to compute operating savings for proposed measures. Extensive attention is given to understanding not only the operating characteristics of all energy consuming systems, but also the situations that cause load profile variations on both an annual and a daily basis. Existing utility data is supplemented with sub-metering of major energy consuming systems and monitoring of system operating characteristics.

The table below summarizes each level:

Type of Audit	Type of Audit Brief Description
Level 1	Brief on-site survey of the building Savings and cost analysis of low-cost/no-cost Energy Conservation Measure (ECMs) Identification of potential capital improvements meriting further consideration
Level 2	More detailed building survey Breakdown of energy use Savings and cost analysis of all ECMs Identification of ECMs requiring more thorough data collection and analysis (Level 3)
Level 3	Attention to capital-intensive projects identified during the Level 2 audit More detailed field analysis More rigorous engineering analysis Cost and savings calculations with a high level of accuracy

KenKen Puzzle

How to solve the KenKen puzzle:

(Answers on page 15)

- 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

2 ÷		6 +		5 -	6 x
2 -	5 +	11 +			
		5 +	10 +		1
3 ÷	5		2 ÷		11 +
	5 -	1 -		4	
5			72 x		

Have a great summer!

We look forward
to seeing
you in September!



CONSTANT
FIRE PROTECTION SYSTEMS LTD.

WADE WEATHERBEE
High Rise Division Manager

5442 56 Avenue SE Telephone: 403-532-3205
Calgary, Alberta Fax: 403-532-0185
T2C 4M6 Cellular: 403-703-7888
E-mail: waderw@telus.net

*Healthy Buildings
on a Sustainable Planet*



**Gasonic
Instruments**
A Member of the Gasonic Group

Bay 8, 823 - 41 Avenue N.E. Phone: (403) 276-2201
Calgary, Alberta T2E 6Y3 Website: www.gasonic.com

CONSULTING • DESIGN • INSPECTION • TESTING SERVICES

Anton J. Vlooswyk, P.Eng.
Cel: (403) 651-1514
Tel: (403) 287-0888
Fax: (403) 287-0880
Email: anton@beei.ca



**BUILDING
ENVELOPE
ENGINEERING
INC.**

102, 4029- 8th Street S.E.
Calgary, Alberta, T2G 3A5
www.beei.ca



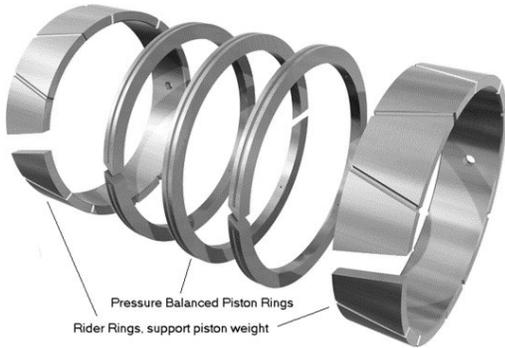
Refrigerant and Oil Relationships

Miscibility

The compressor lubricant in refrigeration and air conditioning systems has many important functions. Even though the refrigerant is the working fluid required for cooling, the lubricant or oil is needed for lubrication of the compressor's moving mechanical parts.

Oil minimizes mechanical wear by reducing friction. Oil also maintains a seal between the high and low side of the compressor. Without proper lubrication, the compressor's valves, mating scrolls, screws, and vanes would not properly seal. The results would be high-side refrigerant pressures entering the low side of the refrigeration system.

Piston rings in reciprocating compressors and rotating vanes in centrifugal compressors rely on the lubricating oil to prevent blow-by around the pistons and vanes. Oil also acts as a noise dampener within the compressor and transfers heat away from moving and rotating parts within the compressor.



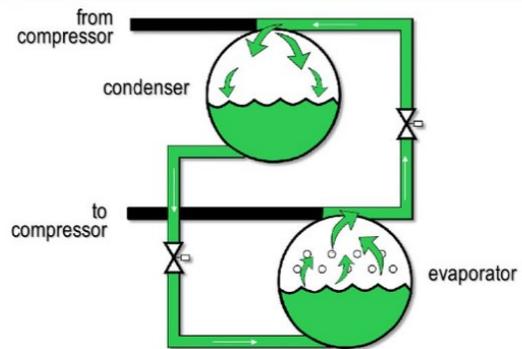
Under normal conditions, there will always be a small amount of oil that escapes a compressor's crankcase and is circulated with the refrigerant throughout the system. It is for this reason that refrigerant oil and the refrigerant itself must be soluble in one another. It is the velocity of the circulated refrigerant that carries the oil back to the compressor's crankcase. If the two were not soluble in one another, this phenomenon could not happen. This is why line, coil, and valve sizing is critical to maintaining the refrigerant velocity required for proper oil return.

REFRIGERANT MIGRATION

During a compressor's off cycle, and especially during a long shutdown, refrigerant will travel to a place where pressure is the lowest. Refrigerant migration is defined as refrigerant, either liquid or vapor, traveling to the compressor's suction line or crankcase during the off cycle.

In nature, fluids travel from a place of higher pressure to a place of lower pressure. The crankcase usually has a lower pressure than the evaporator because of the oil it contains. Refrigeration oil has a very low vapor pressure and refrigerant will flow to it whether the refrigerant is in the vapor or liquid state. In fact, refrigerant oil has such a low vapor pressure it will not vaporize even when a 100-micron vacuum is pulled on the refrigeration system. Some refrigeration oils have a vapor pressure as low as 5-10 microns. If the oil did not have a very low vapor pressure, it would vaporize every time a low pressure existed in the crankcase or when a

free cooling Refrigerant Migration



vacuum was pulled on the crankcase.

Because refrigeration migration can occur with refrigerant vapor, the migration can occur uphill or downhill. When the refrigerant vapor reaches the crankcase, it will be absorbed and condense in the oil. Once this phenomenon happens, the liquid re-

refrigerant will be on the bottom of the oil in the crankcase because it is heavier than the oil. Often, manufacturers will incorporate a crankcase heater on the compressor.

Crankcase heaters are designed to help keep the oil in the compressor's crankcase at a temperature higher than the coldest part of the refrigeration system. If refrigerant migration occurs as a vapor and the system has a crankcase heater, the vapor will be forced away from the crankcase and be driven back into the suction line. This refrigerant may condense in the suction line and cause slugging in the compressor's cylinders on the next start-up. Crankcase heaters do combat refrigerant migration to the compressor's crankcase oil. They also prevent oil and refrigerant dilution within the compressor's crankcase. However, they do not prevent refrigerant slugging at start-up.

SLUGGING

With reciprocating compressors, slugging is liquid refrigerant or liquid oil actually trying to be compressed in the cylinders of the compressor. Slugging happens during the compressor's on cycle. As we know, liquids cannot be compressed and attempts to do so generate tremendous reversal forces that often result in broken parts. Slugging can especially happen if the compressor is located outdoors in a cold ambient. The cold ambient will amplify the lower vapor pressure area and help condensed the refrigerant vapor to liquid. As mentioned earlier, a crankcase heater helps keep the oil in the crankcase free of refrigerant caused from refrigerant migration.

On short compressor off cycles, the migrated refrigerant does not have a chance to settle under the oil but still mixes with the oil in the crankcase. When the compressor turns on, the sudden pressure drop in the crankcase containing liquid refrigerant and oil will cause the refrigerant in the oil to rapidly flash to a vapor. This causes violent foaming in the crankcase. The oil level in the crankcase will then drop and mechanical parts will be scored from inadequate lubrication. The crankcase pressure will rise, and the mixture of refrigerant and oil foam can now be forced through compressor passages, around piston rings, and pumped by the compressor into the refrigeration system.

Not only does this situation cause loss of oil from the crankcase, it also can cause a mild form of slugging in the compressor's cylinders. High compressor current draw, which will lead to motor overheating, usually follows. Also, broken or warped valves can occur as a result of overheating and/or slugging.

AUTOMATIC PUMP DOWN

The only sure remedy or solution to avoiding refrigerant migration is to get rid of all refrigerant in the evaporator, suction line, and crankcase before every off cycle. This can be accomplished via an automatic pump down system. A thermostat controlling box temperature is wired in series with a liquid line solenoid. When the box temperature is satisfied, the thermostat contacts open. This de-energizes the liquid line solenoid and initiates a pump down cycle. All the liquid and vapor refrigerant from the solenoid forward through the compressor will soon be pumped into the high side (condenser and receiver) of the system. Once the low-side pressure reaches about 69 KPa, a low-pressure controller will interrupt the compressor circuit and initiate an off cycle. The system is now pumped down, and migration cannot occur because of lack of refrigerant vapor and liquid in the evaporator, suction line, and crankcase. Figure 1 illustrates an electrical and mechanical hookup of an automatic pump down system.

When the box thermostat calls for cooling, the liquid line solenoid is energized, and refrigerant pressure will travel through the metering device to the low



side of the system. This pressure will cause the cut-in pressure of the low-pressure control to close its contacts and bring the compressor to another on cycle. The cut-in pressure for the low-pressure control is

system- and refrigerant-dependent. It has to be high enough to prevent any short-cycling of the compressor during an off cycle but low enough to allow the low-side pressure to reach it when an on cycle is initiated by the box thermostat. Actual trial and error will allow a service technician to determine the low-pressure control's settings.

Most every low-pressure controller (LPC) has an adjustment to set the cut-in and cut-out pressure to cycle the compressor. There may also be a differential control on this same controller. The difference between the cut-in and cut-out pressures of the LPC is referred to as the differential. For example, if a system is set to cut-in at 172 KPa and has a 103 KPa differential, the cut-out pressure would be 69 KPa. Refer to the equation below:

$$\begin{aligned} &172 \text{ KPa cut-in pressure} \\ &\quad - 103 \text{ KPa differential} \\ &= 69 \text{ KPa cut-out pressure} \end{aligned}$$

It's important not to let the low-side pressure get too low before shutting off the compressor. If the low-side pressure was allowed to drop to 0 KPa before the low-pressure control terminated the cycle every off cycle, damage could occur to the compressor from lack of refrigerant mass-flow rate and high

compression ratios. This severely unloads the compressor and may cause overheating from loss of the cooling effect on the compressor's windings. A cut-out pressure of 69 KPa is low enough to ensure most of the liquid and vapor refrigerant has been cleared from the evaporator, suction line, and crankcase to prevent refrigerant migration during the off cycle.

Many times, systems will use an electronic expansion valve (EEV) in place of the liquid line solenoid. An algorithm in the valve's software will throttle the EEV closed when it is time for an automatic pump down to occur and open it when it is time for the next on cycle.

Article reprinted with permission

WestExcel
Automation Ltd.

Commercial Building Automation Solutions Provider
Over 30 product lines including

Honeywell

Johnson
Controls

BELIMO

Shawn Mclean, Calgary 403-404-3660 www.westexcel.ca



Just for laughs!



“Have you heard of Murphy's law?”

“Yeah.”

“What is it?”

“If something can go wrong, it will go wrong.”

“That's right. Have you heard of Cole's law?”

“No, what is it?”

“Thinly sliced cabbage and mayo.”



SAFE ENTRY STATION
getsafeentry.com

Powered By: **PREDICTMEDIX** | **JUICEWORKS**

USES ARTIFICIAL INTELLIGENCE TO SCAN FOR 7 SYMPTOMS OF INFECTIOUS DISEASE


CONGESTION


FEVER


COUGH


EXHAUSTION


HEADACHE


REDNESS OF EYES


SWEAT GLAND ACTIVATION

Contact us today
John Hodson
 Western Canada Sales Director
 C: 403.312.8500
 E: j.hodson@getsafeentry.com

BOA

Building Operators Association of

Canada

Tradeshow

POSTPONED

 UNTIL

May 2022

Kenken Puzzle Answer

$2 \div$ 2	4	$6 +$ 5	1	$5 -$ 6	$6 \times$ 3
$2 -$ 4	$5 +$ 3	$11 +$ 6	5	1	2
6	2	$5 +$ 4	$10 +$ 3	5	1 1
$3 \div$ 3	5 5	1	$2 \div$ 4	2	$11 +$ 6
1	$5 -$ 6	$1 -$ 3	2	4 4	5
5 5	1	2	$72 \times$ 6	3	4

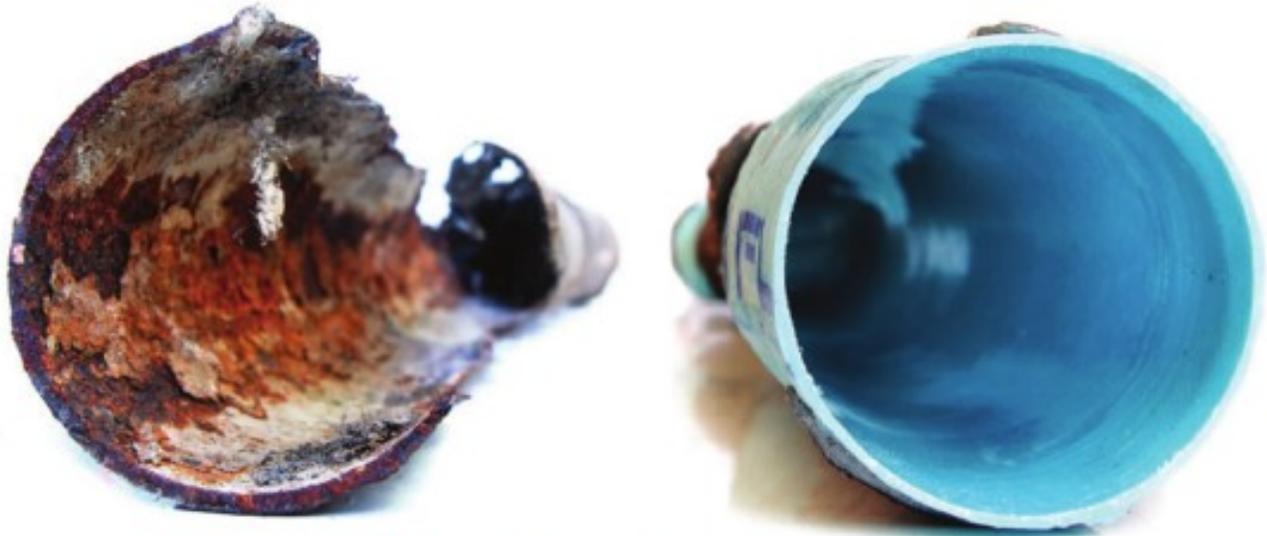
TEST YOUR OPERATOR IQ ANSWERS

Answers: 1) b 2) e 3) e 4) e 5) b

BOA Canada Magazine printed & distributed by:

SURE PRINT & COPY

New pipes inside your old pipes.



**Cost Effective, Less Disruptive.
Simple as that.**

*Whether you're replacing a
drain stack in a skyscraper or
a piece of cracked cast under
the floor in a shopping centre,
we have it handled!*

- Vertical drain stacks behind walls
- Horizontal drains under floors
- HVAC and chiller pipes
- Pipes with multiple bends and offsets
- Pipes with branch connections
- 1 1/2 - 10 Inch diameter (custom sizes available)
- Inside any type of pipe (including cast iron, steel, asbestos concrete, PVC, ABS)
- 50+ year life expectancy

REVIVE
Pipe Restoration Inc.

Inside Building Specialists
403-903-4445
www.revivepipes.com

WHAT ARE ZEVS?

By Alberto Quiroz

Historically, transportability and fossil fuels have been intrinsically linked; Since the invention of the ICE (Internal Combustion Engine) the extent of its applications, from agricultural to industrial and then to the growth of cars, trucks, ships, and trains is closely correlated to the consumption of fossil fuels and climate change. Today, **transportation produces 28% of all greenhouse gas emissions** in North America.

While electric vehicles have been successful only in few niche markets many factors are accelerating the adoption of electric transportation for the mass market, key drivers fueling this acceptance are:

Generation awareness of **Climate Change**

Advances in **Renewable Energy**

- Electric Battery Technology
- Big Data Analytics
- Electric Motor Technology
- Lower **Cost of semiconductors and electronic components**
- Affordability of ZEVs

WHAT ARE ZEVS?

Zero-Emission Vehicles (ZEVs) are vehicles that DO NOT emit any harmful pollutants, like **Green House Gases**, particulates, carbon monoxide, lead, or other toxic pollutants; under any possible operational modes and conditions. Today ZEVs are less expensive to fuel than vehicles powered by gasoline or diesel. In addition to **lower cost of ownership** electric motors offer fewer moving parts than conventional Internal Combustion Engines (ICE), For instance; a Tesla drive-train has only 17 moving parts while a single ICE close to 200 moving parts.

Under the ZEV regulation, there are three types of

zero-emission vehicles:

1. **BEVs: Battery Electric Vehicles**, which run exclusively on rechargeable batteries;
2. **FCEVs: Hydrogen Fuel Cell Electric Vehicles** are powered by Hydrogen that when passed through a fuel cell produces electricity to run electric motors.

ZERO-EMISSION VEHICLES ARE THE FUTURE

Gasoline and diesel engines are primarily responsible for the large percent of nitrogen oxide and crude matter emissions in North America. Zero-Emission Vehicles on the other hand are an essential part of the climate mitigation and adaptation strategy of many countries around the world.

More countries and states have enacted legislation and executive orders to address climate change and adopting ZEVs in future.

To illustrate one; The ZEV standard came into effect on January 11, 2018. Quebec, British Columbia, **California**, Connecticut, Maine, Maryland, Massachusetts, New York, New Jersey, Oregon, Rhode Island, and Vermont have adopted ZEV standards for passenger vehicles; a trend likely to continue as younger generations will be more proactive in protecting the planet.

TAKE AWAY

The number and type of ZEVs will continue to grow as automakers develop a portfolio of ZEV technologies either to compete with many new ZEV startups or to respond to future regulations. An access to charging or fueling infrastructure will soon need to be addressed as the adoption of ZEVs increase in high numbers.

When it comes to ZEV passenger vehicles and existing building infrastructure, the need to maximize the distribution of the available capacity for charging and installing **Energy Management Systems** for EVs will be high on property managers mind.

Article reprinted with permission



May Meeting Minutes

Chaired by:
Mark Arton

Minutes by:
Monika Bhandari

Call to order:
5:01pm

Webinar: May 11, 2021

• Introduction from Mark Arton

Guest Speakers:

Rick Hack, Sheldon Tetrault And Paxton Lang with Norm Denslow Ainsworth Inc.

Topic: **Water Colled Chillers—What's New?**

New Business:

- Will send gentle reminders for payment of membership dues; please support us!
- BOA Tradeshow postponed until May 2022
- More webinars to be presented possibly a few a month—share your ideas with BOA Executive
- Visit the website for YouTube videos of last meetings; download BOA Magazine from www.boacalgary.com
- Next virtual (zoom) meeting on June 8 2021, 5PM
- Current balance is \$5883.78



JOIN US: TUESDAY JUNE 8, 2021 AT 5PM FOR OUR VIRTUAL MONTHLY MEETING

Guest Speaker: **Luc Chamberland, Sales Manager Canada—Control Valve Specialist, Spartan Peripheral Devices**

Title & Brief: **HVAC Control Valves - What You Need to Know**

Luc joined Spartan Peripheral Devices in 2010. He has been working in the industrial Instrumentation automation field since 2000 in various sales departments positions from OEM Specialist to commercial channel sales market.

Over the years, Luc's reputation as control valve retrofit specialist has been spreading in Canada's major engineering firms. He has become a reference for mechanical departments coast to coast. As an active ASHRAE Montreal chapter member, he has been representing Spartan Peripheral Devices since 2010 in HVAC exhibitions CMPX - CMX - CIPHEX WEST AB,BC MEET Trade Shows.

Luc gained a lot of experience in the HVAC commercial market working on various large scale projects. Performing a variety of tasks such as presentations to Engineering Firms providing Technical Support Control Valves ID-Flow sizing CV-Control Valve Retrofit Solution Specialist

Supporting projects through engineering design, integration, commissioning and start-up activities and working with customers' engineers to define functional requirements while managing customer expectations are some of the Luc's key responsibilities. Luc is focussed on problem solving and helping understanding control valves and the applications they are involved with in our daily lives.

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



May 2021 General Meeting Attendance

Les Anderson	George Niksic	San Ban
Sheldon Tetrault	Godfery Licayan	Seyed Hosseini
Mark Arton	Alevis Rodriguez	Scott Brooks
Rick Hack	Matthew Adams	Dean Siemens
Norm Denslow	Casey Kok	Shawna Longeuy
Ed Smid	Fred Costoy	Don Schaab
Rex Matibag	Cory McWhinney	Jose Hernandez
Kyle D'Agostino	Gary Gottwald	Frank Giugovaz
Josh Hogan	Monika Bhandari	Blair Bohnet



BOA CALGARY OPERATOR MAGAZINE ADVERTISING RATES:



1/8 page	\$200	Premium Locations:	
1/4 page	\$400	1/2 page inside/outside cover	\$850
1/2 page	\$775	1/2 page outside cover	\$900
Full page	\$1000		

Deadline for ads is the 10th of each month. For any questions, please email: advertising@boacalgary.com.



Thank you to our incredible sponsors! Your support of the Building Operators Association is invaluable!!

GOLD LEVEL SPONSORS











SILVER LEVEL SPONSORS








BRONZE LEVEL SPONSORS









Advertisers Directory

Automation WestExcel Automation Ltd.	403-404-3660
Boiler Services Black & McDonald Quality Combustion & Controls	403-235-0331 403-936-0065
Cleaning / Janitorial Services Regency Cleaning	403-520-7788
Drain Services Revive Pipes	403-903-4445
Engineering Services Building Envelope Engineering	403-287-0888
Filtration BGE Air Quality Solutions Ltd. Alberta Diesel Dialysis	403-243-5941 403-813-9999
Fire Protection Services Constant Fire Protection Sprouse First & Safety	403-279-7973 403-265-3891
HVAC & Electrical Services Black & McDonald Boulder Mechanical Contractors Ltd.	403-235-0331 403-230-5519
Indoor Air Quality Services Gasonic Instrument Inc, Black & McDonald	403-276-2201 403-235-0331
Lighting Services Calgary Lighting Products	403-258-2988
Motor Services James Electric Motor Services	403-252-5477
Supply Services DC Sales Corporation	403-253-6808

Alberta Certified Power Engineers Online Directory

Check to see when your power
engineer certificate is due for
renewal!

www.absa.ca/directories/alberta-certified-power-engineers-directory/



Support those that support
YOU!

Next time you are looking for a product
or a service provider, please consider
connecting with one of our advertisers
& members of the Building Operators
Association of Calgary



James Electric



Motor Services Ltd.

Professional Pump & Electric Motor Repair

35,000 Square Foot Service Center and Warehouse

In-House Machine Shop & Fabrication Departments

Fully Equipped Service Vans

Certified Hydronic Designer on Staff

Calgary's Largest Replacement Motor Inventory

Largest Stock of Pumps & Pump Parts in Western Canada

Custom Built Fans and Blowers to Meet Your Specifications

ISO & COR Certified

Consumer Choice Award 8 Years Running

All Service Technicians are Trained in Confined Space Entry

Fire Pump, Booster Pump and Sump Pit Annual Inspections Available

Energy Efficient Audits and Solutions

On Call 24 Hours, 7 Days a Week

Motors

A.O. Smith, Baldor, Century, Emerson, Franklin, Fasco, Lafert, Leeson, Marathon, WEG, Teco-Westinghouse, US Motors

Pumps

Armstrong, Albany, Barnes, Bell & Gossett, Burkes, Darling, Franklin, Goulds, Grundfos, Hydromatic, Liberty, Little Giant, Monarch, Paco, Taco, Tsurumi, Xylem

Fans & Blowers

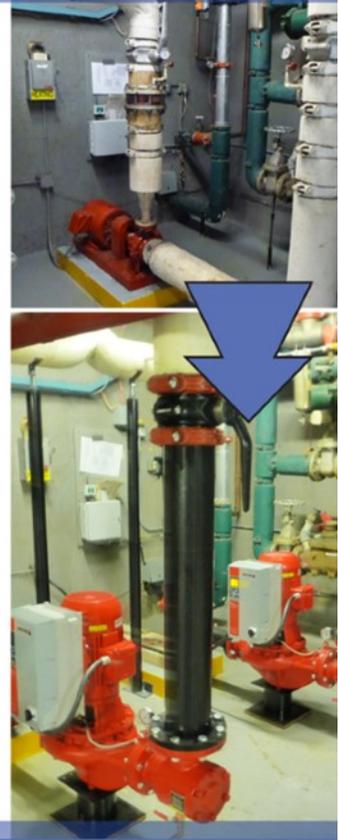
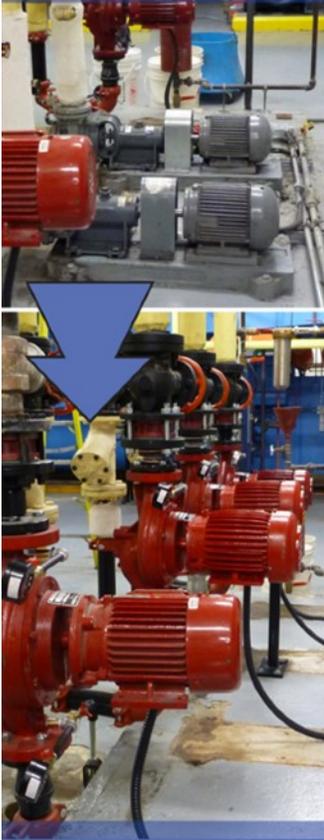
Airdex, AirKing, Broan, Dayton, Delhi, Fantech, Fasco, Greenheck, Lau, Nederman, Nutone, Schaefer, Tjernlund

Variable Frequency Drives & Motor Controls

ABB, Danfoss, Baldor/Reliance, WEG, Santerno, Teco-Westinghouse, Tornatech

Accessories

Gear Boxes, Pressure Tanks, Gauges, Bearings, Mechanical Seals, Flow Indicators, Filter Housings, Filters, Flanges, V-Belts, Float Switches, Pressure Switches, Pulleys, Sheaves, Relays, Contactors, Pressure Reducing Valves



Are your pumps leaking money?



Booster Audit

We have ability to monitor water usage and power consumption to provide the following:

- A comprehensive pre audit booster inspection
- An energy audit with an estimate of annual energy savings and potential payback.
- The "scope of work" for the installing contractor
- Start-up and commissioning on site
- Yearly maintenance inspections
- On site service 24/7/365

Grundfos BoosterpaQ

- Most efficient cascade control, application optimized software in the industry
- Single source responsibility: One manufacturer for pumps, motors, drives and control
- Plug & Play - Easy to install and commission
- Large, clear, user friendly & advanced controls interface
- Reduced floor space footprint
- Ethernet & BUS communications option
- Drinking water approvals: NSF61/372, Hygienic designed 316SS manifolds



4020 - 8 Avenue S.E, Calgary, Alberta, T2G 3A7 www.jameselectric.ca motors@jameselectric.ca



Calgary Lighting Products

Scholarship

5th Class Course

Calgary Lighting Products
in partnership with BOA

is offering a **50% Scholarship**
towards the 5th Class Course

For more details, please contact
president@boacalgary.com

CalgaryLightingProducts.com

Need Trained Building Operators? 

'Be A Part of the First Training of Its Kind'

5th Class Power Engineering 'Building Operator' Training Program



- ▶ Our first ever program graduated nineteen 5th Class Power Engineers Building Operators
- ▶ 90% secured employment with major companies in town!

**If you are a Building Owner/
Manager and would like to:**

- know more about this training or
- be a work experience host employer or
- have recruiting advantage after completion of training

At no cost to you!

Please contact:
Monika Bhandari
Phone: 403.514.8328
Email: mbhandari@ccisab.ca
1111-11 Ave SW 5th Floor
Calgary, Alberta T2R 0G5
www.ogtp.ca






Services

- Heating, Ventilation & Air Conditioning
- Sheet Metal
- Electrical
- Building Automation Systems
- Plumbing
- Refrigeration
- Voice & Data Communications
- Instrumentation
- High Voltage
- Process Piping
- Millwright & Rigging

Calgary Office
1071 26 St NE Calgary
403-235-0331

Capabilities

- Design/Build
- Renovation & Upgrade
- Fast-track Change-out
- Building Commissioning
- Infrared Thermography
- Facilities Management & Operation
- Planned Preventive Maintenance
- Sheet Metal Fabrication Pipe
- Complete Boiler Services
- 24-hour Emergency Service**

Facilities

- Commercial/Office
- Industrial
- Education & Institutional
- Healthcare
- Industrial
- Telecom & Data Centers
- Sports & Assembly
- Airport & Transit Stations
- Military Bases



Black & McDonald is a leader in quality service, committed to implementing innovative solutions throughout a facility's life cycle.

www.blackandmedonald.com