



# BUFFALO TALES

Newsletter of the Manitoba Chapter

*The Manitoba Chapter of the American Society of Heating, Refrigerating and Air Conditioning Engineers was chartered in September 1935. It is the second oldest ASHRAE Chapter in Canada. ASHRAE Manitoba is part of ASHRAE Region XI and covers ASHRAE members in Manitoba and Northwest Ontario.*



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**ASHRAE Supper Meeting  
Victoria Inn, 1808 Wellington Avenue  
Thursday February 10, 2011  
Refrigeration Night**

**Variable Flow Refrigeration Systems**

5:00 pm - Cocktails

6:00 pm – Dinner

7:00 pm – **Variable Refrigerant Flow Systems**

**Presented by**

**Dermot McMorrow**

Dermot McMorrow, P.Eng. (Ontario), C.Eng (UK) is a Development Engineer in VRF and ERV Technologies at Mitsubishi Electric Sales Canada. He has a Bachelor of Engineering (Hons) Building Services Engineering - University of Ulster N. Ireland and an MSc in Building Services Engineering Management - Brunel University, UK.

He is a Delegate to ASHRAE TG-8 Variable Refrigerant Flow Technology. Dermot has 15 years Professional experience in building services engineering including work in HVAC system design, HVAC product application and development, project and program management and engineering education and training. Specific areas of interest and research include performance simulation and validation of variable speed cooling systems, static energy recovery ventilation, displacement ventilation and its application in green buildings in northern climates, combined heat and power (CHP), geothermal heating and cooling system design for commercial buildings and solar photovoltaic technology.

***CONFIRM YOUR ATTENDANCE*** by March 7, 2011 by emailing Stephan Norsworthy at [stephen.norsworthy@snclavalin.com](mailto:stephen.norsworthy@snclavalin.com). Indicate any special meal requirements (vegetarian, allergies, etc.)

ASHRAE dinner meetings are open to all. Non member cost is \$45. The cost for a first time guests accompanied by an ASHRAE Manitoba member is \$25. Pre-registration is required. To pre-register or to get information on the cost of ASHRAE events, e-mail [stephen.norsworthy@snclavalin.com](mailto:stephen.norsworthy@snclavalin.com) or visit [www.ashraemanitoba.ca](http://www.ashraemanitoba.ca).

## Coming Events

**April 14** – Last regular ASHRAE Manitoba Supper Meetings for 2011. The Chapter's wind-up event, which will be held in May or early June is in the planning stages. When the date and venue are confirmed, you will get email notice.

**April 20 and 21 – Building for Tomorrow – 2011 Better Buildings Conference** - For details contact: [tom@bomamanitoba.ca](mailto:tom@bomamanitoba.ca)

**April 21, 2011- ASHRAE WebCast - Ground Source Heat Pump Systems – Putting the Earth to Work for You** – noon til 3PM Manitoba time. It has some great speakers and **it's free**. On-line registration begins March 21, 2011. For details on why you should participate and how to register, go to [www.ashrae.org/GHPwebcast](http://www.ashrae.org/GHPwebcast)

**May 10 - 13, 2011 - The Future of the Building Envelope ... Building Upon Our Past** – the 13th Canadian Conference on Building Science & Technology will be at the Fort Garry Hotel in Winnipeg. For information about this conference including sponsorship opportunities, visit the conference website <http://www.becwinnipeg2011.com/>

**May 11 - 14, 2011 – Region XI CRC in Portland Oregon**

**September 25-27, 2011 - The Canadian Healthcare Engineering Society 2011 National Trade Show & Education Forum & 31st Annual National Trade Show & Education Forum** in Winnipeg Manitoba. The Conference theme is “Sustaining Healthcare Infrastructure”. More detailed information can be found on our website at <http://www.ches.org/en/professional-development/2011-conference.html>.

**Wednesday September 28, 2011 – The Canadian Healthcare Construction Course**. For details visit <http://www.ches.org/en/professional-development/canadian-healthcare-construction-course.html>.

## **Ammonia: The Refrigerant of Choice for Industrial Refrigeration Systems**

Asitha J. Gajaweera

Mechanical refrigeration was developed in the 1800s based on the principle of vapor compression. The basic design of the vapor compressor refrigeration system, using ammonia as a refrigerant in a closed cycle of evaporation, compression, condensation, and expansion, has changed very little since the early 1900s. Ammonia was among the early refrigerants used in mechanical systems, and it's the only one of the early refrigerants to secure a lasting role as a refrigerant. Ammonia was first used as a refrigerant in the 1850s in France and was applied in the United States in the 1860s for artificial ice production.

Ammonia refrigeration has been widely used in food processing industry, cold storage facilities, ice rink facilities and also used in chemical industry. Ammonia refrigeration is the most cost effective and energy efficient method of processing and storing frozen and unfrozen foods. Practically all fruits, vegetables, produce and meats, as well as many beverages and juices, pass through at least one facility that uses an ammonia refrigeration system before reaching our homes.

**Advantages of ammonia** over other refrigerants (Freon) include

1. Ammonia has **zero ozone** depletion potential (ODP) and zero global warming potential (GWP)

Ammonia is considered an environmentally compatible, natural refrigerant. It is not a halocarbon. Ammonia has no effect on the ozone layer. Ammonia, with a life cycle in the atmosphere of less than one week, does not contribute to the greenhouse effect responsible for global warming.

2. Ammonia has **superior thermodynamic properties**

Ammonia is 3-10% more efficient than the other commonly used refrigerants. At the same evaporating and condensing temperature, ammonia has a better coefficient of performance (COP) than R-22. It is considered that ammonia systems use less electricity than other commonly used refrigerant systems. Therefore, its indirect global warming effect due to CO<sub>2</sub> emissions from electric power plants can be considered one of the lowest of all refrigerants.

Some thermo-physical properties of ammonia compared to R-22

Liquid Density	0.5 to 1
Liquid Viscosity	0.8 to 1
Liquid thermal Conductivity	5.5 to 1
Liquid Specific Heat	4.0 to 1

3. Ammonia systems have **low operating cost**

Considering the better thermodynamic properties of ammonia refrigerant, ammonia systems require less primary energy, less refrigerant to produce certain refrigerant effect compared to other industrial refrigerants. The cost of ammonia per pound is significantly less in comparison to all other common refrigerants. All this adds up to lower the operating cost for food processors and cold storage facility operators resulting lower grocery bills for the average household.

4. Ammonia **leaks are easy to detect**

Ammonia has an odor easily detectable by the human nose. Therefore the slightest traces of ammonia in the air can be detected. This allows for the safe and immediate repair of system leaks or sources of leaks. Other commonly used refrigerants like the halocarbons are odorless and their escape difficult to detect without mechanical systems. The pungent odor of ammonia will encourage individuals to leave the immediate area of release before harmful concentrations will exist.

The safety record of ammonia refrigeration is also due to the fact that ammonia is 1.7 times lighter than air and thus easily vented by mechanical means into the atmosphere. If a leak occurs in a refrigeration system under pressure, only the pressurized gas and absent additional heat, a smaller amount of the liquid in that space will be released. Releases of liquid ammonia are rare. Because ammonia vapor is lighter than air, it will rise and quickly become diluted in the atmosphere. In the presence of moisture, a visible water vapor cloud will form. In contrast, halocarbons are heavier than air and will collect at ground level, displacing oxygen and posing a risk of suffocation.

5. Ammonia has a **low probability of ignition or explosions**

Ammonia is difficult to ignite and exhibits a narrow range of flammability. The ignition temperature is high, approximately 1,200°F (649 °C). Ammonia is flammable only at high concentrations and under extremely limited conditions. Because ammonia will not sustain a flame on its own, ignition of ammonia vapor requires an uninterrupted external flame source.

Ammonia's burning velocity, at a maximum of 8cm/s, is substantially lower than other flammable refrigerants, and is not high enough to create an explosion. Properly designed ammonia refrigeration systems that are well ventilated and free of open flames or ignition sources thus mitigating against potential explosion.

6. Ammonia is somewhat **tolerant of water contamination**

Small quantities of water in an ammonia system are not detrimental to its operation and filter driers are not necessary as they are in halocarbon systems. Water that mixes with ammonia forms

“aqua ammonia” whereby the moisture migrates to the chiller and remains there until drained. Water in freon-based system will separate from the refrigerant immediately after the expansion valve and can freeze to block the refrigerant flow.

7. Ammonia has **favourable lubricant management** properties

Most lubricants are immiscible in ammonia and separate out of the liquid easily when the flow velocity is less or when temperatures are lowered. Oil is heavier than ammonia and settles to the bottom of the evaporator (flooded chiller) and into an oil pot where it is readily drained from the system.

One major **disadvantage of ammonia** is that it is considered toxic at low concentration levels of 35 to 50 mg/kg. It is impossible for a person to remain dangerously long in a seriously contaminated area.

Ammonia is an economical choice for industrial systems. Today there is growing interest in ammonia refrigeration. A well designed, engineered and properly installed and maintained ammonia refrigeration system can last many years.

References:

“Ammonia Refrigeration” - An IAR green paper

ASHRAE Handbook Fundamentals -1997

S. M. Miner “An appraisal of ammonia as an alternative refrigerant“ Proceedings, IAR 1992 , ASHRAE handbook refrigeration 2002

## **Guidance for Greening Data Centers: New ASHRAE Book**

More than 50 percent of the total energy consumption of data centers can be attributed to the power and cooling infrastructure that supports the IT equipment housed in them. “Green Tips for Data Centers” identifies techniques for optimizing energy efficiency in existing datacom facilities. Many of the techniques can be implemented through simple operational changes, upgrades or modifications that require a relatively low investment and cause little disruption to the existing operations of the IT equipment.

“The book has particular relevance right now since there is a significant focus on energy efficiency in data centers,” Don Beaty, co-founder of ASHRAE Technical Committee (TC) 9.9, Mission Critical Facilities, Technology Spaces and Electronic Equipment, said. “While it is fun and exciting to look at how we can design new data centers to be energy efficient, the fact is that there are many, many existing datacenters in operation.” “The tips provide insight into practical techniques that have proven successful in other datacom facilities and give owners and operators the confidence to implement similar techniques in their own facilities.”

Among the 26 tips from the book are: optimize supply air temperatures; install monitoring equipment; improve lighting efficiency; optimize data storage, and; improve transformer efficiencies.

The book is part of the ASHRAE Datacom Series, developed to provide a more comprehensive treatment of datacom cooling and related subjects. Other books in the series are “Particulate and Gaseous Contamination in Datacom Environments,” “High Density Data Centers – Case Studies and Best Practices,” “Design Considerations for Datacom Equipment Centers,” “Best Practices for Datacom Facility Energy Efficiency,” “Thermal Guidelines for Data Processing Environments,” “Liquid Cooling Guidelines for Datacom Equipment Centers,” “Datacom Equipment Power Trends and Cooling Applications” and “Structural and Vibration Guidelines for Datacom

Equipment Centers.”

The cost of Green Tips for Data Centers is \$54 (\$46, ASHRAE members). To order, visit [www.ashrae.org/datacenterefficiency](http://www.ashrae.org/datacenterefficiency). Bulk discounts are available to those purchasing multiple copies.

## A Call for Volunteers

When social and peace activist and folk singer Pete Seeger was asked if he thought his volunteer efforts had made a difference, he said he thought so, but even if they hadn't, he got to meet, befriend and work with a lot of wonderful people. If you want to meet and become friends with good people, volunteer.

**1 - Johann Baetsen** - President Elect 2011-2012, is looking for volunteers for the **ASHRAE Manitoba Board of Governors**. You will gain insight the society that drives the HVAC and Refrigeration industry; influence local, provincial and national building codes and; meet other HVAC&R professionals. Persons serving on ASHRAE boards and committees gain leadership and organizational experience that will benefit their career development and EITs can use time spent on ASHRAE committees to meet voluntary service requirements. Contact Johann at epp siepman engineering, 453-1080, [jbaetsen@eppsiepman.com](mailto:jbaetsen@eppsiepman.com) and tell him you are interested.

**2** - In May of 2012, the **Manitoba Chapter will host the annual ASHRAE Region XI Chapters Regional Conference**. Twelve chapters, including some 100 visitors, will meet at the Hotel Fort Garry for three days of activities including business meetings, technical sessions, and social activities. The event has many facets, including social event planning, a golf tournament (or alternate event depending on weather...), technical session coordination, and logistical issues are among the tasks at hand. Contact 2012 Region XI CRC Chair **Russell Lavitt** at SMS Engineering Ltd., 789-2312 [rlavitt@smseng.com](mailto:rlavitt@smseng.com) to volunteer.

## What is CRC? CRC Means Chapters Regional Conference

ASHRAE Chapters are grouped into geographical areas or Regions, each of which consists of several Chapters. Manitoba is one of twelve ASSHRAE Chapters in Region XI. The others are Regina, Saskatoon, Southern Alberta (Calgary), Northern Alberta (Edmonton), BC (Vancouver), Vancouver Island (Victoria), Puget Sound (Seattle), Oregon (Portland), Inland Empire (Tri-Cities area of Washington State), Mid Columbia (Spokane) and Alaska (Anchorage with a branch in Fairbanks).

Each Region has a board made up of a DRC (Director and Regional Chair) and several RVCs (Regional Vice Chairs) with titles similar to those of various Chapter committees. Region XI ASHRAE Region XI Officers are listed on the last page of this newsletter.

Through the Regional structure, the DRCs and RVCs keep Chapters and their officers informed of Society goals and objectives and assist the chapters solve problems they may encounter in their day to day operations. Regional officers also represent the interests of their Chapters and Region in all matters of Society importance.

Each year, each region has a Chapters Regional Conference, usually referred to as the CRC for incoming Chapter officers and committee chairs. Certain Chapter officers and committee chairs are expected to attend CRC and all Chapter members are encouraged to attend.

Workshops are held at the CRC to inform incoming Chapter officers and committee chairs of their duties and to advise them on ASHRAE policy matters. An intent of officer and committee chair training is to ensure that all ASHRAE Chapters adhere to Society Bylaws and Rules of the Board of Directors so their operations are carried on in an effective manner that is consistent with Society's goals.

CRC is also the forum in which chapters communicate their concerns and ideas for change to ASHRAE's Society level officers and management. Representatives from each Chapter called Delegates (usually the incoming Chapter President) and Alternates (usually the incoming President Elect) attend meetings (referred to as Caucus) in which members and Chapters submit motions to the Region and Society for proper review; including nominations for Society and regional offices and for honours and awards. All motions approved at a CRC are presented to the Regions Council which is made up of the DRCs from all Regions plus some Society appointed members. Regions Council must consider all these motions, and approve, disapprove, postpone, amend or refer them.

The next Region XI CRC will be hosted by Portland OR on May 11 to 14, 2011. Manitoba will host the May 2012 Region XI CRC here in Winnipeg.

### **ASHRAE Technology Awards - Bert Phillips, ASHRAE Manitoba CTTC Chair**

ASHRAE Technology Awards recognize designs that push the envelope. Winning ASHRAE Technology Award submissions typically have the following characteristics:

- demonstrate innovation and creativity
- include data for one full year of post construction operation
- clearly identify and describe unique/special aspects of the project
- graphs, tables and drawings are clear and add value to the text and
- are logical and understandable

From my experience as a Tech Award Judge, my suggestion is that applicants focus their submission on one or two significant design innovations, not the whole building design. Awards aren't given for good design, they are given for innovation that pushes the limits of design. Winners get a plaque and are written up in the ASHRAE Journal.

To qualify for the program, the person submitting a project must be an ASHRAE member and have been part of the design team. Projects are first submitted to the local ASHRAE Chapter competition (judged in mid April), Chapter winners can be forwarded to the Regional competition (judged in early May) and Regional winners can be submitted to the Society level competition which is judged in the fall.

For details and application forms, go to <http://www.ashrae.org/members/page/1646> If you have questions beyond that, I am the local ASHRAE guy responsible for this program.

### **The ASHRAE Winter Meeting in Las Vegas**

I always find ASHRAE meetings worthwhile and the meeting in Las Vegas was not an exception. At these meetings, I am continuously exposed to new ideas from the leading lights of the HVAC&R industry. I can meet them face to face, ask questions and get answers that help me better understand some of the more complex issues I come across in my practice.

I like nature, tranquility and places with history, and I like capturing them with photos. As such, Las Vegas is near the bottom of the list of places I dream of visiting and photographing, but the décor in one men's washroom in the ASHRAE Headquarters Hotel, the Las Vegas Hilton seemed

on the wild side, especially for a Hilton. In a week in Las Vegas, it was the only thing that inspired me to pull out my camera. Not a great photo but a fun memory.



## **Wit and Wisdom from the Internet**

Some people are like Slinkies ... not really good for anything, but you can't help but smile when you see them tumble down the stairs.

Light travels faster than sound. This is why some people appear bright..... until you hear them speak.

## **MBCaGBC Courses in Winnipeg**

The Manitoba Chapter of the Canada Green Buildings Council is planning to host the following courses:

- LEED Canada NC: Technical Review v. 2009 - March 16, 2011 - 7 LEED Specific, BD&C GBCI CE hours
- LEED Canada for Existing Buildings: Operations and Maintenance - May 12, 2011 - 7 LEED specific, O&M GBCI CE hours / 7 GBCI CE hours

For details, go to [CaGBC WORKSHOPS](#)

## ASHRAE Manitoba Chapter Officers

President	Jesse Sandhu	SMS Engineering Ltd	789 2307	jsandhu@smseng.com
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Secretary	Mark Windeatt	Engineered Air	632 8535	mark.windeatt@engineeredair.com
Treasurer	Doug Castor	EHPPrice		DougC@price-hvac.com
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	Robert Bisson	Public Schools Finance Board	945 8452	robert.bisson@gov.mb.ca
	Devin Evenson	Manitoba Hydro	360 3971	devenson@hydro.mb.ca
	Stirling Walkes	SMS Engineering Ltd	775 0291	swalkes@smseng.com
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Research Promotion	Daryl Friesen	Midwest Engineering Ltd	989 3636	daryl@midwesteng.mb.ca
Student Activities	Peter Gryc	SMS Engineering Ltd	789-2346	pgryc@smseng.com
Honors and Awards				
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Homepage Editor	Devin Evenson	Manitoba Hydro	360 3971	devenson@hydro.mb.ca
Administrator	Russell Lavitt	SMS Engineering Ltd	789.2312	rlavitt@smseng.com
Programs	Russell Lavitt	SMS Engineering Ltd	789.2312	rlavitt@smseng.com
Refrigeration	Daryl Friesen	Midwest Engineering Ltd	989 3636	daryl@midwesteng.mb.ca
Chapter History	Robert Bisson	Public Schools Finance Board	945 8452	robert.bisson@gov.mb.ca
Accommodations				
Roster				
Special Events	Gary Bailey	Manitoba Hydro	360.5156	gbailley@hydro.mb.ca

## ASHRAE Region XI Officers

Director & Regional Chair	Erich Binder	Erich Binder Consulting	Calgary	erich.binder@worleyparsons.com
Assistant Regional Chair	Kevin Marple	Benz Air Engineering	Portland	kmarple@benzco.com
Technology Transfer	Eileen Jensen	Bonneville Power	Portland	nejensen@bpa.gov
Membership	Murdoch MacPherson	MacPherson Engineering	Regina	m.macpherson@mac-eng.ca
Student Activities	Doug LeCren	Colt Engineering	Anchorage	douglas.lecren@nanworleyparsons.com
Young Engineers in ASHRAE	Tariq Amlani	Stantec	Vancouver	tariq.amlani@stantec.com
Resource Promotion	Ray Sieber	Sask. Research Council	Regina	sieber@src.sk.ca
Nominating Committee	Norm Grusnick	ECCO Manufacturing	Langley	ngrsnick@ecomfg.com
Regional Historian	Kevin Marple	Benz Air Engineering	Portland	kmarple@benzco.com
	Bill Dean	National Research Council of Canada	Saskatoon	bill.dean@nrc-cnrc.gc.ca
Treasurer	Rob Craddock	Inland Metal Manufacturing	Regina	rob@inlandmetal.ca
Web Page Editor	Kathy Habke	SAC ASHRAE	Calgary	chapter.administrator@sac-ashrae.com
CRC Chair, 2011	Keith Yelton	Air Commodities Oregon	Portland	keithY@air-commodities.com

**ASHRAE needs you, but more importantly you need ASHRAE.** ASHRAE always has room for more professionals, just like you. For information regarding ASHRAE membership, contact Manitoba Membership Chair Steven Norsworthy [Stephen.Norsworthy@snclavalin.com](mailto:Stephen.Norsworthy@snclavalin.com) or visit ASHRAE Manitoba at [www.ashraemanitoba.ca](http://www.ashraemanitoba.ca)

ASHRAE, founded in 1894, is an international organization of 50,000 persons. Its sole objective is to advance through research, standards writing, publishing and continuing education the arts and sciences of heating, ventilation, air conditioning and refrigeration to serve the evolving needs of the public. Visit ASHRAE at [www.ashrae.org](http://www.ashrae.org).

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