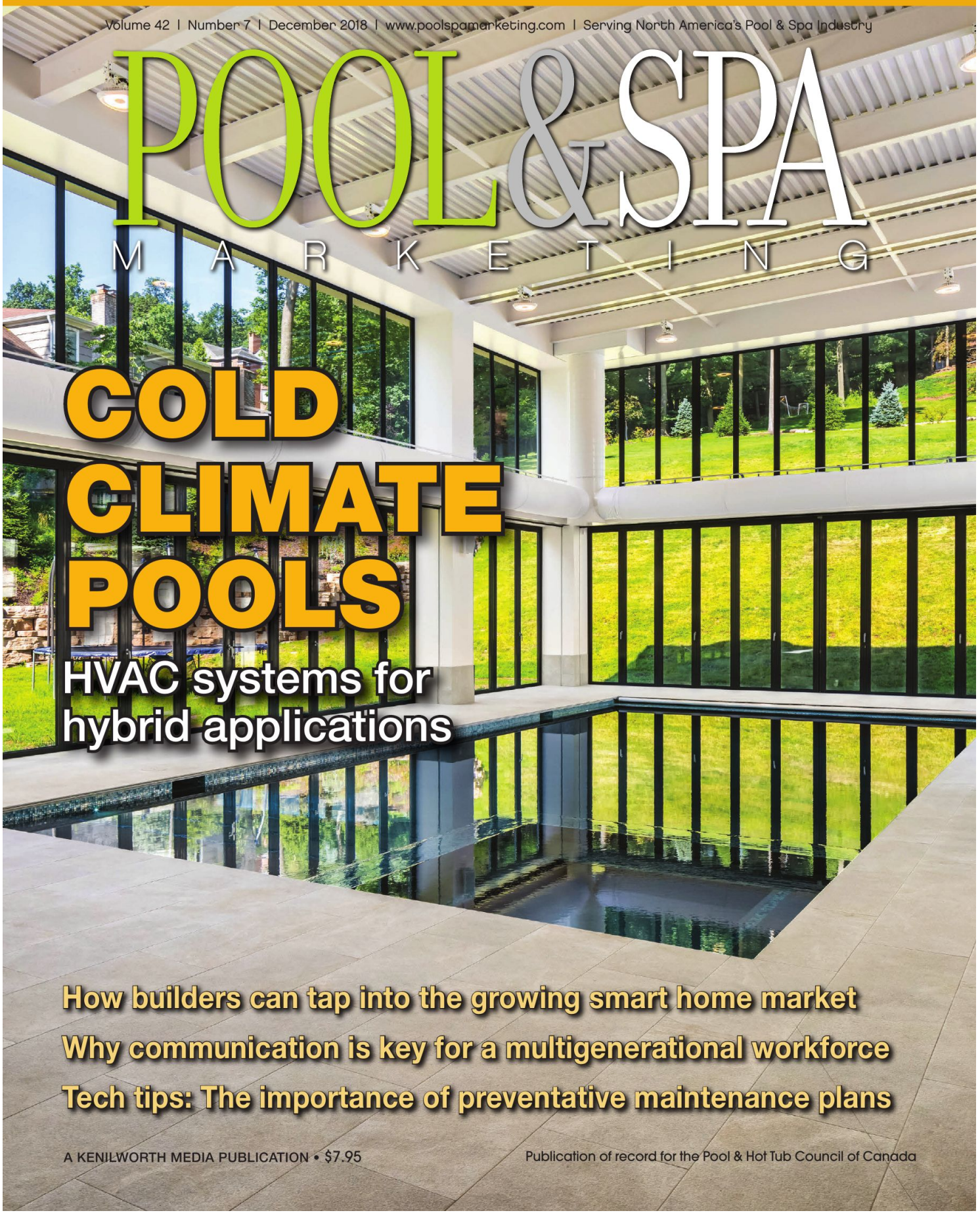
INSIDE: Your guide to the Canadian Pool & Spa Show

Canadian Pool & Spa Conference & Expo
Conférence canadienne et expo des piscines et spas
2018
www.poolandspaexpo.ca

Volume 42 | Number 7 | December 2018 | www.poolspamarketing.com | Serving North America's Pool & Spa Industry

POOL & SPA MARKETING



COLD CLIMATE POOLS

HVAC systems for hybrid applications

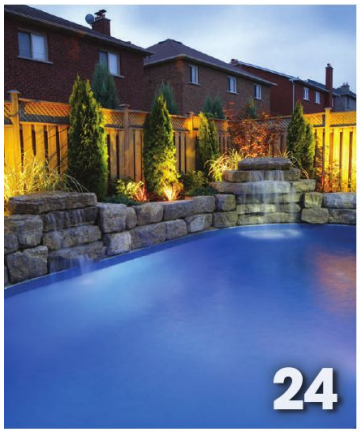
How builders can tap into the growing smart home market

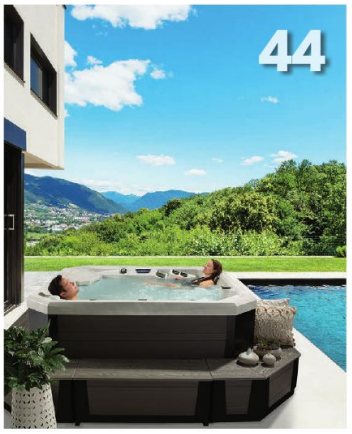
Why communication is key for a multigenerational workforce

Tech tips: The importance of preventative maintenance plans

A KENILWORTH MEDIA PUBLICATION • $7.95

Publication of record for the Pool & Hot Tub Council of Canada





contents

VOLUME 42 ▪ NUMBER 7 ▪ DECEMBER 2018

features

8 **THE MANY ROLES OF A DEHUMIDIFICATION SYSTEM**
Enabling indoor/outdoor pools to operate in cold climates.

16 **KEEPING POOL WATER WARM**
Best practices to ensure long heater life.

24 **SMART HOMES ARE ON THE RISE**
How pool and spa builders can benefit from a growing market.

32 **MIND THE GAP**
Strong teams are built through communication and understanding different traits.

38 **FOSTERING CUSTOMER RELATIONSHIPS**
How retailers can use pool cleaners to increase profits.

44 **MODULAR HOT TUB ENVIRONMENTS**
Painting a more appealing picture in the backyard.

aquatic facilities

52 **PREVENTION IS BETTER THAN CURE**
A good maintenance plan can avoid a facility shutdown and costly repairs.

58 **MAKING AN ECO-FRIENDLY SPLASH**
Edmonton park employs recirculation system in water design.

departments

6 EDITORIAL
62 COUNCIL UPDATE
81 MARKETPLACE/CLASSIFIEDS
82 LAST DROP

on the cover

Besides architectural products that open the enclosure, dehumidifier sizing is especially critical for a pool destined for outdoor use. Luckily, this homeowner's unconventional plan of using the space in an occasional 25.5-C (78-F) temperature already mandated a significantly larger dehumidifier than what more traditional indoor pool activities would require. For more, read the article on page 8.

Photo by Evan Joseph/New York

show guide

64 PROGRAM AT A GLANCE
68 COURSES
70 SEMINARS
72 MISCELLANEOUS EVENTS & FEATURES
74 EXHIBITOR FLOOR PLAN
76 EXHIBITOR LISTINGS

FEATURE STORY

THE MANY ROLES OF A DEHUMIDIFICATION SYSTEM

ENABLING INDOOR/OUTDOOR POOLS TO OPERATE IN COLD CLIMATES

The unique 232-m² (2500-sf), two-storey rectangular pool enclosure features 6.4-m (21-ft) high glass on three sides.
Photos by Evan Joseph/New York

BY RALPH KITTLER, P.ENG.

Can a residential pool be designed for the best of both worlds—indoor and outdoor swimming—even in frigid climates? The answer is yes, but extreme care in design and equipment sizing must be first determined. While there are hundreds of indoor residential and commercial pools in Canada and the U.S., only a few have been designed for indoor and outdoor use.

Even without an outdoor function, indoor pools themselves can be an engineering and architectural challenge, as they require a strict design regiment using proper building materials, ventilation configuration, mechanical equipment, and other factors. Adding the conversion to outdoor use can exacerbate these challenges, if it is not planned properly during the design phase. For example, world wonders such as the Great Wall of China, the Washington Monument, or the Taj Mahal are all successful construction projects, but only because the designers planned ahead with the specifics in mind for each application.

The mechanical dehumidification equipment sizing, the glass' thermal value and ease of retraction, insect control, and an auxiliary pool water heater are all critical design considerations for indoor pools that are planned for outdoor use as well.

OPENING A RESIDENTIAL INDOOR POOL TO THE GREAT OUTDOORS

Recently, an indoor pool was designed for occasional outdoor use in New Jersey, a region with a similar climate to areas in southern Canada. The design and magnitude of the pool, built inside a 1951-m² (21,000-sf) 100-year-old home named 'Daybreak' in Montclair, N.J.'s famous estates and historic homes section, confronted mechanical engineers. Psychrometric and sustainability challenges were significant just as an indoor pool, not to mention the option of retracting dozens of glass doors for an outdoor conversion.

The enclosure's outdoor function features dozens of 914-mm (36-in.) wide, triple-pane window panels ranging from 2.1 to 3 m (7 to 10 ft) tall, depending on the height of the wall to accommodate the property

THE HVAC EQUIPMENT, THE GLASS' THERMAL VALUE AND EASE OF RETRACTION, AND AN AUXILIARY POOL WATER HEATER ARE ALL CRITICAL DESIGN FACTORS **FOR INDOOR POOLS THAT ARE PLANNED FOR OUTDOOR USE AS WELL.**

gradient. The glass doors on ground-level allow the homeowner to manually open along a track in an accordion fashion within five minutes. They fold up horizontally off to the side and require little storage space while giving a total unobstructed view of the outdoors. Afterward, remote controlled automatic screens hidden in soffits behind the heating, ventilation, and air conditioning (HVAC) equipment supply duct are descended vertically for insect protection. At this point, the enclosure functions as an outdoor pool with more than 70 per cent of its perimeter exposed to the outdoors.

Adding an outdoor feature does not come cheap; however, because the additional architectural design, custom windows, automatic screens, and other considerations increased the project cost by roughly 15 per cent.

"You've got to really want it (the flexibility of outdoor/indoor swimming)," said the homeowner, Yoel Borgenicht, who, as president of King Rose Construction, New York, has a background in construction projects.

The design allows Borgenicht to convert the enclosure into an outdoor pool anytime between April and September.

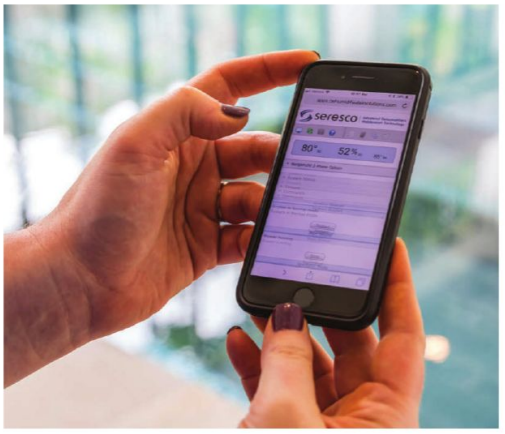
"We're glad we did it because there's a priceless esthetic associated with having a breeze come through the enclosure and hearing the outdoor sounds."

DEHUMIDIFIER SIZING FOR INDOOR/ OUTDOOR POOLS

Besides architectural products that open the enclosure, dehumidifier sizing is especially critical for a pool destined for outdoor use. Luckily, the homeowner's unconventional plan of using the space in an occasional 25.5-C (78-F) temperature already mandated a significantly larger dehumidifier than what more traditional indoor pool activities would require. Therefore, set-point temperature and humidity recovery is quick after closing the retractable windows on a high humidity or cooler day, simply because the dehumidifier has more capacity.

"The dehumidifier, which was sized to provide eight volumetric air changes per hour, can bring

The heating, ventilation, and air conditioning (HVAC) equipment is anchored by a 16-ton dehumidifier, which is three-to-four times larger than a typical residential pool unit.



The homeowner's smartphone app permits real-time log-in, as well as provides historical data from the command centre on more than 60 operating parameters.

the enclosure's relative humidity (RH) down to its targeted 50 per cent RH air comfort level within a half-hour of sealing the enclosure after outdoor operation," said Edward G. Sneed III, a manufacturer's representative and HVAC manager with Stillwell-Hansen in Edison, N.J., who consulted with engineers and assisted on the project.

Another reason for specifying a considerably larger dehumidifier than what is typically required for residential indoor pools was the homeowner's unconventional proposed water and space temperatures (32.2 C [90 F] water and 27.7 C [82 F] space). This differential produces higher evaporative rates than the two-degree differential (such as 26.6 C [80 F] water, 27.7 C [82 F] space) recommended in the natatorium chapter of the *American Society of Heating, Refrigerating and Air-Conditioning Engineers'* (*ASHRAE*) Handbook.

The project's HVAC design is anchored by a 16-ton dehumidifier, which is three to four times larger than a typical residential pool unit. While the manufacturer can produce mechanical dehumidifiers ranging up to 140 tons for large facilities with tremendous humidity loads, such as indoor waterparks, the 16-ton unit was one of the largest dehumidifiers manufactured for a residential application. The 226.5-m^3/min (8000-CFM) unit can dehumidify to 50 per cent relative humidity (RH) and heat/cool the space.

The dehumidifier, which typically runs 24-7 to protect the enclosure from the effects of stratified humid air—whether in an occupied or unoccupied partial load mode—has built-in sustainability for reducing energy costs. One way the system does this is by recovering waste heat from compressor operation to provide free pool water heating at a significant energy savings. Additional efficiency comes from its electronically commutated (EC) direct-drive fan motors, which can cut ventilation operating costs by up to 15 per cent versus conventional equipment. The dehumidifier also features a condenser with owl-wing fan blades (one of the lowest decibel-operating fans in the HVAC industry) to maintain quietness near the home's bedroom windows.

A typical residential indoor pool requires a smaller 4- to 8-ton dehumidifier and only a single-phase electric service. In this case, however, the volumetric size of the two-storey building and its substantial amount of glass, combined with the significant evaporative rate of a large 6.1- x 12.2-m (20- x 40-ft) pool, and 2.4-m^2 (8-sf) spa, mandated a 16-ton dehumidifier, which far surpasses the dehumidifier size of most hotel and health club indoor pools.

Instead of three 6-ton units running on single-phase electric, the local utility made the exception of

THE DEHUMIDIFIER, WHICH TYPICALLY RUNS 24-7 TO PROTECT THE ENCLOSURE FROM THE EFFECTS OF STRATIFIED HUMID AIR, HAS BUILT-IN SUSTAINABILITY FOR REDUCING ENERGY COSTS.

After opening windows, remote controlled automatic screens hidden in soffits behind the ventilation duct descend vertically for insect protection. At this point, the enclosure functions like an outdoor pool with more than 70 per cent of its perimeter exposed to the outdoors.

running three-phase electrical service to the household to handle the HVAC requirements. One large unit saved the homeowner thousands of dollars in installation and future maintenance costs versus three units.

The towering windows afford swimmers open, uncropped views of the 0.6-ha (1.7-acre) property's esthetic backyard landscaping, which treks upward towards one of the two most prominent ridges of the Watchung Mountain. That said, the substantial amount of windows proved challenging for the project's engineers because the design goal guarantees condensation-free windows to maintain the views even during sub-zero winter days.

"Architects and building owners love a lot of windows in indoor pools, but engineers don't because they're difficult to keep free of condensation during wintertime dew points," said Sneed, who has assisted engineers on hundreds of residential and commercial indoor pool projects. "However, with the right building materials, HVAC equipment sizing, air distribution, and other proper engineering practices, condensation can be eliminated regardless of the amount of glass."

The difficulty in keeping glass free of condensation was one reason the homeowner abandoned his original design, which included a 4.5- x 9.1-m (15- x 30-ft) skylight. This is discouraged for indoor pool enclosures because it produces a glare on the water surface.

"We didn't like the skylight concept, because they're difficult to keep the glass conditioned and free of condensation," said Vladimir Ayzenberg, P.E., director of engineering, Jarmel-Kizel, who led the project's mechanical design team.

ENERGY SAVINGS

The engineer's specification of a dual-compressor dehumidifier and an automatic pool cover will save the homeowner thousands of dollars annually in energy costs, as both strategies take into account the homeowner uses the pool area a small percentage of the day.

The dual compressor strategy operates one 8-ton compressor to maintain RH during idle times and the majority of family swim periods. The second compressor is automatically activated by the dehumidifier's command centre if the temperature of the space or RH levels are not satisfied (*e.g.* during extremely cold days, start-ups after retractable window closing, or the party mode). The automatic pool cover significantly reduces water evaporation, thus the compressor has significantly less run-times during idle periods.

AIR DISTRIBUTION DESIGN IS CRITICAL

The engineers' air distribution design is equally as important as the dehumidifier for keeping windows clear of condensation. A 711-mm (28-in.) diameter spiral metal rooftop drop and metal tee supply two 609-mm (24-in.) white fabric duct lines. The duct, mounted 3 m (10 ft) high, nearly encircles the perimeter and is supported by custom-fabricated white architectural wall-hanging brackets. The engineer ordered a linear air diffusion pattern angled to keep the windows above and below bathed evenly in warm, dehumidified air that is above the outdoor dew point.

Two 609-mm (24-in.) white fabric duct lines are mounted 3 m (10 ft) high and nearly encircle the entire pool perimeter.

A wall-mounted monitor/control touchpad system connects the homeowner directly to the dehumidifier climate control equipment and allows them to modify the natatorium's environmental conditions within seconds.

A SUSTAINABLE BUILDING ENVELOPE

The homeowner felt the best complement to the grandeur of the early 1900s marble-and-brick three-storey home would be a modern concrete and steel roof pool enclosure. The design evolved into an eclectic, contemporary addition using sustainable building materials. For example, the heavily insulated foundation/deck and steel roof deck have an R-value of 35 and 52, respectively. The windows carry a solar heat gain coefficient (SHGC) of 0.24, a U-factor (rate of heat loss) of 0.17, and a visible transmittance (VT) of 0.21.

An interesting design aspect is the windows above the ductwork are vertically aligned with the windows below the ductwork, even though they do not open and subsequently their custom millwork frames are smaller.

The pool support equipment is also state-of-the-art and anchored by a diatomaceous earth (DE) filter and back-up pool heater, which only activates during extremely cold days when the dehumidifier cannot maintain free pool water heating through compressor waste heat recovery, or when the dehumidifier is operating in a fan-only mode during outdoor pool modes. The pool is also equipped with an ultraviolet (UV) water sanitation system.

KEEPING CONNECTED FOR SUSTAINABILITY

The homeowner uses the dehumidifier's proprietary web browser-based monitor and control interface to help keep the HVAC system operating efficiently. Older dehumidifiers can run inefficiently for months between annual service check-ups; however, the homeowner's smartphone app allows him to log-in on real-time and view historical data reported from the command centre for more than 60 operating parameters or receive an alarm within seconds of an operational inefficiency.

This is also an important reason to run the dehumidifier's fan only in its lowest speed during outdoor operation so all the sensors are continually transmitting data to the web browser-based software in the event the homeowner wants to review any humidity or temperature readouts.

Thanks to modern technology, intuitive engineering, and a well-built building envelope, the homeowner will reap hundreds of thousands of dollars in energy savings during the indoor pool lifecycle, while also experiencing the ultimate of indoor air comfort. Further, it also functions successfully as an outdoor pool due to querying the homeowner on the pool's foreseeable uses, which is critical in its design.

Ralph Kittler, P.Eng., is vice-president of sales at Dehumidified Air Solutions (DAS) based in Montreal, Que. He is the co-founder and former vice-president of sales/marketing at Seresco Technologies, an Ottawa-based mechanical dehumidifier manufacturer brand of DAS. Kittler is an American Society of Heating, Refrigerating, and Air-Conditioning Engineer (ASHRAE), distinguished lecturer, and the reviser responsible for Chapter 25 ('Mechanical Dehumidifiers and Related Equipment') for the 2012 ASHRAE Handbook: HVAC Systems and Equipment. Kittler can be reached via e-mail at ralphkittler@dehumidifiedairsolutions.com.