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Cooling India

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Publisher's Letter

New Normal 2021 Trends For Continuous Challenges ...

We were vibrantly alive ten months earlier, businesses and economy was on track, and then with un-alarming ease a sinister health threat coronavirus stabbed us. Globally, all cities plunged into a novel set of safety norms in 2020. As I pen down, we all are transcending the pandemic curve onto new normal times armed with new opportunities; continuing the invasion, now an infectious strain of virus variant creates global ripples after its discovery in UK, SA, Denmark and Brazil.

Visibly, sifting trends are influencing companies to design new solutions, in HVAC/R territory. World over, citizens and industries are exuding optimism that things would return to normal irrespective of fresh quarantines and lockdowns. Though manufacturing and industrial activity slowed, on slowed orders during last 3 months, on worries of a fresh surge in covid-cases, yet growth is expected to sustain recovery momentum.

Companies are utilizing skills to innovate; doing new features, upgrades and new design for HVAC systems. The virtual meetings and events have become the routine affair. Newer strategies may include portable air purifiers, upgraded HVAC filters and air quality measures to tackle health, safety and clean air issues. Green solutions and reduced cost are some of the trends to watch when looking into 2021 and beyond.

Role of technology for HVAC growth is important to meet the demand for energy efficient solutions. I foresee strong surge of optimism for HVAC industry as we enter 2021. And, we at Chary Publications keep on attending virtual meetings and networking sessions, to provide you all with latest content in cooling technology.

As 2020 goes by, businesses are reopening doors in new normal times. Remote working trends and precautions will continue with pandemic impact. To this end, healthy and safe working environment will rely upon new HVAC trends and features like temperature control, good air flow, level of comfort, safety and more so. In fact, there is an imminent need to go for more safety precautions within HVAC industry.

I welcome you all into new normal 2021.

Please do write to me with your inputs to serve you in the best possible ways at pravita@charypublications.in

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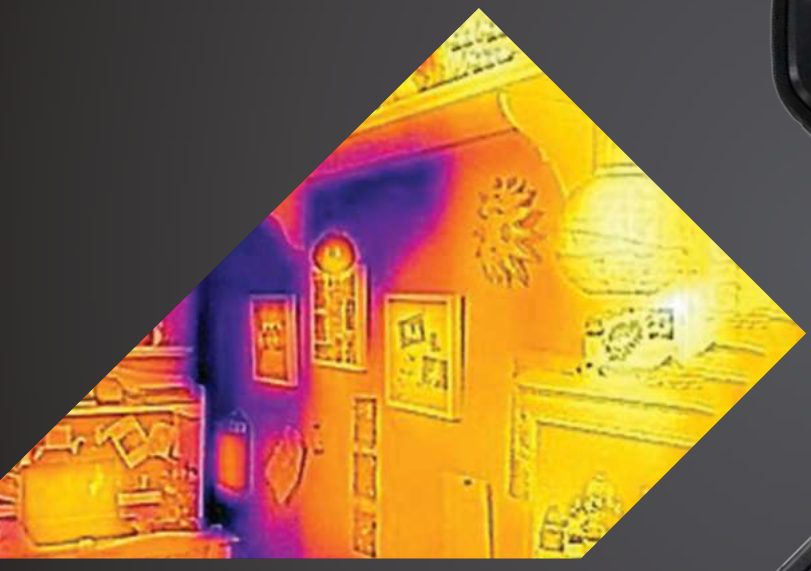

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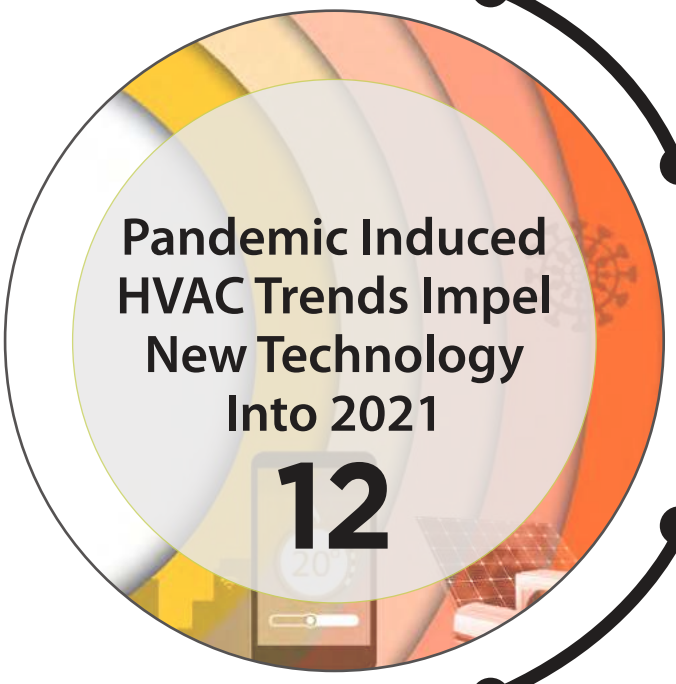


INSIDE

SECTIONS

Carrier aims for carbon neutrality by 2030

Carrier Global Corporation is targeting carbon neutrality across its operations by 2030 and also aiming to reduce its customers' carbon footprint by more than one gigaton, with planned investment of more than $2 billion over the next ten years toward development of healthier, safer and sustainable building and cold chain solutions.

Dave Gitlin, President & CEO, Carrier said, "At Carrier, we are applying our industry-leading innovation to fight climate change through new energy-efficient product offerings and through lower emissions in our operations. Our 2030 goals will drive our company to be a positive catalyst for societal change in our areas of expertise including, healthy buildings and the cold chain, as well as in the communities in which we operate around the world."

The 2030 ESG Goals include a transformation of the company's operations to be carbon-neutral while maintaining world-class safety metrics, and the incorporation of leading sustainable design principles from manufacturing through end-of-life. Additional goals include following:

- Achieve carbon and water neutral operations and deliver zero-waste to landfill from our manufacturing locations
- Establish a responsible supply chain program and assess key factory suppliers against program criteria
- Achieve gender parity in senior leadership roles and a diverse workforce that represents communities in which Carrier's employees live and work
- Positively impact our communities through enabling access to safe and healthy indoor environments, alleviating hunger and food waste, and volunteering our time and talent
- Invest in STEM education programs that promote diversity and inclusion, and promote sustainability through education, partnerships and climate resiliency programs
- Maintain world-class safety metrics. ■

Grundfos India collaborates with EFI to restore Annaikeni Pond

Grundfos India partnered with Environmentalist Foundation of India (EFI) to complete restoration of the Annaikeni Pond in Sholinganallur, Chennai.

The restoration work included the excavation of the water holding area to increase the capacity by 18 – 20%, the strengthening of the circumference embankment, fencing and the planting of native plant species around the pond. As part of the restoration efforts, the entire lake was cleared, of the garbage and more than four tonnes of water hyacinth and Prosopis Juliflora shrubs (weeds).

Saravanan Panneer Selvam, General Manager, INDO Region, Grundfos, said: "Grundfos is committed, toward promoting the United Nations' Sustainable Development Goal 6 (Water and Sanitation). Water bodies play a key role in maintaining and ensuring a good ecosystem not only for humans but also for the flora and fauna. We at Grundfos India are therefore focusing some of our CSR efforts on restoring water bodies in Chennai. Through this restoration of the Annaikeni pond, we hope the groundwater level and its quality in the locality improves and that the community can enjoy the presence of a clean water body that will help nature thrive."

Arun Krishnamurthy, Founder, Environmentalist Foundation India, remarked, facing challenge of bringing Chennai's water bodies back to life again. The project is a tri-party collaboration between the Greater Chennai Corporation as the Administrative Partner; Grundfos India as the CSR partner and executed by EFI. This collaboration for a water positive Chennai has taught us several lessons in water conservation. At EFI we took a scientific approach towards restoring this lake and also worked closely with all the involved partners, and local residents. ■

Hanon Systems to supply R744 Heat Pump components to Volkswagen Group

Hanon Systems is supplying R744 heat pump components to the Volkswagen Group for its global MEB platform. It is designed specifically for battery-powered and electric vehicles, R744 heat pump components enable a single solution that delivers cabin comfort in cold or warm conditions with low power consumption.

Nurdal Kücükkaya, President, Hanon Systems said, "Based on our own market insight and engagement with global vehicle manufacturers, electric vehicle driving range is a known important consideration. Our solutions for R744 heat pump systems demonstrate Hanon Systems is actively developing and bringing to market solutions to address these challenges in automotive electrification."

The solution designed with Volkswagen uses R744 refrigerant (carbon dioxide), which is widely known for its heat transfer properties and operates at higher pressure levels compared to other refrigerants. The solutions supplied by Hanon Systems, in combination with the refrigerant characteristics of R744, improves energy consumption compared to conventional refrigerants while meeting the desired cabin temperature, even in challenging sub-zero temperatures.

Hanon Systems supplies the electric compressor, refrigerant valves, internal heat exchanger and the accumulator as part of the R744 heat pump system equipped on various models based on the Volkswagen MEB platform. ■

Quattroflow launches QF2500HT Quaternary Diaphragm Pumps

Image by Quattroflow Fluid System

Quattroflow, part of PSG, a Dover company and a brand of positive displacement quaternary diaphragm pumps, expanded its line of HT drives with the addition of the new QF2500HT Quaternary (Four-Piston) Diaphragm Pump. With a compact design, high turndown ratio, and a maximum flow rate of 2,500 lph (660 gph), the new QF2500HT pump, is suited to meet the needs within demanding biopharma applications, including chromatography, TFF, virus filtration, sterile filtration, and depth filtration.

Quattroflow QF2500HT incorporates all the same industry-leading features and benefits as the QF2500 model with space-saving "All-in-One" technology that integrates the pump chamber, pump drive, motor and control box into one unit. The elimination of a separate control box results in easier handling while giving the QF2500HT a more compact design and smaller footprint, ideal for applications that require a smaller pump that offers an extended turndown ratio for a wider range of flow rates. The design of the QF2500HT includes easy plug and play installation and startup, and a keypad for manual control and display of the motor speed.

QF2500HT pumps are good in biopharma applications due to industry-leading designs, including pump chambers that provide improved drain ability to maximize product recovery. The QF2500HT pump also features higher flow stability even at low flow rates, linear flow performance, high accuracy in controlling flow rates, and clean-in-place (CIP)/steam-in-place (SIP) capability. The QF2500 model can be integrated, with the new Q-Control Integrated Pump Controller to provide users with automated control over their pump operations. ■

ASHRAE and NASEO sign a new MoU

ASHRAE and the National Association of State Energy Officials (NASEO) have signed a new Memorandum of Understanding (MoU) formalizing the organizations' relationship.

The MOU was signed, by C**harles E. Gulledge III, P.E., 2020-21 ASHRAE President and David Terry, NASEO Executive Director** during a virtual signing ceremony on November 20. The agreement outlines how ASHRAE and NASEO will work cooperatively to promote the advancements of a more sustainable built environment through HVAC&R technologies and their applications.

Areas of collaboration include government advocacy; joint conferences and meetings; consistent leadership communication; publication development and distribution; education and professional development; technical activities coordination; and research.

Gulledge said, "NASEO's well-established relationships with state energy offices will serve as a bridge to bring ASHRAE's unparalleled technical expertise in HVAC&R systems to improve the resiliency, sustainability and health of our built environment. Agreements like this serve the interests of both organizations and leverage our collective resources to support sustainable building practices where the benefits are, felt on a large scale." Terry says, NASEO is thrilled to continue our constructive partnership with ASHRAE. ■

Mitsubishi Electric Trane HVAC US participates in GO GREEN

Mitsubishi Electric Trane HVAC US (METUS) a provider of Zoned Comfort Solutions and supplier of Variable Refrigerant Flow heating and cooling systems, participates in GO GREEN - a short-form, digital home makeover series that empowers the American household to lessen their carbon footprint, save money, and improve their quality of life through flexible and affordable clean energy solutions.

GO GREEN is created by Lucia Entertainment and co-produced by The Solutions Project with guest appearances by Mark Ruffalo and Don Cheadle, expands upon the traditional home renovation show by focusing on clean energy solutions that enhance homeowners' comfort, and well-being — including Mitsubishi Electric heating and cooling systems.

METUS contributed an all-electric, multi-zone heat pump system in the episode featuring Sonja, (a Los Angeles native and volunteer turned full-time community organizer). The multiple indoor units including wall-mounted, recessed ceiling cassettes and a multi-position air handler used in the installation allow the family to enjoy different temperatures in different parts of the house.

Michelle Robb, Senior Director of Marketing, Mitsubishi Electric Trane HVAC US, said, "The installation of our sustainable Zoned Comfort Solutions in Sonja's home helps demonstrate how clean energy sources are accessible to homeowners. By creating multiple zones in her home, Sonja and her mom will enjoy customized comfort in each room while saving on heating and cooling operating costs. We're pleased to be part of the GO GREEN experience."

By replacing old, gas-based system with fully electric, energy-efficient Mitsubishi Electric HVAC system; Sonja will circulate fresher air in her home, reduce her heating and cooling expense, and lessen carbon footprint in her community. ■

Aircuity introduces AQaaS for safer building re-openings

Aircuity, introduced "Air Quality as a Service" (AQaaS), an indoor IAQ solution that helps building owners create "healthy buildings" that meet both COVID-19 re-entry and longer-term air quality requirements. As an operating expenditure, Aircuity's AQaaS requires no or low upfront capital, making it easier – and faster – to deploy in existing buildings.

Aircuity approaches each AQaaS engagement by working with clients to prioritize their portfolio for IAQ improvement and identifying each organization's largest operational and energy savings potentials. In many cases, untapped savings opportunities exist in critical environments and other highly variable occupancy spaces. These savings opportunities can easily, help fund such air quality improvements to create a positive cashflow implementation and a true "win-win" for owners, who see improved air quality and lower operating costs; occupiers get a platform and understanding of better air quality; and the operators get a life cycle platform approach to managing and maintaining air quality over the life of the facilities.

Dan Diehl, CEO, Aircuity said, "Aircuity's AQaaS addresses building owners' need to deploy comprehensive air quality programs through a sustainable and economic strategy for both the current COVID-19 pandemic and the undeniable future demand for healthier buildings. We view this AQaaS solution as a 'best practice' to address the growing demand for healthy buildings, and it comes without a dramatic increase in operating costs or large upfront capital. Aircuity customers can access AQaaS at a time of historic low cost of capital and can immediately leverage identifiable and proven efficiency opportunities while achieving comprehensive and verifiable outcomes."

Diehl says, Aircuity's AQaaS solution meets the challenge of improved air quality to implement a triple bottom line approach to secure: Health, Efficiency, and Productivity. ■

CAREL's control technology to speed up CO_2 applications deployment

Image by CAREL

A cold storage warehouse located in the port of Osaka that handles cold and frozen foods was equipped with an innovative CO_2 refrigeration system designed and built by Panasonic Appliances. The system comprises ten 80 HP and four 40 HP compressor racks. All of the units use CO_2 as the refrigerant and are managed by the CAREL pRack 300T controller.

Tadao Sekiguchi, Managing Director, CAREL Japan said, "This is both an exciting and ambitious project. We are proud to have been involved in the initial design of the units, in addition to providing Panasonic with technical support during the commissioning work in the field. This success proves we're capable of supporting our customers closely for this leading technology."

Alberto Catullo, CEO, CAREL APAC-North, added, "True teamwork! Thanks to CAREL's organisation, we delivered CAREL's CO_2 transcritical experience to an important customer in Japan without having to compromise. It's a success both in terms of technology and organisation. With remote connectivity provided by the boss series, CAREL's experts based in China, Italy and Japan worked together with Panasonic to perfectly fine-tune the system." ■

ACCA postpones its February 2021 Conference and Expo

ACCA Events Committee concerning with health and safety of everyone in the HVACR industry, took decision to postpone its 2021 Conference and Expo, scheduled for February 21 - 24 in New Orleans.

Barton James, President and CEO, ACCA said, "Following increased and overwhelming concerns about the COVID-19 virus, the ACCA Events Committee felt this was the best way to proceed during such an unprecedented global situation. While there is disappointment regarding the postponement of this event for our members, event attendees, partners, and exhibitors, we know this is the right decision based on the information we have today."

Factors determining the cancellation included; reviewing information about COVID-19 infection rates, exhibitor travel, quarantine restrictions, and member travel abilities.

Brian Stack, Chairman of the events committee, said, "We were hoping to be able to see everyone in New Orleans, but we know this is the best decision for right now. We are looking forward to seeing everyone at an ACCA conference very soon. We are offering attendees the opportunity to transfer their paid registration to a future in-person ACCA event. Registrants and exhibitors will be contacted, directly with their options." ■

Daikin participates in Singapore's Smart City project

Illustration: completed Tengah Town

Daikin Industries recently signed a memorandum of understanding with Singapore Power (SP Group) to establish a joint venture to realize a district-level centralized cooling system for Tengah Town, a smart energy town project being promoted in Singapore by the Singaporean government.

Under this project, collaborating with SP Group, Daikin supplies an advanced centralized cooling system to the residences in the smart city. With this system, 30% life cycle costs savings are realized, at each household compared to individual air-conditioning instalment. A centralized cooling system is a cooling mechanism that supplies water cooled from a newly developed, high-efficiency modular chiller, which is a large-scale air conditioner to a fan coil unit (an indoor unit with an air blowing function) that installed in residential units. Residents who opted for a centralized cooling system will be charged subscription-based billing. Moreover, Daikin has also concluded maintenance contracts for large-scale air conditioners and fan coil units throughout the city, as a means to provide smart support to the township and develop a sustainable business model.

AC expense is said to occupy 40% of total electricity usage at households. Daikin contributes to saving energy of total smart city highlighting the air-conditioning field. The latest energy management system installed in residences will enable residents to visualize electricity use and help save energy throughout their homes by using mobile apps. Tengah Town expects to see its first batch of its residents move in by 2023. ■

Residential HVAC Market: Recovery route from COVID-19

The report titled Global Residential HVAC Market 2020-2024, from Technavio indicates Negative growth in the short term due to the impact of COVID-19 on the business.

A senior analyst for Industrials, Technavio stated, one of the primary growth drivers for this market is the growing concern for indoor air quality."

The growing concern for indoor air quality is one of the main reasons driving the growth of the HVAC market. Daily exposure to multiple chemicals and having a significant indoor presence add to the increasing prevalence of asthma, autism, childhood cancer and many other medically unexplained symptoms. Thus, people have become more aware of these concerns in the recent past and have started adopting measures to prevent these problems.

One of the popular preventive measures is the adoption of HVAC equipment. Taking these factors into consideration, Technavio's market research analysts expect the global residential HVAC market to grow tremendously during the forecast period.

As the markets recover, Technavio expects the residential HVAC market size to grow by US $ 16.97 bn during the period 2020-2024.

The residential HVAC market expects to post a y-o-y growth rate of -8.25%. Market growth in this segment will be faster than the growth of the market in the heating system and ventilation system segments. 61% of the growth will originate from the APAC region. China and Japan are the key markets for residential HVAC in APAC. ■

Facilio and Belimo for IoT-driven Connected Building Environments

Facilio, an AI-driven property operations & maintenance (O&M) platform, and Belimo, in HVAC field devices, entered into strategic collaboration to enhance buildings industry by delivering connected and sustainable environments.

Addressing the growing need for efficient building operations, both will help real estate owners, operators, and service providers turn IoT data into operational insights and workflows to optimize building performance and comfort in real-time.

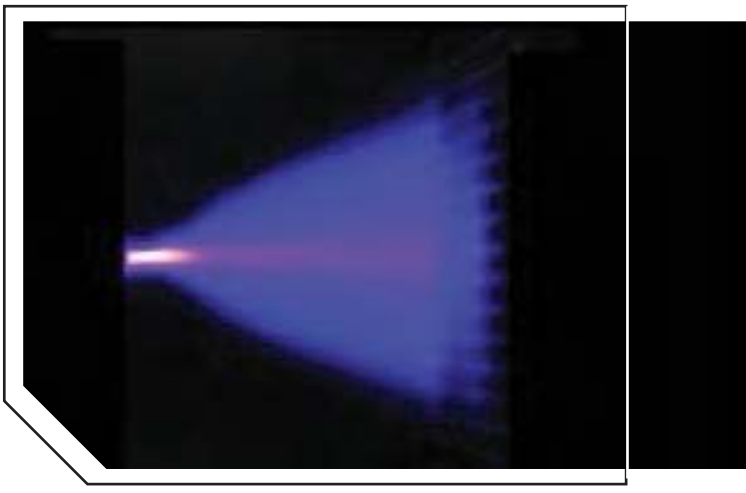
Prabhu Ramachandran, CEO & Founder, Facilio said,"For customers who are shifting to an agile, data-driven operating model, Facilio and Belimo will deliver a single connected operational environment, helping them gain complete real-time visibility and control of their space and equipment. We are excited to partner with market leader Belimo to significantly impact how the real estate industry transforms their property operations with data."

Facilio's O&M platform harnesses IoT and aggregates hard-to-access building data to optimize HVAC systems and building performance in real-time, implementing effective sustainability measures, and elevating the tenant experience – all from one place. Facilio works with estate owners and operators to provide real-time building performance to help them take action.

Salvatore Cataldi, Global Strategic Building IoT Expert, Belimo said,"The real estate industry is engaged in creating sustainable buildings and contributing to ESG goals through digital transformation and industry collaborations. The synergy between Belimo's digital ecosystem and Facilio's O&M platform leverage available data to unlock the potential of connected buildings and address the new challenges."

Collaboration between Belimo and Facilio O&M solution enhances the real estate industry to innovate faster and meet today's fast-changing market needs. ■

DAIKIN STREAMER TECHNOLOGY TO INACTIVATE CORONAVIRUS



Streamer Discharge

Daikin has been collaborating with universities and public research institutes to demonstrate the effectiveness of this technology for highly virulent influenza viruses (A-type H5N1), weakly virulent influenza viruses (A-type H1N1), mouse norovirus, and toxins and bacterias that cause food poisoning.

From the latest study, Daikin has confirmed that Streamer technology inactivates more than 99.9% of coronavirus (SARS-CoV-2) after irradiating the viruses for three hours with Streamer Discharge. This demonstration shows the results of experiments using a device that generated Streamer discharge under test conditions and does not indicate the effectiveness of an actual Streamer product in use under actual conditions.

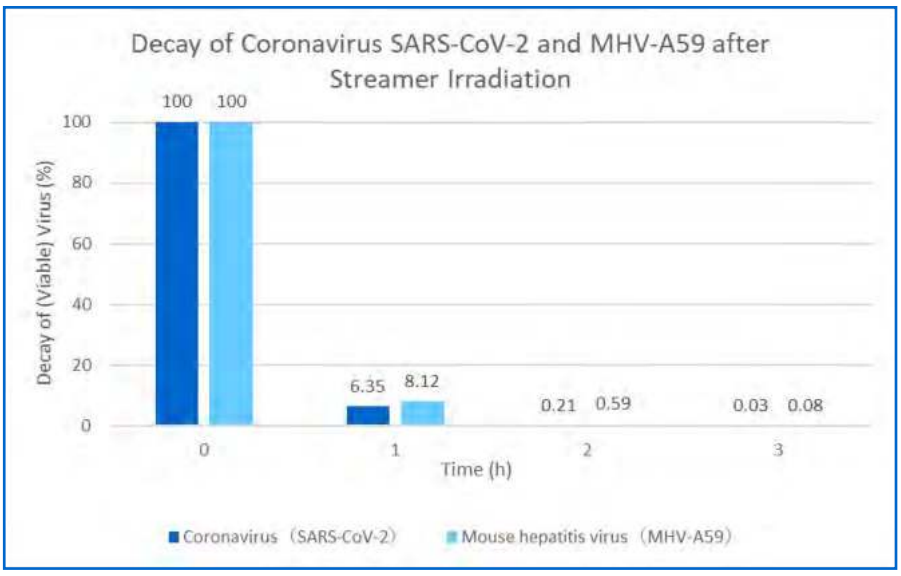
Study done by Daikin Industries, Ltd., in cooperation with Professor Shigeru Kyuwa, Department of Biomedical Science, Graduate School of Agriculture and Life Science, the University of Tokyo, and a group of research professors led by Professor Shigeru Morikawa, Department of Microbiology, Faculty of Veterinary Medicine, Okayama University of Science.

Study Method: The team conducted an experiment, wherein they irradiated the viruses for three hours with Streamer Discharge.

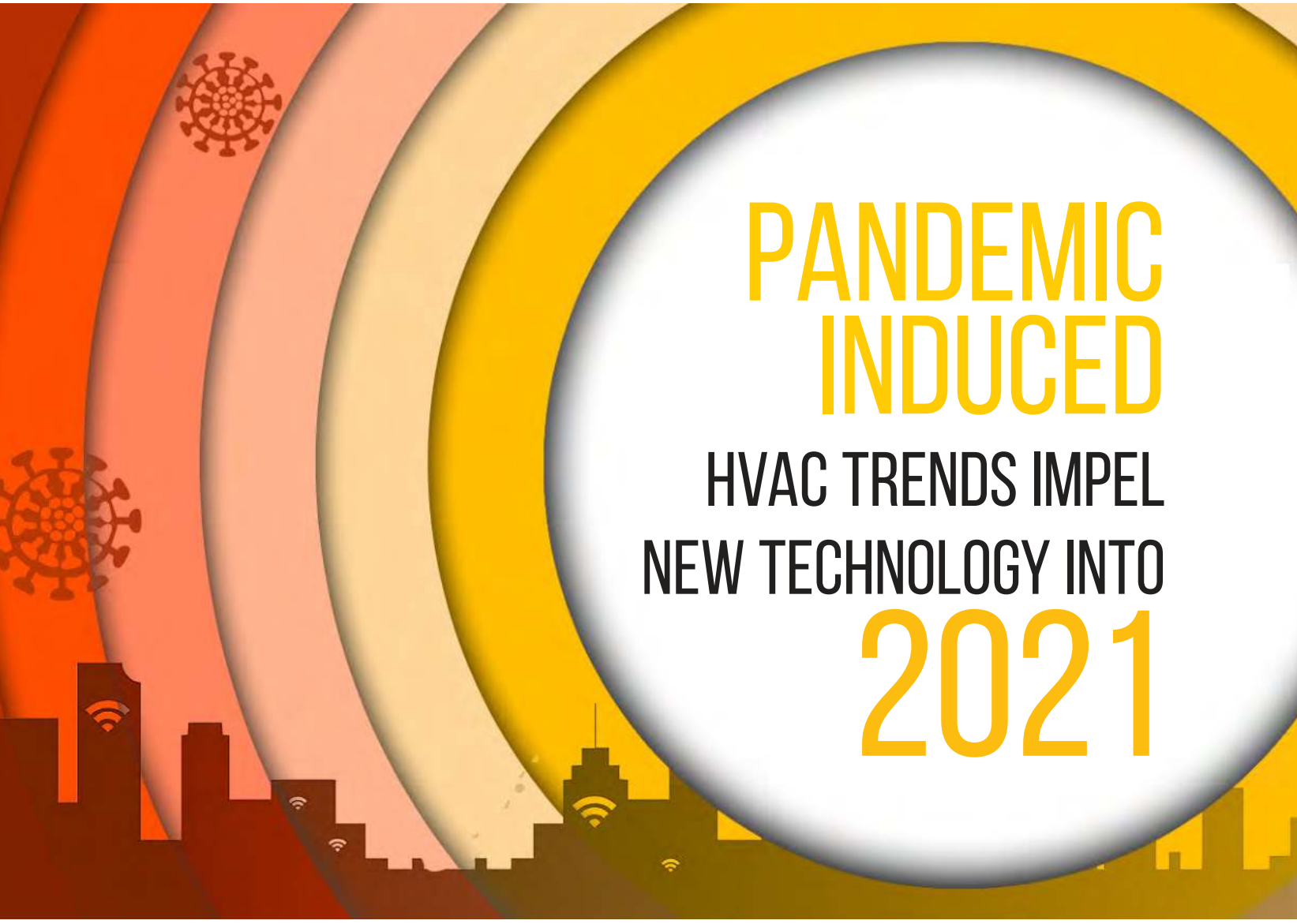
Streamer Technology: is a type of plasma discharge featuring an innovative air purification technology that stably generates "high-speed electrons," a feat which had proven difficult up to that time. Its oxidative decomposition capability is much greater than that of conventional plasma discharge (glow discharge). Moreover, when combined with air components, these high-speed electrons have a capability for powerful oxidative decomposition, and this capability enables Streamer discharge to continuously remove odors, bacterias, and indoor air pollutants such as formaldehyde.

- **Source1:** "Study report on the inactivation effect of plasma ion generator (Daikin Streamer) on SARS-CoV-2" written by Shigeru Morikawa, Department of Veterinary Medicine, Microbiology Course, Okayama University of Science.
- **Source2:** "Study on inactivation of plasma ion generator (Daikin Streamer) against mouse coronavirus" written by Shigeru Kyuwa, Laboratory of Animal Science, Graduate School of Agricultural and Life Sciences, University of Tokyo. ■

Study Results



- Irradiation with Streamer discharge for one hour inactivated 93.6% of coronavirus (SAR-CoV-2) and 91.8% of mouse hepatitis virus A59 (MHV-A59).
- Irradiation with Streamer discharge for three hours inactivated more than 99.9% of coronavirus (SARS-CoV-2) and mouse hepatitis virus A59 (MHV-A59).



PANDEMIC INDUCED

HVAC TRENDS IMPEL NEW TECHNOLOGY INTO 2021

Future trends get smarter with new features. Currently, HVAC focuses in reducing amount of energy used to heat and cool facility, creating more environment-friendly processes. Innovative and different ways for smart and efficient HVAC has solutions in enhanced technologies, using renewable energy and smart apps trending with online solutions.

- Gopal Krishna Anand

Global pandemic almost killed the market and is still on the spree. Positively, it induces innovative trends in terms of efficient systems all over. The young generation engages itself in developing new technologies — including online solutions, smart homes, energy efficient buildings, training techniques, connected devices and automated business systems controls. The concern for green building, and increase in number of manufacturing and industrial applications is increasing adoption of new HVAC systems and brings in new trends and opportunities.

Just to mention, one of the HVAC market trends is: more conscious residents want to set different temperatures in different parts of their homes, and that's good for energy efficiency also. Smartphone, smart thermostats and smart HVAC systems are in demand more than ever. Today, the technology provides us more control than ever

- from sensors to remote temperature adjustment to integration of energy. And, as the equipment get more advanced, 2021 requires technicians to refresh, learn and arm themselves with new technologies.

Corona sparks innovative trends

HVAC industry started strong in 2020, but the coronavirus brought global economies to a halt. While necessary/ emergency repairs and service continues, more companies are transitioning from office to work remotely. Momentum of the housing market, backed by rising need for more work-at-home space is expected to be a major trend with strong rise in repair and retrofit activity. Even, when the pandemic subsides and we return to new normal life, the safety precautions and remote work trends adopted during the pandemic are likely to remain in one form or the other. Even though skilled labor shortage prevailed in 2020, curving with year 2021, new opportunities are trending the HVACR space.

Staying ahead of the curve means looking beyond where we are at now and finding new ways to excite our customers. That's where HVAC trends come into play. HVAC industry outlook predicts 13% growth through 2028, which clearly speaks about the overall health of the industry. AHR Expo and ASHRAE Journal predict, HVAC jobs will grow 15% over a 10-year period (2016-2026). Sources indicate employment numbers for the HVAC industry and consumers' expectations too, are impacting HVAC market trends.

Smart and green options

Smart technologies, making waves in the industry, help us stay connected to our environment. Smart appliances become smarter by remembering usage habits to anticipate one's needs. An innovation lies in smart technologies like mobile apps that allow building managers to control HVAC technology from one centralised point. For example, smart thermostats that detect measurements, such as humidity, temperature, and motion.

There is a global drive for greener options, focused on developing new and sustainable innovations, increased energy efficiency, substituting hazardous substances, minimising noise and vibration, and reducing CO_2 emissions.

Solar HVAC solutions in the field of sustainable energy can be used for both heating and cooling, making them an attractive option as 'go green'.

A HVAC trend like inverter compressor solves inefficiencies and noise problems, resulting in an air conditioner that cools faster, lasts longer, and runs quieter. It has a unique power saving operation range frequency that saves more energy. This, paired with Ionizer technology, removes harmful substances and odours surrounding the unit, resulting in fresher air supply.

Filtration strategy trend uses antibacterial air filter filtration systems, to protect users from all harmful substances, including odour, bacteria, allergen, virus, micro-dust, etc. And, when used with Plasmaster Ionizer, offers protection with over three million ions sterilising the air passing through the air conditioner, as well as surrounding surfaces, for a safer, cleaner environment.

Internet of Things

Internet of Things has joined home HVAC systems with the help of smart thermostats manufactured by Nest, Honeywell, Ecobee and Emerson. These devices connect to smartphones and tablets, allowing homeowners to control their heating and cooling systems from anywhere in the world. The thermostats can automatically adjust to suit homeowner's personal preferences, notify them maintenance issues, help monitor and reduce energy consumption over time.

Digitization of the companies' via e-commerce and iOS/ Android-enabled apps, supported by a database of product information, continues to see momentum. The companies, in order to expand market share, are bound to actively pursue acquisitions to broaden their product portfolio. With a growing number of Wi-Fi-enabled household appliances, it's

estimated that more than 14 million homes in U.S. use smart home devices and products—and that number is expected to go up reads www.servicetitan.com site; also, researching and possibly stocking products help reduce customers' carbon footprint.

About to change is geothermal as alternative energy source - set to become a big part of the HVAC industry. This highly efficient new and renewable energy source is gaining traction to deliver CoPs between 3.0 and 5.0. Programs, such as Horizon 2020, funded by the EU also help to bring this technology to the forefront and promoting innovation in the field. An awareness, demand, and installations is needed for geothermal heat pumps an eco-friendly solution.

Mobile Technology for fleets

Mobile technology is a success for fleets. Today's fleets facing pressure on multiple fronts need to not just survive, but to thrive. And, mobile technology as key is a way to build intelligent, efficient, and scalable fleets that exceed requirements and expedite their organizations' digital transformation process.

Encouraging clients to a future, shaped by growth - Frost & Sullivan recently gathered thought leaders from across the trucking industry - to participate in a virtual think tank discussion about the solutions they're implementing, the challenges they're neutralizing, and the lessons they're learning along the way. Outcome pointed that businesses should benchmark against these shared insights and use this summary to strategize, navigate change, and improve performance: https://ww2.frost.com/

Mobile technology with features such as introduction of faster cellular data networks, GPS, smartphones and tablets, helped make mobilization available and affordable to fleets of every size. Thought leaders are utilizing mobile technology in multiple and varied ways. Examples include: Enabling ELD (electronic logging device) solutions; providing near-real-time navigation, mapping, geo-fencing and dynamic routing; moving information and reports from paper to the mobile device; monitoring vehicle performance and maintenance; tracking shipments; implementing video safety solutions and enriching driver communications tools.

As the COVID crisis has demonstrated, building flexibility into solutions and planning help adapt quickly and correctly to unforeseen circumstances.

Mobile technology product will evolve, change and introduce new capabilities constantly. Successful fleet organizations look ahead and plan accordingly. Users should be involved in product evaluation process as they might provide idea - for instance, they may ask how to support our driver when a tech emergency brings things to a halt, such as when a truck's PC goes down.

"In these uncertain times, flexibility becomes key."
- Howard Cochran, Senior Director Strategic Technologies, Estes Express.

"Be flexible in your transformation goals, knowing what is missioncritical versus nice-to-have. Being able to quickly adapt to changing business conditions and deliver value is key."
– Tom Baughman, EVP Technology, Kenan Advantage Group.

Finally, a carefully selected mobility partner can bring much-needed expertise, improve and expedite solution implementation. Flexibility, future-proofing, and valuing users help optimize mobile fleet offerings.

Market scenario

Data center cooling market is expected to grow by US $ 566.98 million during 2020-2024. The market witnesses a neutral impact during the forecast period owing to the widespread growth of the COVID-19 pandemic. As per Technavio's pandemic-focused market research, market growth is likely to increase. Bitfury Group Ltd., Cisco Systems Inc., and Emerson Electric Co. to emerge as major data center cooling market participants during 2020-2024.

- **Global HVAC Market** with growing usage of HVAC systems in industrial, residential, and commercial settings, would exhibit huge expansion in the coming years. As a result, the value of the market would rise from $240.8 billion to $358.1 billion from 2019 to 2030 and would progress at a CAGR of 4.8% between 2020 and 2030.
- **Global HVAC equipment market** valued at US $ 91.30 billion, is expected to reach US $ 173 billion by 2024, which will increase to 6% CAGR from 2018 to 2024. HVAC equipment, an indoor and vehicle technology facilitates the environment, and is essential for large industrial and commercial infrastructure to control temperature and humidity.

Next Innovative technologies

Recent breakthrough in renewable energy and smart technology are revolutionizing HVAC, says **Jon Cornachio** in an architizer.com blog, making these systems more sustainable, consuming less energy while promoting healthier indoor and outdoor environments.

Solar-powered air conditioning: Chromasun's Micro-concentrator rooftop panels' special mirrored lenses - automatically

follow the sun's path, concentrating and capturing solar energy. That energy is then utilized by the building's HVAC system, converting peak sun loads into efficient air conditioning.

Ice-powered air conditioning: Ice Bear thermal battery transforms existing air conditioners into cost-effective cooling machines. During the night, Ice Bear fills with water and freezes it into a block of ice. During the day, this ice is used to provide air conditioning to the building, without running the air conditioner's compressor. This results in 95% less energy use, cutting both electricity bills and carbon emissions.

NREL engineers with the DeVAP prototype. Photo by Dennis Schroeder via NREL.

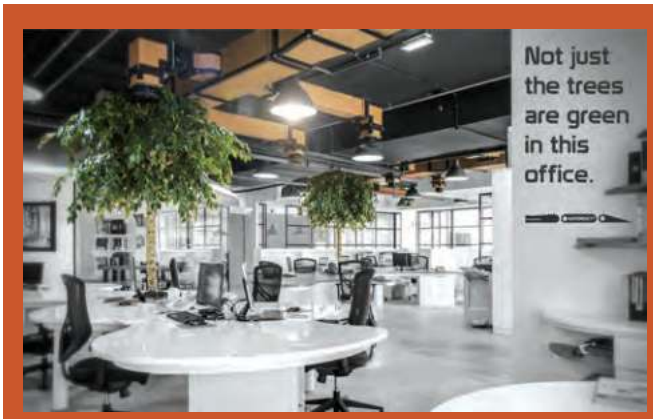
Desiccant-Enhanced Evaporative Air Conditioner, or DEVap developed by National Renewable Energy Laboratory, device combines the cooling power of evaporation with the dehumidifying power of liquefied desiccants — to create an AC that creates cold, dry air at a fraction of the cost. Not yet commercially available, the prototypes have demonstrated a 90% reduction in energy use.

Sustainable Retrofits: Transformative Wave has developed a new generation of sustainable retrofit technology known as 'Catalyst' that installs directly into existing rooftop units, with the features — economizers, variable fan speeds, demand-response ventilation, smart controls and automated capabilities — lead to a 25% to 50% reduction in energy use.

Digital ceiling: The future of building automation is equipped with sensors — detecting motion, occupancy levels, temperature, carbon dioxide levels and more —that converge the building's lighting, security and HVAC systems into a single, easy to manage network. These adaptive sensors learn the daily habits of building occupants and adjust air and light settings accordingly; minimizing energy waste.

Recyclable Ductwork: GatorDuct, a simple cardboard product — treated with a fire-resistant and waterproof coating — takes the place of ordinary HVAC ductwork. These triple-walled cardboard ducts are stronger, lighter, and cheaper, require 20% less insulation than their sheet metal counterparts. Best of all, GatorDucts are produced from sustainably managed forests and are 100% recyclable.

Wearable Technology software: XOi Technologies combat maintenance by arming field technicians with smart glasses;



GatorDucts exposed in an office space by GatorDuct.

connecting them to an online network of HVAC experts. The glasses transmit video in real time, allowing multiple technicians to inspect and diagnose a system remotely while automatically generating a detailed service report for the owner. This innovative software is compatible with many brands of smart glasses, including Realwear, Vuzix and GoPro.

Motor efficiency in HVACs

The technology trends focused on increasing efficiency of motors can bring savings in the HVAC applications involving motors. Since efficiency causes less excess heat, it results into increased life-cycle of components. Over 50% of Earth's total electricity consumption is used for operating motors and motor systems. The latest and trending technology will improve the future of motors in HVAC. "Most motors are moving into some sort of variable speed technology," said Dave Mayer, product manager at Greenheck, PRV & Roof Curbs.

UV technology to kill coronavirus

Since the start of the coronavirus pandemic, agencies are installing ultraviolet light systems in heating and air conditioning systems. Intelligent technology can help them in their fight for indoor air quality, concerning how the coronavirus might interact, especially relevant for schools that host large number of students circulating in and out of the building.

"Light has been killing germs since the beginning of time, it definitely kills COVID-19."
- Terrance Berland, CEO of Violet Defense.

Researchers have shown - when UV light is exposed to the coronavirus on surfaces, it can kill its DNA, and prevent it from reproducing. "There is limited published data about the wavelength, dose, and duration of ultraviolet radiation required to inactivate COVID-19," the **US Food and Drug administration** website reads. So, the installation of CDC-recommended air filters that are rated

MERV 13 and MERV 9 is advisable. With increased ventilation the use of UV-C lighting has increased effectiveness of the approach to contain spread of the virus.

Impact of trends in 2021 and beyond

Living in a technologically driven world makes the future more exciting for the HVAC industry. Domestic users can look forward to more innovative designs and features with advanced simple-to-use controls, total solution integration products and products using the latest technology available.

As per a report produced by PricewaterhouseCoopers (PwC), the total spending on infrastructural development and construction projects across the globe will rise to $15.5 trillion by 2030. Countries such as the U.S., China, the U.A.E., Qatar, and Saudi Arabia are witnessing soaring construction activities such as those pertaining to the building of shopping complexes, hotels, and skyscrapers, primarily because of upcoming events such as the FIFA World Cup 2022 and the Dubai Expo 2020 postponed till 2021.

Tourism industry is another reason behind the huge investments being made in the development of five-star hotels and luxury resorts and amusement parks in these countries. These structures and facilities, once completed, would require HVAC equipment and maintenance services, which would, in turn, propel the demand for HVAC systems and services in the future years. Furthermore, many countries are making huge investments in the replacement of old HVAC systems with new energy-efficient ones.

"Following the massive disruption caused by the global pandemic and subsequent recession in 2020, we are speaking to stakeholders from around the world to try and get a sense of what to expect next year."
– Marc Chasserot,
CEO, SHECCO.

The Ministry of Power started an initiative called 'Eco-Niwas Samhita 2018', which is an Energy Conservation Building Code for Residential Buildings (ECBC-R). The code applies to mixed-land-use buildings and residential structures built on an area of land equal to or greater than 500 m2 and comprise minimum performance standards. This initiative massively boosted the requirement for HVAC systems and services in the country.

Looking into 2021

The year 2021 is shaping up to be avant-garde for the industry in the coming years. As we look towards the future, already several emerging and existing trends are shaping the commercial HVAC industry; from smart technologies to eco-friendly systems that ensure not only global sustainability but also longevity of devices, solar systems and for sure, new technologies for HVAC industry will focus on system efficiency and renewable energy.

There is a big push for HVAC professionals who thought ahead and learned the new technologies. Also, an increase in construction activities is leading to growth in the market of HVACR system. There is increasing preference toward VRF technology and growing preference toward smart HVAC systems.

With the continuing spread of coronavirus pandemic, organizations across the globe are gradually leveraging technology. Many businesses will go through response, recovery, and renewal phase. Building business resilience and enabling agility will aid organizations to move forward in their journey out of the COVID-19 crisis towards the next 'New Normal' period.

Yet, you may agree that with new normal phenomenon, boundless research and limitless creativity can alter the trends and curves leading to future HVAC technology that remains still unfounded and which we don't even know about yet! ■

VIRTUAL OPENING CEREMONY

Bitzer India moves to New Mumbai-based Office at Powai

BITZER India relocates its head office to a new location in the city centre of Mumbai, which was officially opened during a virtual opening ceremony. Bitzer now has a total of seven offices in the subcontinent of India, including representations of subsidiaries and the service network Green Point.

From its new office in Mumbai, located at 604 & 605, 6th Floor, B – Wing, Powai Plaza Building, Hiranandani Garden, Powai, Mumbai – 400076; BITZER India continues with its support for local customers. Close proximity to its customers is a matter of crucial importance to BITZER. The company is settled in different parts of India to meet the high demand for reliable cooling all over the country. Most recently, BITZER's subsidiary VaCom Technologies opened an own office in India.

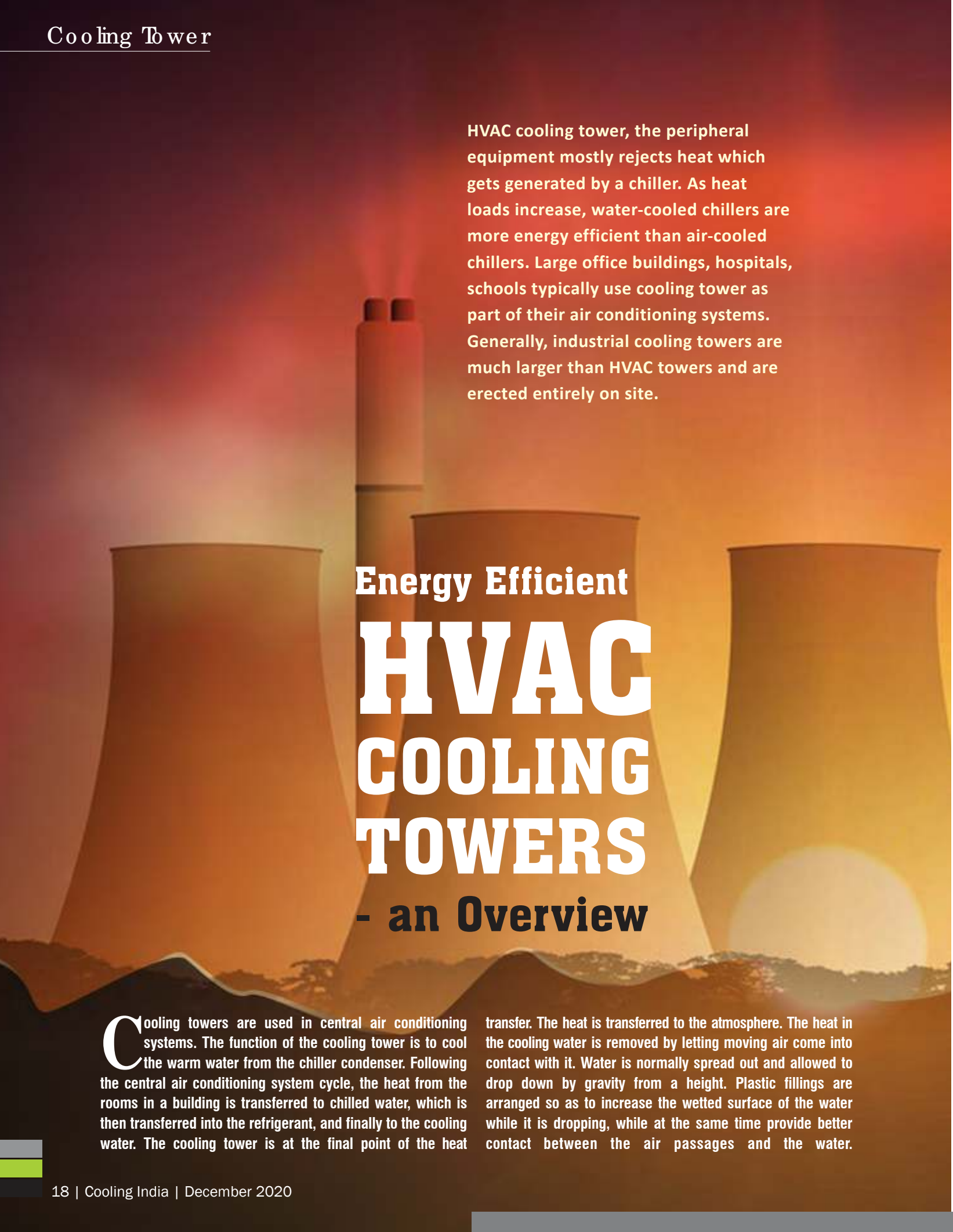
Harvinder Bhatia, MD BITZER India, with his team at virtual opening ceremony.

From (L to R): Gianni Parlanti, Chief Sales and Marketing Officer, Frank Hartmann, CFO and Rainer Große-Kracht, CTO, at virtual opening ceremony in BITZER headquarters.

BITZER Chief Sales and Marketing Officer, Gianni Parlanti said in his opening speech, 'Besides our traditional markets, we have also been active in Asia for many decades. Our business relations with India can even be traced back to the year 1959. Today BITZER India is present in six locations and always close to the local customers: in Mumbai, Delhi, Bengaluru, Kolkata, Lucknow and Cochin. We also have our new subsidiary Vacom in Pune'. 'The Indian government has committed itself to meeting the climate protection targets set out in the Paris agreement. In order to meet these high standards, innovative, future-oriented technologies are needed.

Harvinder Bhatia, Managing Director BITZER India, remarked, 'With an increase in sales over the year, we were falling short of space and hence decided to move to a bigger office, where our administrational departments are located now. Our colleagues from Services and Green Point continue to operate from the previous building. The additional space we gained there will be used to stock more spare parts, oils, compressors, condensing units and heat exchangers.'

The awards from independent experts reveal the importance of the BITZER products: in 2019, BITZER CSV and OS.A95 screw compressors received the Acrex India Award of Excellence in the category Green Products. This year, the company won the Acrex India Award of Excellence in the category Sustainable Design with their ORBIT scroll compressors. The company's designed product solutions are precisely tailored to the requirements of the Indian markets and has a record rapid growth in nearly all product groups in recent years. ■



HVAC cooling tower, the peripheral equipment mostly rejects heat which gets generated by a chiller. As heat loads increase, water-cooled chillers are more energy efficient than air-cooled chillers. Large office buildings, hospitals, schools typically use cooling tower as part of their air conditioning systems. Generally, industrial cooling towers are much larger than HVAC towers and are erected entirely on site.

Energy Efficient HVAC COOLING TOWERS - an Overview

Cooling towers are used in central air conditioning systems. The function of the cooling tower is to cool the warm water from the chiller condenser. Following the central air conditioning system cycle, the heat from the rooms in a building is transferred to chilled water, which is then transferred into the refrigerant, and finally to the cooling water. The cooling tower is at the final point of the heat transfer. The heat is transferred to the atmosphere. The heat in the cooling water is removed by letting moving air come into contact with it. Water is normally spread out and allowed to drop down by gravity from a height. Plastic fillings are arranged so as to increase the wetted surface of the water while it is dropping, while at the same time provide better contact between the air passages and the water.

This depends on the humidity of the surrounding air. Usually the tower should be able to cool the water by about 6°F to 7°F of the air wet bulb temperature. For example, if the wet bulb temperature of the air is 78°F and the hot water coming to the tower from the condenser is 95°F, then the cooled water that leaves the tower can be 85°F, about 7°F lower than the air wet bulb temperature. An example of the application is the use of this equipment to cool the water-cooled condenser from a chiller system.

Principle of Cooling Tower

The hot water from the chiller condenser which could be located in the building is piped to the cooling tower. Pumps are used to circulate the water from the condenser to the tower and back. The hot water is sprayed through nozzle onto the thin films materials (also known as fill) which can be made of plastic, wood slats or metal fins. Their surfaces can be in the shape of honeycomb, corrugated sheet or flat sheet. As the water flows through these materials, air from the surrounding which can be natural-draft or forced-draft rushed through it, and in the process evaporates some of it. This cools the water which is then collected at the lower sump and through a filter to get rid of leaves and other materials before being circulated back to the condenser. A drain is used to remove the hard water minerals from the system. The tower should be located in an area where the ventilation is good and not located too close to the building. This is critical for the natural-draft tower where the cooling is done naturally.

Working of Cooling Tower

Cooling towers are special type of heat exchanger that allows water and air to come in contact with each other to lower the temperature of the hot water. During this process, small volumes of water evaporate, lowering the temperature of the water that is being circulated throughout the cooling tower. In a short summary, a cooling tower cools down water that gets over heated by industrial equipment and processes. The hot water is usually caused by air conditioning condensers or other industrial processes. That water is pumped through pipes directly into the cooling tower. Cooling tower nozzles are used to spray the water onto to the "fill media", which slows the water flow down and exposes the maximum amount of water surface area possible for the best air-water contact. The water is exposed to air as it flows throughout the cooling tower. The air is being pulled by a motor-driven electric "cooling tower fan". When the air and water come together, a small volume of water evaporates, creating an action of cooling. The colder water gets pumped back to the process/equipment that absorbs heat or the condenser. It repeats the loop over and over again to constantly cool down the heated equipment or condensers.

Types of Cooling Tower

Cooling tower is mainly divided into two categories according to need of power requirement for its operation as follows:

Natural Draft Cooling Tower

The natural draft or hyperbolic cooling tower makes use of the difference in temperature between the ambient air and the hotter air inside the tower as hot air moves upwards through the tower (because hot air rises), fresh cool air is drawn into the tower through an air inlet at the bottom as shown in Fig.1.

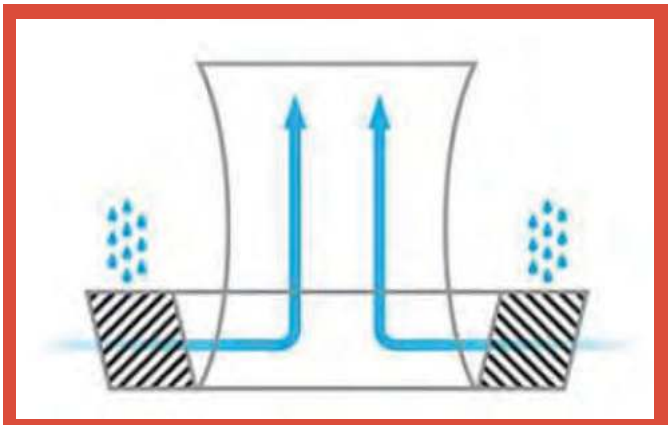


Fig. 1. Natural draft cooling tower.

Mechanical Draft Cooling Tower

Mechanical draft towers have large fans to force or draw air through circulated water as shown in Fig. 2. The water falls downwards over fill surfaces, which help increase the contact time between the water and the air. This helps maximize heat transfer between the two. Cooling rates of various parameters such as fan mechanical draft towers depend upon diameter and speed of operation, fills for system resistance etc.

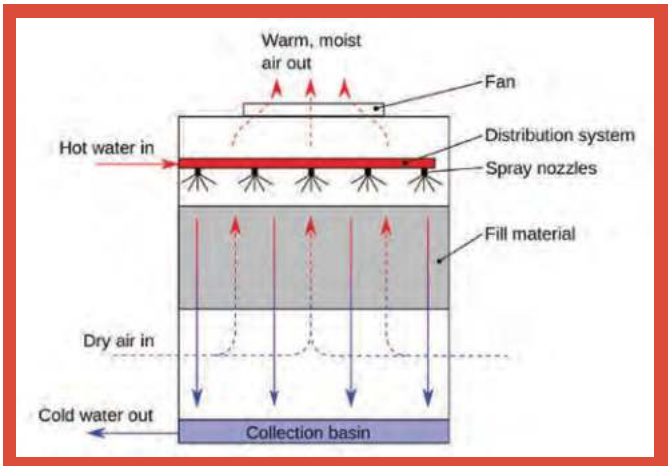


Fig. 2. Mechanical draft cooling tower.

Cross flow and counter flow design

In cross flow cooling tower systems (Fig. 3 a) the water vertically flows through the fill media while the air horizontally flows across the falling water. That's why they call it "cross flow" because the air and water cross paths or flows. Because of the crossing of flows, the air doesn't need to pass through the distribution system. This permits the use of hot water flow via gravity and distribution basins on the top of the tower right above the fill media. The basins are a standard of cross flow cooling towers and are applied on all units.

In counter flow cooling tower system processes (Fig. 3 b), the air vertically flows upwards, counter to the water flow in the fill media. Due to the air flowing vertically, it is not possible to

Table 1. Comparison between counter flow and cross flow cooling tower.		
	Counterflow	**Crossflow**
Water distribution	Lower HP pumping head	Up to 50% higher riser
Recirculation	No intendancy	Reduction in performance
Capacity	50% more with cellular fill	Too costly for film fill
Icing	Controllable with Aux piping Reverse fan more effective	Louver icing prevalent Too high a profile to be heated
Future Expansion	Fill depth easily increased	No inexpensive capability
Maintenance	Easier access to components Cold water basin open	Interior height dangerous Cannot clean the cold water basin
Fan Horse Power (HP)	Less usually required	More HP for same work
First Cost	Larger capacity towers, less	Costs more for same work

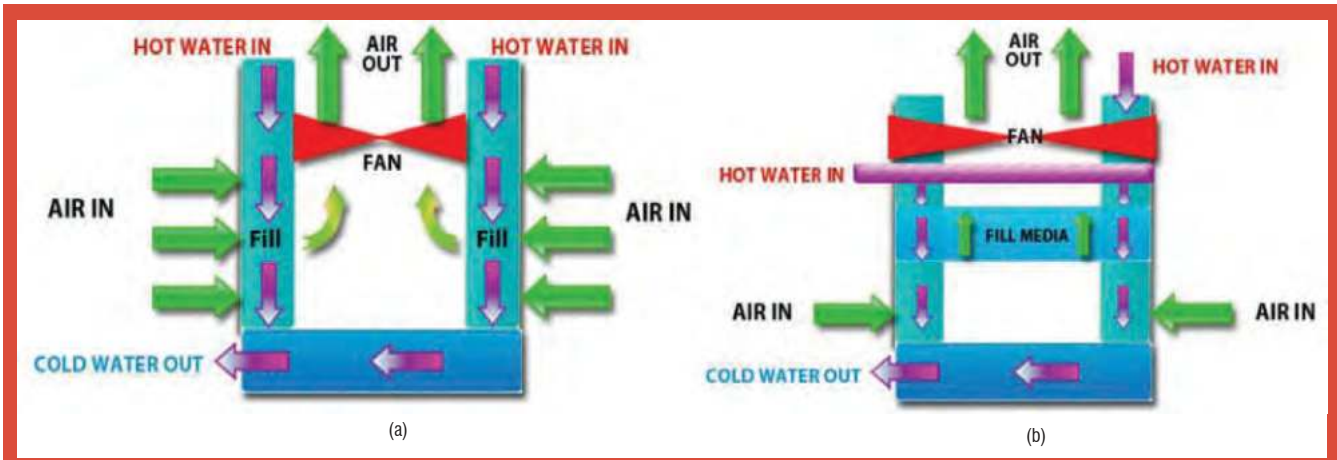


Fig. 3. (a) Cross flow (b) Counter flow cooling tower.

use the basin's gravity flow like in cross flow towers. As a substitute, these towers use pressurized spray systems, usually pipe-type, to spray the water on top of the fill media. The pipes and cooling tower nozzles are usually spread farther apart so they will not restrict any air flow.

A brief comparison between counter flow and cross flow cooling tower is tabulated below as Table 1.

Performance Parameters for Cooling Towers

A number of parameters describe the performance of a cooling tower.

- **Water/Air Ratio (m_w/m_a)** is the mass ratio of water (Liquid) flowing through the tower to the air (Gas) L/G flow.
- **Approach** is the difference between the temperature of the water leaving the tower and the wet bulb temperature of the entering air.
- **Range** is the temperature difference between the hot water entering the cooling tower and the cold water leaving. The range is virtually identical with the condenser rise.
- **Evaporation Rate** is the fraction of the circulating water that is evaporated in the cooling process.
- **Drift** is water that is carried away from the tower in the form of droplets with the air discharged from the tower.
- **Recirculation** is warm, moist air discharged from the tower that mixes with the incoming air and re-enters the tower.

Performance Analysis of Cooling Towers

Fig. 4 shows effect of fan speed on performance of cooling

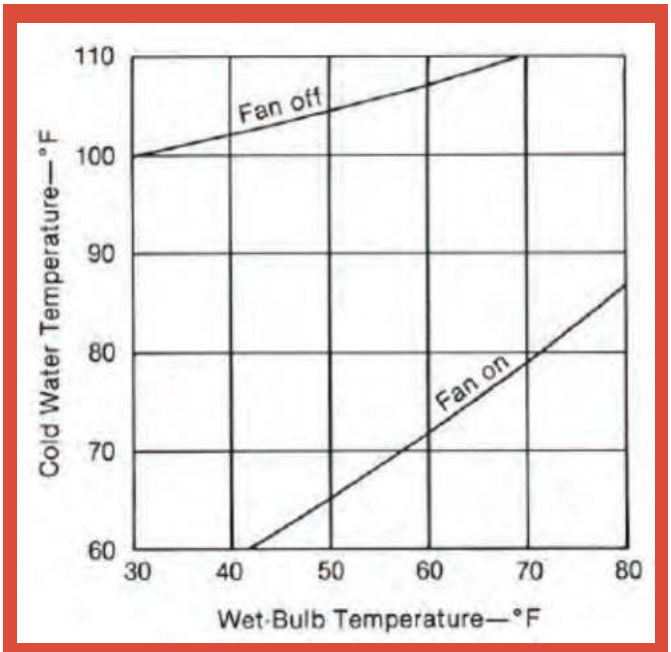


Fig. 4. Effect of fan speed on requirement of cooling water temp at various WBT of air.

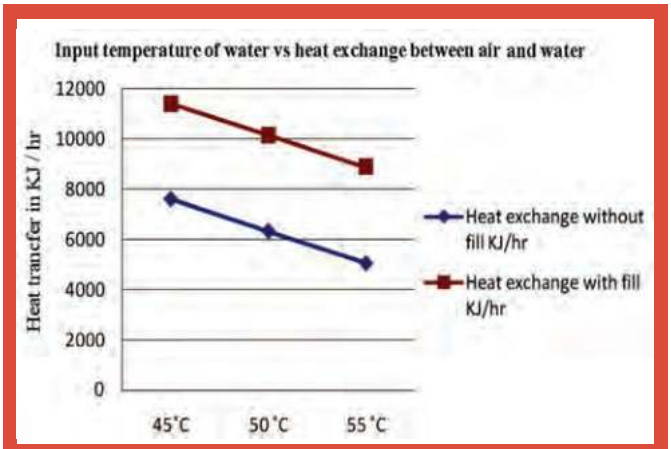


Fig. 5. Effect of fill on heat transfer rate in cooling tower.

tower in case of cold water temperature requirement with various wet bulb temperature of incoming air. By providing the fan speed, cold water requirement lowers at minimum the wet bulb temperature of incoming air.

Fig. 5 shows amelioration in heat transfer by providing fill in the cooling tower. Heat transfer from evaporated water to air can be increased by providing filler of good quality material in cooling tower. The efficiency of cooling tower with fill material is high compared to the efficiency of cooling tower without fill material. Fill material increases the water and air contact inside the cooling tower so the heat loss by water is also high compared to the cooling tower without fill material. The evaporation loss of cooling tower with fill material is little high because the water and air contact time is high. Even though losses are generated in the cooling tower, the cooling is achieved due to heat transfer between air and water.

Precaution in Cooling Towers Operations

In temperate countries, the water can freeze during winter when the temperature drops below 32°F or 0°C. Hence, anti-freeze chemical and a heater are necessary for proper operation during this time. Pipes will have to be insulated to prevent the loss of heat. Chemicals are also added to prevent the formation of algae, fungus and other micro-organism in the water. Study also showed that Legionella bacteria could grow in the cooling tower water. Hence, it is also important to add disinfectants such as chloride compounds into the water. The level is maintained regularly and testing of the bacteria is to be carried out in instances where the spread of Legionnaire disease is rampant. These days, the materials that are used to construct the equipment are made of galvanized or stainless steel for easy maintenance. Non-metallic tower tends to degrade over time especially in polluted and harsh environment. Even the components inside the tower such as fan blades are also being constructed using fiberglass reinforced polyester or FRP. Epoxy is also used to coat them for protection from the ultra violet rays.

Water Treatment

In cooling towers, the cooling effect is achieved by evaporation of a portion of the water passing through it. As the water is evaporated, impurities remain in the re-circulating water. The concentration of the dissolved solids increases rapidly and can reach unacceptable levels. In addition, airborne impurities are often introduced into the water. If the contaminants are not controlled, they can cause scaling, corrosion, and sludge accumulations which can reduce heat transfer efficiencies. In order to control the concentrations, it is necessary to bleed a small amount of circulating water from the system and top up with fresh water. If the site conditions are such that constant bleed-off will not control scale or corrosion, chemical treatment is necessary. Even with bleed-off or chemical treatment, it is still necessary to control biological contamination. The growth of algae, and other microorganisms can reduce system efficiency and may even contribute to potentially health hazards. Biocides are used to treat the water to control the biological growths.

Check points

- Mechanical cooling towers are often much smaller than natural draft cooling towers.
- Since natural draft cooling towers require outside air, they need to be outside. Mechanical draft cooling towers can be located inside buildings.
- For all cooling towers located outside, considerations need to be taken into account for colder weather. Steps should be taken to prevent freezing especially in the Northern climate regions (in the Northern hemisphere); vice-versa for the Southern hemisphere.
- Fans that are in the exit air stream need to be weatherized and protected. Protected from corrosion and other harmful effects of moist air.
- Maintenance factors of various cooling towers differ a lot.
- Noise transmission of the cooling towers needs to be taken into account.
- Plume discharges from the cooling tower can cause serious problems. This is true if located too close to inlet air ducts for building make-up air.
- Parking lots in the path of the discharge plume need to be taken into account. The discharge can cause liability issues with vehicles and paint jobs on those vehicles.
- Drift rates can be excessive even with drift eliminators. Some municipalities will credit for high water usage for cooling towers. Therefore, check with local government for any benefits. ■

Dr. D.B. Jani
Government Engineering College, Dahod, Gujarat Technological University – GTU, Ahmedabad, Gujarat.

DUBAI BUILDINGS UNLOCK up to 80% energy savings with simple pump swaps...

"I'm keen to say it was worth it. We changed to state-of-the-art equipment and achieved energy savings of 50-80%," says Vasileios Vatistas, Portfolio Manager, H&H Property Management and Development.

Sometimes, it takes something as simple and concrete as unhappy tenants to connect the dots between how to fix one's own building and your government's goals for improving buildings' energy use.

The Dubai government aims to retrofit 30,000 of its buildings by 2030 to help reduce the city's energy demand by 30%. It is one of several major initiatives for saving energy and water in the United Arab Emirates. Given the rapid pace at which technology is advancing, the city now has access to solutions that enable such drastic savings in the buildings. After Dubai's major and fast growth over the past few decades, the need for those solutions has become more and more clear in recent years.

"This city was built very fast – but at the time, there wasn't a focus on quality design, quality construction, quality materials, operation and maintenance," says Charles Blaschke, founder and CEO of Taka Solutions –

"I'm really keen to say it was worth it," says Vasileios Vatistas, Portfolio Manager, H&H Property Management and Development, on the Grundfos Energy Check and Taka Solutions pump and chiller system upgrade at three buildings in Dubai.

an energy consulting company specialised in engineering, technology and finance optimisation for commercial buildings based in Dubai.

"And these big, beautiful buildings are mostly glass. In the desert, we're in an extreme climate. Dubai is sunny - 364 days a year. Rain is almost zero. It always has a very intense sun with solar radiation hitting the buildings. Glass buildings consume a lot of energy. At the time, energy was cheap, so people didn't focus on energy. They just wanted comfortable buildings. 'Let's put in a bigger AC system, a bigger pump system, to ensure that no matter what happens – fully occupied or not – let's make sure it's more than enough to keep the building cool.' So all over Dubai, the pumps and AC systems are usually much bigger than they need to be. They're not operating for maximum efficiency."

Indigo Tower's 'jet engine'

Indigo Tower is one of those buildings constructed in the rush and with a way-too-large AC system. It is a typical, mid-sized building around ten years old in one of Dubai's developments north of the city. It has eight stories of apartments. The pump room is on the roof – just over rooms 812, 813 and 805. The residents in those rooms particularly described the noise above their ceilings as "constant – like a jet engine."

Indigo Tower, Dubailand, Dubai.

"People were trying to live and sleep there – it's an apartment building. All they could hear was this loud, rattling noise that never went away," says Charles Blaschke. "Because of the AC demands in this hot region, AC literally runs 24/7, 365 days a year. There wasn't an hour of the year that they were comfortable and having issues with their experience in the building. There was a huge drive to solve this problem."

Indigo Tower's owner, H&H Property Management and Development, was also experiencing unusually high electricity costs at two of its other buildings, Green Tower (commercial) and Falcon Tower (residential), in the Deira District of Dubai.

Green Tower, Deira, Dubai.

Portfolio Manager Vasileios Vatistas suspected it also had to do with the pumping and chilling systems. This was when his company got in touch with Taka Solutions.

Grundfos Energy Check

Taka Solutions worked with Grundfos to determine the problems around the existing HVAC (heating, ventilation and air conditioning) pumping systems. A Grundfos Energy Check determined that the buildings were equipped with oversized pumps, inefficient operation and poor balancing in their constant, primary chiller systems. The pumps ran at constant speed. The Delta-T (the temperature difference between the supply and return chilled water) was only 1 degree Celsius – which in a building's chilling system means extreme inefficiency.

Grundfos recommendation

Grundfos recommended changing to close-coupled, end-suction pumps with variable frequency drives – intelligent NB-E pumps. These could provide the exact flow requirements to the chillers without wastage and improve the Delta-T to five degrees Celsius. A simple, turnkey solution.

"When we saw that the pumps in these three buildings – Indigo, Green and Falcon – were wasting energy, were vibrating,

were causing noise issues, weren't reliable and had savings potential, we saw this as a real winner and equipment to replace," says Taka Solutions' Charles Blaschke. And then Taka Solutions offered to replace the old pumps - for free.

"It's a fact that many people from our team were sceptical about this," says H&H's Vasileios Vatistas on the performance-based contract. But, it did not take long to understand how it worked. The energy savings would pay for the pump upgrade.

Solution

He says, "The idea is really simple" of the performance-based contract. "Taka Solutions has return on investment based on the savings that those buildings will perform. It's a win-win

How to monitor the Grundfos NBE pumps via a smartphone Grundfos GO app.

situation, because we get new, state-of-the-art equipment. We extend the lifespan of our assets. We can provide a better environment to our residents, which is really important for us in H&H. And Taka Solutions gets its money back from the energy savings over some years – depending on the agreement we have."

Immediate results

H&H saw results almost immediately. At Indigo Tower, the pumps previously used 36 kW every hour. After the upgrade, they used between 7-10 kW/h. Now two years in operation, they use 81% less electricity than previously. In addition, pump efficiency is not only better, but also the efficiency of the whole HVAC system. Actual payback time on the investment is just eight months.

"With everything we do, we're only paid from the savings we generate," says Charles Blaschke. "We have to ensure that a project is designed for the long term. Working with quality partners and equipment suppliers like Grundfos across our projects is key, because it gives us peace of mind. We know we can trust them. We know what they put in is right. It's going to be the right optimised solution. Not just today, but also tomorrow."

It's not hopes and dreams or something that's not feasible. It's right there, and it's very simple to achieve.
– Charles Blaschke, founder and CEO of Taka Solutions.

Outcome

The numbers on the other two building retrofits in 2018 tell similar stories. Falcon Tower cut its pumps' electricity consumption by 46% and Green Tower cut its use by 57%. Overall, the buildings cut their total energy savings – including that from chillers, ventilation and lights – between 20-25%.

"I'm really keen to say that it was worth it," says Vasileios Vatistas. He adds that not only was it worth it for his company, but the residents in all three buildings are experiencing more comfort. And the eighth storey rooms below the pumps at Indigo Tower? All is now quiet – no more complaints.

The potential for similar retrofits in Dubai is enormous. "It is important to focus attention on the massive contribution that retrofitting old and inefficient pumps will make to meeting Dubai's 2030 vision of a 30% reduction in water and energy consumption," says Charles Blaschke. He adds that pump retrofits also contribute

Green Tower's new HVAC pumps are using 57% less electricity for keeping the office building cool than previously after the building retrofit.

toward the UN's Sustainable Development Goals SDG6 and 13 – water and climate.

"It starts with one building. One building at a time," he says. "We see these buildings as locked potentials of value. Energy savings, carbon savings, money savings – they are all sitting in these buildings almost untouched and untapped.

"He says the "pay as you save" business model, allowing building owners to retrofit their HVAC systems at no capital cost, is the incentive to unlock the long-term value in their buildings.

"All we need to do is get to them and almost open the valve," he says. "It's not hopes and dreams or something that's not feasible. It's right there, and it's very simple to achieve." ■

QUALITY COOLING AND SUSTAINABLE PERFORMANCE

A newly constructed refrigeration system with 10 walk-in cold stores and freezer rooms distributed across 19 floors at Hotel Alsik in Sønderborg, Denmark.

Construction of the hotel Alsik, which features restaurants and spa areas, was part of a larger project involving Sønderborg's waterfront, that opened its doors last year for the first time, with the hotel supporting the town's vision of being CO_2 - neutral by 2029.

Focus on sustainability and high quality

From the cellar to the attic space, Hotel Alsik used materials of the highest quality. Alsik is also acting as a showroom for the special Clean Tech expertise of the companies in the Sønderborg area. One of them is BITZER.

Refrigeration system

The refrigeration system, which is based in the cellar, provides cooling for 10 different cold stores and freezer rooms across different locations. The system includes ten **Bitzer Ecoline** semi-hermetic reciprocating compressors with water-cooled shell, and tube condensers from the Bitzer K-3 series. Together they ensure the correct temperatures in the various kitchens, cold stores and freezer rooms of the hotel. The solution also provides high performance refrigeration capacity and low energy costs.

The design of the compressors allows for the use of low-GWP **refrigerants like R449A and R513A**. Components were supplied by wholesaler, H. Jessen Jürgensen A/S and fitted by the Climate A/S.

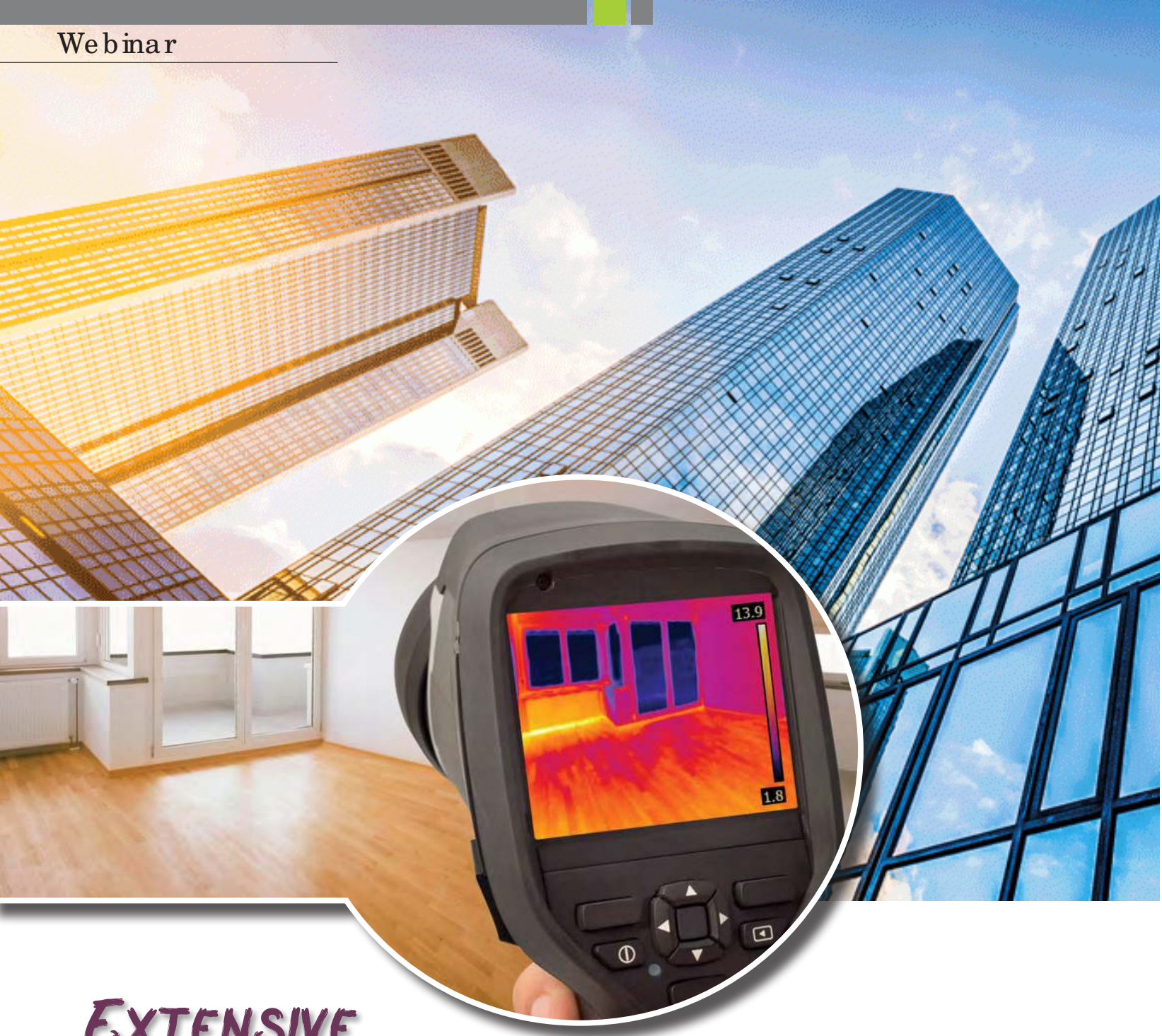
Jessen Jürgensen sales engineer, Carsten Pedersen said, the focus of the project was on sustainability, quality and performance and as a refrigeration wholesaler; it's a pleasure for us to work with customers like Climate who appreciate the value of our technical support and product specialists.

Hotel Alsik facility manager, Michael Kurth, daily supervising all the cold stores and freezer rooms, which also includes several wine cabinets in both the cellar and on floor 18, said, "The refrigeration system has worked well from day one, we haven't experienced a single complication."

Climate sales manager, Jørgen Ludvigsen, states, the system's design will also make it easier to troubleshoot in the future. The way in which the system is designed, constructed and positioned means not only does it look great, but it is easier for our technicians to provide the correct service.

End result

At the moment, heat is transferred from the closed refrigerating circuit to a free cooler. In the long term, Hotel Alsik is planning to exploit this heat and make use of it in a heat pump for domestic hot water or space heating. ■



Extensive methods to measure building leaks

The webinar presentation highlights the importance of detecting building leaks, methods used to detect the leaks and its pros and cons.

Recently, a webinar was organized, by TightVent Europe and AIVC on 'Better Quantifying and Locating Building Leakages'. The panellist for the webinar were, **Martin Prignon, UCLouvain, BE; Vitor Cardoso, FEUP, PT and Benedikt Kölsch, DLR, DE.** Each panellist presented a technical presentation on existing methods to measure the airtightness of individual buildings components.

Martin Prignon, UCLouvain, BE said, "The consequences faced by building

occupants due to infiltration has an impact on energy health and comfort of the residents. The research in airtightness focused on energy results in a tremendous increase in several pressurization tests or blower door tests which helps improve airtightness, develop a national database and guidelines for architects and contractors on how to build airtight buildings."

Martin added, "However, the fact that we promote fan pressurization test also had a couple of setbacks because the fan pasteurization test reports airtightness of 50 pascals. Assuming that leakage is uniformly distributed along the envelope. The problem here is that the consequences and the amount of filtration depend on leakage location and distribution."

He further explained the Quantification of Building Component Airtightness and its pros and cons as follows:

Numerical models - Airflow estimation through the development of fundamental equations of fluid mechanics.

PROS

- No planning constraints
- Easy interpolation of models
- Transferrable to larger models.

CONS

- Representation of reality
- Validation work needed
- Lack of crack data.

Laboratory testing - Measurement of $\Delta p - q$ relation of the component in a highly controlled environment.

PROS

- No planning constraints
- Control of variables
- Visualisation of the component.

CONS

- Not "real configuration": Component alone and No dust, enough space, etc.

In-situ testing - Measurement of $\Delta p - q$ relation of the component directly on site.

PROS

- Real configuration (i.e., includes workmanship quality).

CONS

- Planning constraints
- Uncontrolled environment.

Vitor Emanuel Martins Cardoso, Doctoral Program, Civil Engineering presented a technical presentation on the uncertainty of effective leakage areas determination-reductive sealing technique. He also explained three different regression models, OLS – Ordinary least squares, OLS Uncertainty – Ordinary least squares uncertainty and WLOC – Weighted Line of Organic Correlation, their application and best practices.

Vitor said, "Dealing with air filtration besides weather, terrain and shielding data building details and ventilation strategies are important in modelling exchange rates, air movements, energy demand and this all make part of a decision and provide feedback to these variables."

Effective leakage areas data is received, from the treatment of tightness measurements with fine pressurization. It represents the area of single orbitals that produce the same leakage as a group of leakages at the reference pressure difference. It is dependent on airflow, pressure difference and temperature. The typical form of expressing air leakage characteristics of building components or whole envelopes available extensively in ASHRAE and AIVC documentation repeated measurements and compilation of laboratory and in situ experiments. Results using ordinary least squares regression in the airflow and no propagation of uncertainty in incremental sealing.

Vitor added, "Reductive sealing LFC Offsetting results from blower door tests to attain the performance of individual elements or groups." For example, the French database has 46 subcategories of leaks.

Martin explained the equation of Direct testing of building components with the help of an experimental setup. The direct component test measures in-situ n and C values of building components with high reliability (between 3% and 10%, depending on the chamber design).

But they must be replicated when measuring multiple components, it requires different pressure chambers depending on the component measured and uses another equipment than the fan pressurisation test. The application promises guarantee of a good installation, intermediate testing earlier in the construction process and improved databases with reliable in-situ values including n.

Benedikt Kölsch German Aerospace Center (DLR) – Institute of Solar Research Jülich, Germany discuss a new method for the single air leakage evaluation.

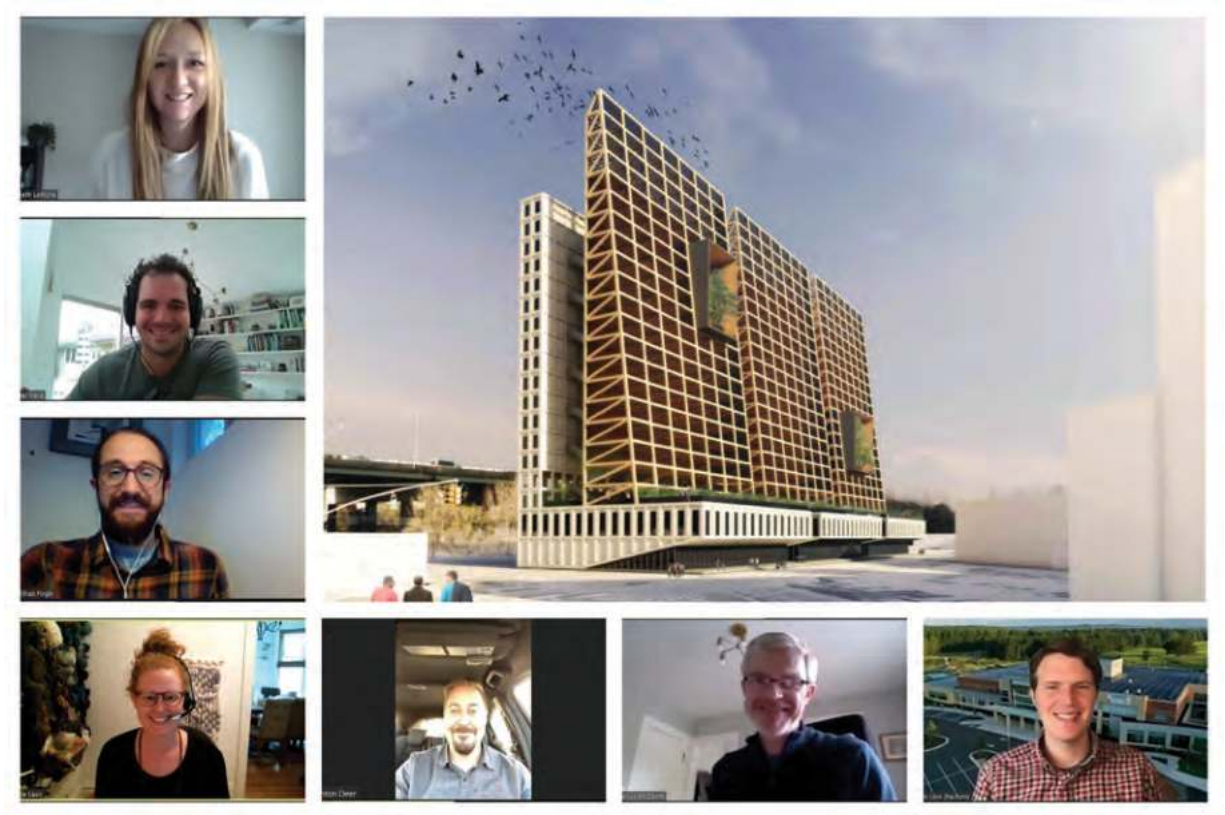
Benedikt said, "Uncontrolled airflow leads to increase consumption of heating and cooling energy. The most prominent method of measuring airtightness is Blower door test which has three purposes measuring air leakage in buildings, comparing relative airtightness of different buildings and determining the reduction of air permeability. But leak detection is time-consuming and expensive depending upon the inspection who's doing the measurements and quantification of single leaks is very cumbersome in buildings. So, we are going to implement to investigate supplementary methods for the leak quantification but we will still have these broader tests as a subsequent, analysis and as a comparison in this presentation."

Using Acoustics-

Sound takes predominantly the same paths as air in the fan pressurization method. So, it can be applied while the building is in use, independent from pressure or temperature differences and microphone arrays may localize leakage spots. He explained the same with a laboratory test apparatus in which 43 different leak configurations were tested identifying the distinction between different leak sizes possible. Its analysing the potential for localization of leaks using acoustics. ■

Congratulations to 2020 ASHRAE LowDown Showdown Winners

The 2020 LowDown Showdown modeling competition was held virtually for the first time in conjunction with the virtual 2020 Building Performance Analysis Conference and Simbuild co-organized by ASHRAE and IBPSA-USA. This year's competition took a page from New York City's new Climate Mobilization Act that requires building owners to reduce their carbon footprint.



Aequitas Team Poster

Design teams considered carbon emissions of the utility grid in 2025 and 2050 to estimate the carbon emissions now and further into the future and the impacts of future climate conditions. Participating teams designed 300,000 sq.ft., 15 story mixed-use building located in the five boroughs of New York City. The building contained retail space, residential space and a full-service restaurant. Teams were evaluated in six categories: Carbon Neutral Approach/Energy Use; Creativity; Innovative Approaches; Sustainability/Durability; Indoor Environmental Quality; Workflow and Teamwork.

First Place: Aequitas

First place was awarded to team Aequitas for designing a net-zero-energy building that balanced contextual neighborhood cues and functional performance. Aequitas, an integrated architecture and engineering team, approached this mixed-use building with the aim of designing a Net Zero Energy building with a holistic and integrated approach to sustainability and resilience. It aims to minimize embodied carbon, enhance community assets and resources and achieve long-term resiliency in the face of increasing temperatures and extreme storm events. Elizabeth LeRiche, team captain stated that the residents and neighbors can gather in outdoor green spaces and community gardens, fostering bonds through a shared appreciation of food production and our connection to collective impact on the environment.

Second Place (Tie): Carbonbusters

Second-place team, the Carbonbusters, chose an adaptive reuse design strategy restoring a brick power plant that had been abandoned; with a focus on energy efficient construction and locally sourced materials. The site is within walking distance from the subway, Prospect park, and Whole Foods, adjacent to the Gowanus canal, offers opportunities for resiliency, electrical and thermal energy production, and connectivity to the rest of the city.

Second Place (Tie): Parametric Posse Recharged

Also receiving second place, Parametric Posse Recharged team focused on using parametric design tools to strategically enhance the performance of the building type with respect to climate response, energy efficiency, carbon mitigation and occupant well-being. The mid-rise residential tower with ground floor commercial space ubiquitous is in New York City. Throughout the design process, they examined performance enhancement at 3 scales: apartment unit, floor plate, and the whole building.

Fan Favorite: Carbon Lighters

Fan favorite team, the Carbon Lighters, followed a tiered design process on a 41,860 sq.ft., fast food chain drive through building. The site at 57 Empire Boulevard in Brooklyn, adjacent to Prospect Park, is approximately 41,860 sq ft., and is currently underutilized by a fast food chain drive through building. All decisions were based on environmental performance analysis at every step.

Finalist: C.R.E.A.M. (Carbon Rules Everything Around Me)

Throughout this century and beyond, New York City will face unprecedented challenges from the anthropogenic climate crisis, and many of the city's most underserved communities will be disproportionately burdened by climate impacts. Due to residents' age and income, as well as the area's tree coverage and extent of hardscape, Bronx Community District 3 (BX3) is flagged as a high heat vulnerability area.

Finalist: NetCarbon.IN

The ASHRAE LowDown Showdown competition of designing a carbon-neutral building is captivating. The site is supposed to be in New York. The competition focusses on carbon neutrality.

John Bynum, competition chair said, "Each year of the LDSd competition, we ask participating teams to take on a new challenge in building performance analysis. The teams presented outstanding ideas for designing a new building that has a low carbon or carbon neutral footprint, this year's challenge." LowDown Showdown engages architects, engineers, designers and energy modelers by working on integrated teams in the creation of outstanding designs that solve in real-world building efficiency challenges.

The competition results were announced during the virtual conference. ■

Controlant honored with 2020 Icelandic Innovation Award

Controlant has been named winner of the 2020 Icelandic Innovation Award, at Iceland's Annual Innovation Congress during November 2020. The award recognizes pioneering Icelandic companies that have developed clear visionary and transformative ideas. It emphasizes relationship between research, innovation, and knowledge.

"Innovation has become a major theme for Icelandic organizations across virtually all industries. This year's recipient is a testament to the creativity, passion, and perseverance of high-performing teams," said Karl Guðmundsson, Chairman of the Jury, Director of Trade and Invest at Promote Iceland.

Gisli Herjolfsson, Co-Founder and CEO of Controlant remarked about team's hard work in making Controlant's solutions indispensable to our customers and to the supply chain industry. He added, our growth journey exemplifies the importance of increasing visibility and safety throughout the pharmaceutical and food supply chain, to deliver critical vaccines, medicines, and food products that have a material impact on people's lives and reduce environmental waste."

The Icelandic Innovation Award is presented annually by Rannís, the Icelandic Center of Research, Promote Iceland, The Innovation Center of Iceland, and the New Venture Business Fund. Controlant's Cold Chain as a Service solution provides proactive farm-to-fork supply chain visibility. ■

Danfoss India Into Atmanirbhar Bharat Mission Mode

Danfoss Industries Pvt. Ltd., announced its furthering the presence of its Drives segment in India, to further its localisation and support GoI's mission towards an 'Athmanirbhar Bharat'. The Danfoss Group has made significant investments to the tune of INR 1000+ crores in last six years, to further the company's commitment towards **strengthening its local manufacturing** and powering its capabilities towards India-focussed R&D and innovation. Since the company began its independent operations in India, Danfoss India has quadrupled its localisation efforts in terms of production and supply chain capabilities and projects 90% localisation by 2022.

Speaking on Danfoss Global Drives business, **Vesa Laisi, President, Danfoss Drives** said, "At Danfoss Drives, we are focussed on generating value from our decades of experience to help drive the sustainability goals of national and international governments, in a bid to help engineer a better and more sustainable future. Backed by a strong understanding of the global megatrends that are powering the world's economic and social growth, we aim to push the boundaries of technology by innovating solutions to tackle climate change, helps cope with rapid urbanisation and helps improve standards of living among the citizens of the world. "

By 2025, it is estimated that more than **5 billion people** will benefit directly or indirectly from the value added by Danfoss Drives globally in their everyday lives. Additionally, the current installed base of drives is estimated to help to save the annual equivalent of 60 hours of global energy consumption.

P L Palanisamy, Director – Danfoss Drives, Danfoss India says, with wide-spread adoption of our drives across key Indian industries, we have strengthened our resolve to make our Danfoss Drives business self-reliant where ~80% of our supplies are produced from India campus with an increasing focus on building a local supplier base and enhancing process innovation for our customers in India.

Expands production at its Chennai campus

Danfoss' current investment allows for further expansion (since August 2020) for the assembly of the FC51/FC360 range of drives to cater exclusively to the Indian market and further expand the P600 manufacturing line in the coming months. The new range of drives will create a significant impact towards improving energy efficiency and maximising energy productivity. The latest additions to the drives portfolio to assemble in India will drive up the percentage of sales of 'Made in India' drives to over 80%.

Today, Danfoss Drives' India Design Center serves as a hub for Global High Power Designs, Application Development Center and Product Engineering Center and Center of Excellence in heavy industries. With a steady focus on building a strong Global R&D & Engineering function, Danfoss India enhances the product testing capabilities at global standards and increase the speed of innovation.

The 50 Acre Platinum rating Danfoss' Chennai factory at Oragadam is equipped with two state-of-the-art assembly lines for drives, full load & Harmonics testing facility up to 1MW including EMC labs. Since March 2020, with the implementation of the nationwide lockdown, Danfoss India's select production lines have already been ramped-up to 100% capacity, a sizeable portion of the staff continues to work from home. Danfoss has ably leveraged its digital capabilities.

Ravichandran Purushothaman, President, Danfoss India states, "Danfoss India commitment to India has been unwavering from the start and the recent increase in India investments of our Drives segment reinforces this commitment. The added step towards increasing our production lines is a testament to our success story in addressing the needs of our customers and the industry during these trying times. We remain steadfast in our journey towards complete localisation and stand in solidarity with the centre's clarion call for 'India for India' and the 'Aatmanirbhar Bharat Abhiyaan'."

Currently, the final products of its India campus are also exported to markets such as US, Middle East, ASEA regions.

For sustainability, **company has committed to reduce the company's energy intensity by 50% and double the company's energy productivity before 2030** – both measured against the base year of 2007. It is also set to change its company car fleet to become all electric latest by 2030. In the coming years, Danfoss also aims to implement numerous measures to further reduce energy consumption and drive greener technology investments in its buildings and processes. ■

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HVAC DUCT SYSTEM CLEANING

'THE LUNGS OF A BUILDING'

It is extremely important for air delivery systems to be clean and efficient Poor air quality caused by issues with the building's HVAC systems is frequently cited as a major contributor to sick building syndrome.

Sick Building Syndrome

In a commercial environment, it is extremely important for air delivery systems to be clean and efficient, delivering pure, clean air to everyone in the building. Studies have proven that indoor air can be several times more polluted than outdoor air. Poor air quality caused by issues with the building's HVAC systems is frequently cited as a major contributor to sick building syndrome: a medical condition in which multiple occupants of the same building suffer from health problems, linked directly back to time spent within the building. Sick building syndrome can be caused by several things, including contaminants and poor building ventilation.

Value to its occupants

This means that duct cleaning and air purification

services can be of tremendous value to a business and its staff, helping to improve workplace efficiency through the overall health of the workforce.

The current COVID-19 pandemic has increased the awareness of improving indoor air quality. It has brought into focus the spread of virus, bacteria and other pathogens in living and working spaces and the risk they pose for employees, workers, residents and consumers. In this situation, we cannot stress enough the importance of cleaning the ducts of air conditioning systems.

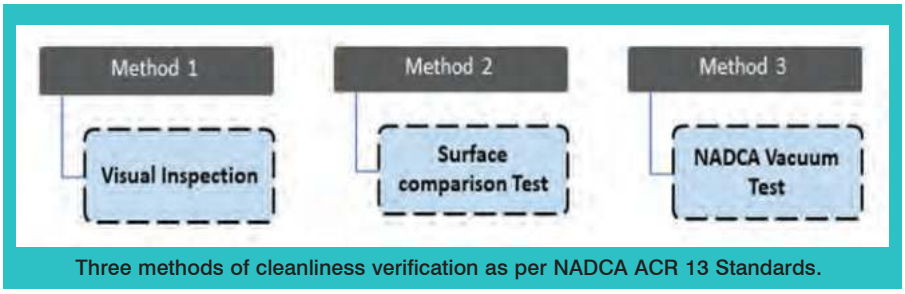
Duct Cleaning & Standards

Duct cleaning helps eliminate bacteria and particulate debris which form inside ducts over a period of time. Regular duct cleaning ensures that the occupants breathe clean and pollution-free air. The National Air Duct Cleaners Association (NADCA) and many other global associations recommends that the complete HVAC system should be cleaned to prevent re-contamination.

NADCA ACR 13 Standards

The NADCA Standard for Assessment, Cleaning & Restoration of HVAC Systems is the internationally recognized industry standard for HVAC cleaning and restoration. **NADCA ACR 13 standards has five sections namely -**

- Inspection
- Work Plans
- Engineering Controls
- Cleaning And Restoration Procedures
- Cleanliness, Verification And Documentation.



Three methods of cleanliness verification as per NADCA ACR 13 Standards.

NADCA ACR 13 Standard provides practical, reliable and Industry-backed information for-

- Assessing new and existing HVAC systems.
- Evaluating & verifying the cleanliness of HVAC system components.
- Guiding the cleaning and restoration of HVAC systems to a specific level of cleanliness.
- Helps determine the need to clean.
- Helps you to have a clear scope of work.
- Provides protocols to protect the safety of building occupants & prevents cross contamination.
- Helps you understand proper cleaning procedures.
- Provide quantifiable methods for verifying cleanliness.

Determining need to clean

It is recommended that HVAC systems be cleaned when one or more of the following conditions exist in the HVAC system.

- Contaminated with an accumulation of particulate;
- Performance is compromised due to contamination build-up;
- Has been determined to be source of unacceptable odors;
- Discharging visible dirt or debris into the conditioned space;
- Has been contaminated as a result of fire, smoke or their byproducts;
- Has become contaminated with construction dust and/or other debris;
- Mold contamination conditions have reached Condition 2 or 3;
- Deterioration of fiber glass duct liner, duct board or other porous components.

New dynamics of IAQ

With the advent of the HVAC system, new IAQ dynamics was born and these lungs of the building had to be cleaned in a safe secure manner. Industry professional got together and formed an association and the first standards of HVAC Duct Cleaning were created.

The need for cleaning may arise when the HVAC system operation has resulted in the build-up of particulate and debris which may adversely impact the indoor environment and performance of the system. In such cases, the HVAC system will require cleaning activities beyond those performed in normal HVAC mechanical maintenance and servicing.

Standards safety seal at EPSCO India (Environmental Protection Service Company India Pvt. Ltd.)

EPSCO India is a certified member of NADCA. Thus, strict guidelines and standards set by NADCA are followed by us for all our services. Its Air System Cleaning Specialist (ASCS), certified by NADCA, renders efficient service every single time regardless of the complexity of the project. Its service technicians have immense knowledge of the tools and tackles.

EPSCO INDIA proudly adheres to and has evolved as a company by getting itself certified and regularly audited as per ISO 9000/14000/45000. These are tools to assist business and government to ensure the quality and processes of services, and to manage the impact of their activities on the environment. Having a documented quality procedure gives

Benefits of HVAC System Cleaning.

EPSCO INDIA a strong advantage over its competitors. For example, it guides to build quality and standardization of service and avoid costly after-the-fact inspections, warranty costs, and rework and legal liabilities. Our services are always carried out by professionals, with the right tools and training for the job as it is vital to ensure that HVAC systems are cleaned to a professional standard. We conduct IAQ audits of commercial and office buildings to discover levels of VOC, CO2, mold, bacteria, PM2.5, PM10 and other polluting components in the air and build a report highlighting solutions to reduce them to appropriate levels by adopting most appropriate solutions.

HVAC duct cleaning services from EPSCO INDIA carries in-house capabilities, knowledge and expertise as one of India's largest air duct cleaning and HVAC cleaning company. Made up of professionally trained HVAC specialists, it utilizes advanced technology, industry-leading methods, and effective techniques, creating a customized cleaning plan for its prestigious clients.

Our specialists are trained and certified for all commercial duct cleaning needs, providing comprehensive indoor air quality and HVAC duct cleaning services, with the benefits as below:

- Enhances the air quality,
- Improves overall air circulation,
- Removes unpleasant odors,
- Eliminates built-up contaminants,
- Extends the life of heating and cooling systems.

EPSCO INDIA team makes use of state of- the-art sensors and reporting software to identify pollution levels in the specified building / office premise by conducting walk through audit of the space and by capturing data of pollution causing substances in various part of the building.

We also possess capabilities to handle hazardous containment zones in cleaning process. We are trained and certified as per AHERA (USEPA), Niosh and Nibosh. We have handled large Asbestos, Lead and Mercury abatement jobs.

Our team are also equipped and trained to handle Flood and Fire Restoration jobs. We are equipped to do structural Drying of buildings and smoke damage restoration We are constantly upgrading our knowledge and technology to be the leaders of environmental restoration in region.

The way forward - EPSCO

In future, we intend to get in to soil remediation and water treatment too.

As we are already into IAQ audits and solutions, in line with the same we intend to soon launch an IOT project for indoor environment monitoring 24x7. This will help us provide better and timely solution to environmental restoration. Our key differentiator is that our qualified consultants and HVAC engineers with extensive experience of designing, operating, maintaining and optimizing heating, ventilation and air conditioning systems, with in-depth knowledge of indoor air quality best practices, testing, monitoring, analysis and improvement. We just not only identify which key parameters are outside of guidelines/best practice limits, but also determine the root cause and develop engineered solutions to rectify these, which significantly improves the IAQ and occupant satisfaction with the indoor environment.

Indoor Air Quality solutions specialize in getting to the root causes of any indoor air quality issue and has the experience to define a detailed and effective scope of work to mitigate any identified problems.

Good indoor air quality is an important component of a healthy indoor environment, which contributes to productivity, comfort, and a sense of health and well-being at the workplace. ■

Suhel Parker
CEO – Environmental Protection Service Company (India) Pvt. Ltd.

EFFICIENT ENERGY'S LARGER-CAPACITY WATER-ONLY eCHILLER120

Efficient Energy, the German manufacturer introduces a new chiller with a 120kW (34.1TR) cooling capacity suitable for industrial cooling and using only water (R718) as refrigerant.

The eChiller120 model is suitable for process and machine cooling applications like laser heads, rollers and cooling basins; it can also be used for technical air conditioning of data centers and server rooms. The eChiller is equipped to produce chilled-water temperatures between 16°C (61°F) and 22°C (72°F).

Georg Dietrich, Efficient Energy GmbH's CEO and MD said, "Our eChiller is the only series product worldwide that works with water as a refrigerant and therefore does not generate any direct CO2 emissions." The eChiller120 will complement Efficient Energy's current range, which includes 35kW and 45kW (10 to 12.8TR) R718 chillers. Those units can be combined and scaled up to 300kW (85TR).

The eChillers are suitable as standalone systems. They can also be connected to existing coolers, and for example do subcooling for transcritical CO_2 systems. Efficient Energy, based in Feldkirchen, is ready to take orders for the new eChiller120, and expects to begin delivery in the summer of 2021. The new eChiller120 is up to 82% more energy efficient than conventional chiller systems, Efficient Energy said in a press release announcing the launch.

The company said, in the last six years, the company has implemented around 25 data center projects with eChillers in major data centers like British Telecom, a London-based telecommunications and broadband provider. ■

PROPANE-OPTIMISED CONDENSER FROM ALFA LAVAL

Alfa Laval expands heat exchanger portfolio introducing CB24, an efficient, low-charge propane (R290)-optimized condenser. It is designed to combine low refrigerant charge and increased heat transfer efficiency, hence lowering the carbon footprint. The model is suitable as both evaporator and condenser for heating and cooling applications, including commercial refrigeration display cases, ground source heat pumps, satellite systems for tap water, etc.

Fredrik Ekström, President for Business Unit Brazed & Fusion Bonded Heat Exchangers, Alfa Laval said, "The aim of CB24 has been to solve these challenges for some of the heating and cooling duties where the ability to use R290 will become increasingly critical. We did this by adapting some of the unique innovations Alfa Laval has developed through our long experience in these applications. This has given us a dedicated condenser that successfully accommodates the refrigerant charge limitations of working with propane, without sacrificing thermal performance."

Patented FlexFlow plate design

The CB24 is created using Alfa Laval's patented FlexFlow plate design technique that makes it possible to increase turbulence and optimize the pressure drop to each particular application, thereby increasing the overall heat transfer efficiency while using a lower charge.

PressureSecure design

CB24 also features Alfa Laval's PressureSecure design. This "optimizes the relationship between thermal, mechanical and material properties to support pressure loads associated with R290," according to the company's website. The overall result is a robust heat exchanger, especially around the port areas.

Thermal efficiency

The new unit can reduce the number of condensers in a retail display case from three to one. with CB24 only one unit is necessary due to the increased efficiency according to Alfa Laval sources. Ekström adds, the results are equally positive for geothermal applications. We have already installed our first CB24 condensers in a GSHP system in southern Europe. With CB24, the possibility to improve thermal efficiency will also create new opportunities for energy savings for customers.

CB24 easily meets the strict regulations for some commercial refrigeration applications, which limit a propane charge to 500g, said Ekström, adding that CB24 can even fulfill the stringent requirements for GSHPs, which in Europe are limited to a refrigerant charge of just 150g. ■

UPCOMING EVENTS

CHINA REFRIGERATION 2021
Location: China
Contacts: xuelongyun@biec.com.cn, kanglu@biec.com.cn

07-09 April 2021

13-15 April 2021

REFRIGERA 2021
Location: Italy
Contacts: +39-02-66306866

HVAC R EXPO SAUDI 2021
Location: Saudi Arabia
Contacts: dmgdubai@dmgeventsme.com

24-27 May 2021

15-17 June 2021

REVAC EXPO & FORUM 2021
Location: Malaysia
Contacts: +91 22 6172 7000

EXPO FRIO CALOR ARGENTINA 2021
Location: Argentina
Contacts: info@ccs.com.ar

17-19 June 2021

10-12 November 2021

HVACR VIETNAM 2021
Location: Vietnam
Contacts: ryan.nguyen@informa.com

A FREE SUPPLIER WEBINAR FROM CARRIER
02 FEBRUARY 2021
Time: 2 p.m. ET
Organazier: ASHRAE

ASHRAE 2021 ANNUAL CONFERENCE
09 - 11 FEBRUARY 2021
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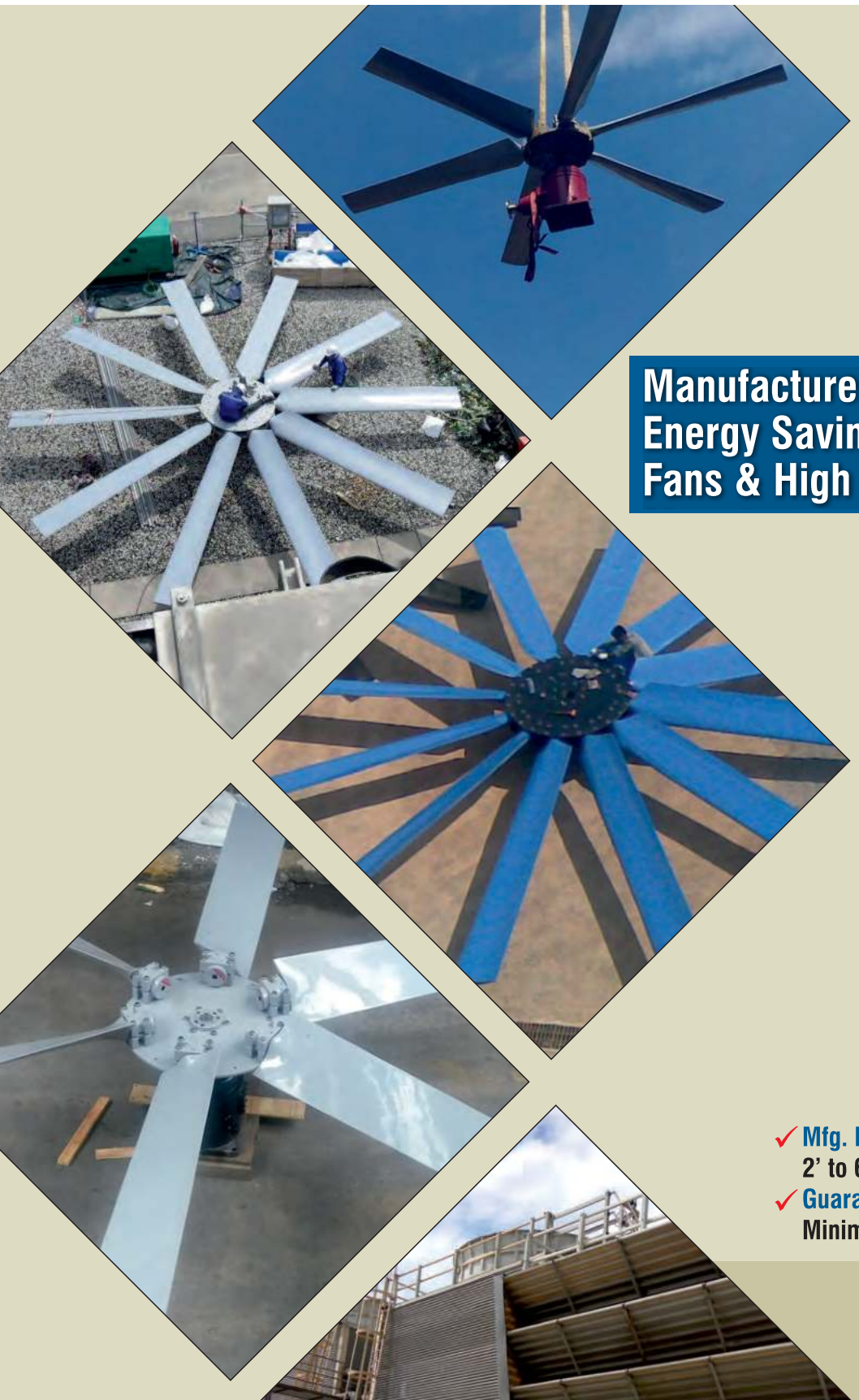

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