WHY THE REINVENTED AERMEC MODULAR CHILLER IS TRANSFORMING THE INDUSTRY

An Executive Q&A with:

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- Jim Chaters, Manager of Aermec North America

1. What do chillers do and how do they work?

A chiller plant is an HVAC system that removes heat from a liquid via a vapor-compression or absorption refrigeration cycle. This liquid can then be circulated through a heat exchanger to cool equipment or another process stream, such as air or process water. As a necessary byproduct, refrigeration creates waste heat that must be exhausted into the environment or recovered for heating purposes to improve efficiency.

2. What challenges exist with conventional chillers in New York City?

Current chiller-plant options in New York City pose serious challenges to building owners, engineers and contractors alike. These include:

- **Difficult to install in tight spaces:** In New York City's buildings, space is a rare commodity when it comes to fitting in a conventional centrifugal chiller. Hallways are tight, doors are narrow, freight elevators are the same size as non-freight ones, HVAC mechanical rooms are small and sometimes even a subway line will cross through the building. This makes installation difficult, costly and time-consuming for large, traditional chillers since walls have to be removed and replaced, leading to massive construction efforts and costs.
- **Redundancy takes up valuable space:** Proper redundancy for a centrifugal chiller means that an entire second chiller of the same size needs to be installed in case the first one malfunctions. For example, if a large 300-ton chiller is installed, a second 300-ton chiller also has to be there ready to run in case the first one fails. That takes up a lot of extremely valuable floor space.
- **Expensive and complex to maintain:** If a centrifugal chiller has a problem and needs maintenance, then the entire unit has to be turned off and the whole system needs to be looked at to pinpoint the issue. This makes the maintenance process costly, time-consuming and tremendously disruptive for building operations.
- **Noisy and inconvenient:** Centrifugal chillers make an incredible amount of noise, which means they can only be installed far away from any spaces inhabited

by occupants. This is particularly challenging when the building has an outdoor space, such as a roof deck or patio, since a centrifugal chiller can't be installed close by to such an area. This adds to the inconvenience of installation.

- **Wasteful and polluting:** By 2050, the world is set to use more energy for cooling than heating due to a predicted 33-fold increase in global power consumption for cooling purposes.[1] Conventional chillers are key contributors to this energy increase because they are inefficient and burn an excessive amount of fossil fuels to run, thus releasing harmful carbon emissions into the atmosphere.

There's a better way forward – the reinvented Aermec modular chiller.

3. Why is the reinvented Aermec modular chiller transforming the HVAC industry?

A more innovative alternative to conventional centrifugal chillers exists – one that is easy to install, takes up less total-installed space, simple to maintain, is quiet, offers greater flexibility and maximizes efficiencies. This better option is the Aermec modular chiller plant, which was reinvented based on specific design recommendations provided by HIGHMARK so as to create a chiller that would excel in New York City's demanding conditions.

The Aermec modular chiller is a small-tonnage chiller plant that connects and operates in a series to make up a larger chiller. It can overcome the challenges faced by conventional centrifugal chillers in New York City for the following reasons:

- **Easy to install in tight spaces:** Aermec modular chillers come together to form one larger chiller, which means each module is compact and has a small footprint. As a result, individual modules can be rolled through standard New York City doors and into regular elevators. Once all the modules have passed through the tight spaces and reach the installation destination, they can either be stacked or placed side-by-side or front-to-back, depending on the dimensions of the installation site. This means that walls don't have to be taken down since the modules fit easily through the tight spaces that are available and conform to the space available. As a result, modular chillers can utilize spaces that wouldn't be used in the past for centrifugal chillers.
- **Takes up less total-installed space:** The beauty of the modular system is that for redundancy purposes, instead of having to install an entire full-size second chiller – like with a centrifugal chiller – it's only necessary to install one extra module, which is compact and takes up minimal space. This means that the second 300-ton centrifugal chiller required in a conventional-chiller scenario can be replaced by a 30-ton modular chiller, while still fulfilling all redundancy requirements.
- **Simple to maintain:** Maintenance is simple on a modular chiller since any issues that arise can be pinpointed to a single module without having to look at the entire

[1] Jon Henley, "World set to use more energy for cooling than heating," The Guardian, October 26, 2015, https://www.theguardian.com/environment/2015/oct/26/cold-economy-cop21-global-warming-carbon-emissions.

plant. Additionally, because of the way the chiller modules are connected, when one needs work done on it, the whole system doesn't have to be taken offline. This ensures uninterrupted operations during maintenance, unlike with a conventional chiller.

- **Significantly reduced costs:** Serious cost savings add up when using an Aermec modular chiller. Construction costs are minimized since walls remain intact and debris doesn't have to be removed when the chillers are brought into the buildings. Installation is much easier and faster, which means fewer costs. Less total-installed space is used, which opens up valuable square footage for other uses that can generate revenue for building owners. Maintenance is quick and easy, which saves on upkeep expenses. This is good news for the building's bottom line.
- **Quiet operations:** The Aermec modular chiller was designed to be so quiet that the modules can be placed directly next to an outdoor patio area without any concerns of noise problems. This opens up many additional installation areas since noise concerns are alleviated.
- **Ultimate flexibility:** There's no other product on the market today that's as flexible as the Aermec modular chiller. This is because the modules are so compact that they can fit through standard doors and elevators, numerous installation configurations are possible, maintenance is a breeze and quiet operations enable the system to go almost anywhere in the building. This provides tremendous flexibility to engineers and contractors.
- **Energy and water efficiency:** With free-cooling capabilities, variable-flow pumping and low refrigerant charges, modular chillers are much more energy efficient, refrigerant efficient and water efficient than conventional chillers. This means that Aermec modular chillers meet and exceed New York City's most stringent energy codes.

4. What product options exist for the Aermec modular chiller?

Aermec offers two modular-chiller options that have been reinvented to meet the unique and demanding needs of the New York City market. These are the NYB Air-Cooled Modular Chiller and the WWM Water-Cooled Modular Chiller. These two systems have been designed to change the way chillers are installed, serviced and replaced in New York City and across the country.

Details for each product include:

Aermec NYB Air-Cooled Modular Chiller

The award-winning Aermec NYB Air-Cooled Modular Chiller is the industry's first modular air-cooled chiller to feature integrated free-cooling operation.

Inspired by HIGHMARK, the NYB is AHRI Certified and designed specifically to meet stringent New York City energy codes by maximizing free-cooling potential. The NYB's key benefits include:

- **Compact footprint:** Due to its small size, the NYB can overcome tight space constraints.
- **Easy to install and use:** The NYB fits easily through standard doors and into elevators, and Victaulic connections allow for fast installation. Operation is also simple.

- **Efficient and ecological:** The NYB is the only modular air-cooled chiller featuring integrated free-cooling operation to boost efficiency.
- **Green building certified:** The NYB is UL Listed and AHRI Certified to meet ASHRAE 90.1-2010 minimum efficiency levels.
- **Peace of mind:** Functionality and performance tests are conducted on each NYB module in a climatic test chamber to ensure ultimate reliability.
- **Quick servicing:** With accessibility provided at the ends of the unit, the NYB enables quick in-row servicing.
- **Uninterrupted operations:** During servicing, the NYB always maintains full operations.
- **Advanced user-friendly control:** The NYB's user-friendly microprocessor controller optimizes mechanical and free cooling.
- **Lowest noise levels:** The extremely quiet operation of the NYB provides a solution to sound-sensitive applications.
- **Multiply your benefit:** Multiple NYB modules retain a 100% free-cooling capacity without additional dimensions needed.
- **Award-winning design:** The NYB was named a 2017 AHR Expo Innovation Award Finalist for its cutting-edge design that challenges the HVAC status quo.

Aermec WWM Water-Cooled Modular Chiller

The Aermec WWM Water-Cooled Modular Chiller is small in size, flexible in terms of installation, simple to service, energy efficient and compliant with strict New York City energy codes. Inspired by HIGHMARK, it was designed to make it easier to install chillers, and it's the most compact and energy-efficient chiller on the market today. The WWM's key benefits include:

- **Compact footprint:** The WWM's footprint is half the size of its competition, thus enabling it to fit through standard doors and into elevators for simple installation. Its small size also frees up valuable square footage for building owners to utilize for boosting lease potential.
- **Easy installation:** Due to the WWM's modular design, installation can be adapted to suit specific development needs while guaranteeing improved safety and reliability.
- **Tremendous flexibility:** Unlike other products, the WWM has many flexible installation and layout options, including back-to-back, side-to-side, top-to-bottom or any of these combinations. This allows for as much cooling tonnage in a square foot as in a large centrifugal chiller. In addition, its modular design enables the cooling capacity to be easily increased over time and at a limited cost, thus furthering flexibility.
- **Simple maintenance:** The WWM is simple to service in tight building interiors, and the refrigeration components that need to be serviced are located in a drawer in the front that slides out for easy access.
- **Uninterrupted operations:** Operations aren't interrupted during servicing since a module can be worked on without impacting any of the other cooling in the plant.
- **Enhanced redundancy:** The redundancy realized with the WWM is exceptional due to all of the standard compressors.
- **Maximized energy efficiency:** The WWM is the most energy-efficient chiller in its class, while having the lowest refrigerant charge of any chiller on the market.
- **Free-cooling capability:** Working in conjunction with water-side economizers offers free cooling for a water-cooled system such as the WWM.
- **Compliant with strict energy codes:** The WWM is AHRI Certified and exceeds all ASHRAE 90.1 energy code requirements for chiller energy efficiency.

5. Why is the reinvented Aermec modular chiller that's designed for New York City relevant to all of North America?

New York City's buildings present some of the most demanding design challenges for modular chillers due to the tremendous space constraints and structural complexities that exist. Therefore, if a modular chiller can succeed in a New York City building, it can do well anywhere.

In fact, Aermec worked with HIGHMARK to design the NYB and WWM for the New York City market first and then to introduce the products to the rest of North America. Today, many NYB and WWM units are thriving in a variety of installations across North America.

6. Why is the Aermec-HIGHMARK partnership so effective in New York City?

In the New York City market, the HIGHMARK team knows exactly what technologies need to be implemented to increase building efficiency. They know what works and what should be avoided. Aermec shares HIGHMARK's passion for innovative building-efficiency technologies and for challenging the HVAC status quo. Both companies are committed to working together to achieve shared goals of increasing building efficiency and exceeding customer expectations.

For more information, visit HIGHMARK at www.highmark-ny.com and Aermec North America at www.aermec.us.