



# Mastering Data Center HVAC Challenges

The Brookaire Guide for Facility Managers & Technicians



# Data Centers Today

## An Intro for Facility Managers & Technicians

### What You Need to Know

**As a facility manager or technician with responsibility for data center facilities, you're working in an industry that is central to today's interconnected world**

During your day-to-day work, you'll be responsible for the upkeep and maintenance of just over 5,000 data centers currently operating throughout the USA. With an average size of 100,000 square feet (Techjury), these vital facilities account for 4% of global energy consumption and 1% of global greenhouse gas emissions. These significant numbers demand HVAC solutions that are up to the challenge - and we'll get into those challenges later.

For now, let's examine just some of the significant stats behind the industry you're in. Take a look...

#### Fastest growth rate

The 1st half of 2023 saw the largest amount of construction of data center construction in history (CBRE)

#### A massive spend

The energy application sector of the data center services market is projected to consume more than \$8 billion (Global Market Insights)

#### Employment opportunities

There are over 19,197 data center operators currently employed in the United States, with employment opportunities expected to grow significantly (Zippia)

#### American Leadership

The United States data center industry is valued at an estimated 99.97 billion (Techjury), with the US hosting 8 of the 20 largest data centers on the planet (Cushman Wakefield)

#### Market behavior

The top seven wholesale data center markets in North America are in the United States: Northern Virginia, Dallas / Fort Worth, Silicon Valley, Chicago, Phoenix, New York Tri-State Area, and Atlanta (CBRE).

### The Story Behind the Stats:

#### What it Means for You

Those are all big numbers. But what do they mean to the wider data center industry, and how can you expect these stats to change how you'll work as a technician or facility manager in the years ahead?

Before we get into it, consider this. In 2022, White House Office of Technology and Science Policy's (OTSP's) Climate and energy implications of crypto-assets in the US report recommended a number of legislative and regulatory initiatives in an effort to create a more environmentally friendly data center landscape, with complimentary legislation now in the pipeline.

**As a result, data centers will increasingly demand high-performance HVAC products and services now and into the future to keep up with changing regulations.**

That means more consideration of the importance of HVAC in your facility, and more expectations from the US government in terms of the efficiency of your systems and their wider environmental implications.

As a data center professional, you must adapt, upgrade and constantly update your air filtration and HVAC knowledge in order to remain functioning and compliant

Why? It's simple  
**your customers and wider US society demand it.**



# Data Center Challenges

## What Your Customers Expect

As the statistics we shared prove, your key stakeholders - including data center clients and US legislators - expect your approach to HVAC to be more considered and innovative than they would have in previous decades. Sustainability, cost-effectiveness and system performance are now at the core of what you need from your data center's HVAC systems. Below, we've highlighted just some of the challenges you must address:

### Energy Efficiency

Maintaining the correct temperature within a data center is necessary to ensure optimal performance, and HVAC systems play a key part in this. However, keeping data centers at the right temperature can be both costly and energy intensive. As a technician or facility manager, you need a HVAC solution that can mitigate these major challenges.

### System Longevity

Data center units represent a significant investment for any organization, and maintaining them properly is a bare essential - not only in terms of protecting data, but also in terms of ensuring the longevity of the system itself. It is for this reason that the data center market is increasingly turning towards HVAC solutions that offer more than just air quality benefits, standing up to the pressures of time and constant operation.

### System Performance

Downtime represents a significant threat to data centers, with your clients bearing the brunt of any potential system failure. This risk is heightened in circumstances where data center cooling systems are contaminated by dust, dirt and other pollutants. It is for this reason that data centers need HVAC solutions that are powerful enough to capture these pollutants, whilst also being efficient enough to maintain cleaner and more efficient heat exchange.

### Indoor Air Quality Concerns

Servers generate a lot of heat, which causes the surrounding air to become warm and humid. This can lead to mold and mildew, which can cause respiratory problems for people working in the data center. Indeed, this problem is only worsened by the harmful chemicals which servers can release into the air. Beyond protecting data center units, your choice of HVAC solution should also protect the staff who maintain them

### Component Protection

Data centers are filled with sensitive and valuable electronic equipment that requires a controlled environment to perform properly and optimally. Circuit boards, wiring, and intricate mechanical components can all be affected by airborne particles and contaminants which can cause problems if they get into these systems. If they do, these airborne contaminants can severely reduce operating efficiency, cause electronic interference and, in some cases, even lead to total system shutdown. With this in-mind, your HVAC solution should act as a line of first defense.

### Labor Costs

Ease of installation is a growing expectation among data center technicians and facility managers. This process should be straightforward, quick, and minimally disruptive. In addition, consideration of the useful life of a filter should be taken in an effort to reduce the number of changes required.

### Disposal Costs

Filters are typically bulky and can cost a lot to transport and dispose of. Opting for filters with a compact design can help reduce these costs.

## How Can You Meet the Demand?

As a data center technician or facility manager, the challenges you face are clear. With your facility's air filtration requirements growing year-on-year, you need to partner with vendors and rely on products that can truly step up to meet them head on. That's where we come in. Bringing decades of experience in the HVAC industry, we've carried out the research and designed the products and services you need to succeed. For each challenge, our products and services - including air filters - are the ultimate choice.

### Meeting the energy challenge

- Brookaire Air Filter experts can help you select the most Energy-efficient air filter for your data. Air flow resistance, target filtration efficiency and filter lifespan are all balanced when selecting the correct filter for a given application. This crucial balance directly impacts utility bills and the overall carbon footprint of a center.
- Brookaire's filtration media is made using nanofiber technology, allowing for optimal airflow efficiency, maximum filtration, and ensures filtration efficiency throughout the life of the filter. This cutting edge media ensures your data modules run more efficiently and consume less energy.
- Where energy costs are a significant concern, Brookaire's energy-efficient air filters represent an essential investment for cost-conscious and environmentally aware decision makers.

### Meeting the longevity challenge

- System reliability must be put first and a Preventative Maintenance Program is the best way to ensure maximum lifespan of HVAC units, as well as your data units.
- Missing a planned maintenance due to lack of time and resources is no longer an option, and your data clients want to know what you're doing about it.
- Prioritize your Air Filter efficiency or MERV rating. Choosing a filter with a higher MERV rating will ensure components stay free of dust and debris, ensuring HVAC systems run at optimal efficiency for long periods of time.
- Check for maximum dust holding capacity. Choosing an air filter with high dust holding capacity means fewer disruptions, less time invested in HVAC management, and ultimately, more cost savings for you and your customers.
- We ensure that our air filters withstand the test of time, providing a durable solution that aligns with the practical and economic realities of today's data centers

### Meeting the performance challenge

- ASHRAE 52.2 is a standard developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for testing the performance of air filters used in heating, ventilation, and air conditioning HVAC systems.
- Brookaire's air filters are designed in accordance with these standards and verified by independent labs, offering high-grade filtration that is crucial for maintaining a healthy, safe indoor environment in various settings.
- Our manufacturing process is bolstered by decades of experience and innovation. Our range of filters provide a strong line of defense against airborne contaminants, diseases and more.

### Meeting the domestic preference challenge

- Data center decision makers generally prefer a HVAC product manufactured domestically in the USA. Brookaire caters to this preference by offering products that are made in our own manufacturing facilities in the Northeast.
- In addition, Brookaire prioritizes domestic supply of raw materials, with 100% of materials for pleated filters being sourced in the USA.
- This not only aligns with the localized sentiments of American consumers but also assures them of quality, reliability, and adherence to domestic manufacturing standards.
- Our commitment to providing American-made products reinforces consumer trust and satisfaction, an essential factor in the data industry

### Meeting the convenience challenge

- In our experience, a disposable pleated air filter as the first line of defense is the most convenient and efficient way to filter the air in a data center. This ensures filter and labor efficiency is optimal compared to washable or metal frame options.
- This focus on convenience and minimal operational impact is a testament to Brookaire's commitment to customer-centric innovation and service - we'll dive deeper into this area later in this white paper.

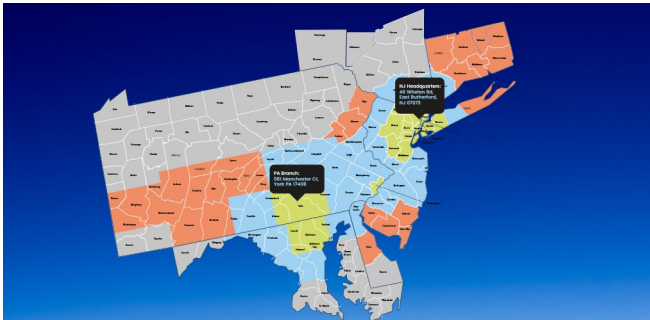
# Brookaire

## How We Help Data Centers

It's true: our inventory of products offer the level of performance, energy efficiency and longevity your facility needs. However, when you work with us, you can expect more. We're more than just an air filter supplier - we're a true partner to data centers across the USA. Keep reading to discover why.

### 01. EFFICIENCY

We Get Your Job Finished Faster



#### 30-Minute Delivery Window

Every minute counts. This is why we offer a precise 30-minute delivery window. Our commitment to promptness means you spend less time waiting and more time doing.



#### Scheduled Delivery Dates

You know what delivery date works best for your facility, that's why you pick the date.

#### Reduce Handling

Our precise delivery windows allow you to ensure you get the filters exactly on the date you need them, eliminating the need to receive them in advance of the maintenance leading to additional handling.

#### Reduce Your Storage Needs

We understand that air filters, especially in bulk, are bulky and require significant space. Our direct delivery service removes the burden of storage from your shoulders. We'll bring them to you, exactly when you need them, allowing you to focus solely on bringing your tools and expertise.

#### Get More Done With Fewer Technicians

Time saved is money earned. By reducing the hours your technicians spend off-site, Brookaire's delivery service turns these hours into productive time. This efficiency means you can achieve more with fewer resources, optimizing your workforce and enhancing your bottom line.

#### Ease of Installation

Our products, particularly air filters, are engineered to fit seamlessly into existing systems, ensuring a hassle-free installation process. This ease of installation means your technicians can complete more jobs in less time, significantly boosting productivity. Our filters are compatible with a wide range of HVAC systems, reducing the need for time-consuming adjustments or modifications on site. Whether you're dealing with standard or custom-sized filters, the design and build quality of Brookaire products guarantee a smooth, efficient fit every time.

# Brookaire

## How We Help Data Centers

### 02. SATISFACTION

#### We Care About Your Reputation

##### **We Care**

We recognize that as a trusted data center, your facility's reputation can be easily impacted by system downtime. That's why our commitment to the highest standards is unwavering, as we understand that the satisfaction of your data clients is a direct reflection of the trust they place in you.

##### **Highest-Quality Materials**

In the HVAC industry, the quality of materials is not just a feature; it's a cornerstone. We source premium materials for our products, ensuring they are robust, efficient, and long-lasting. This attention to quality means that when data center technicians install Brookaire products, they are installing with confidence. Your clients will notice the difference – a system that performs optimally, with fewer issues over ti

##### **Advanced Manufacturing Processes**

Our manufacturing processes are at the forefront of technological innovation. We employ state-of-the-art techniques to ensure precision in every product we make. This precision translates into products that are not only top-quality but also consistent in their performance. By ensuring that each item meets our stringent standards, we providedata center decision makers with products that they can install with confidence, knowing that they will work seamlessly within any HVAC system.

##### **Partnering With You**

We view our relationship with data centers as a partnership. Your success is our success. By providing you with superior products, we aim to bolster your capabilities. We understand that each successful installation contributes to your standing as a reliable, quality-focused facility. As such, we are committed to continuous improvement, ensuring that our products not only meet but exceed industry standards and expectations.

### 03. FILTERS

#### We Manufacture Filters Just For You

##### **Customization at Its Best**

Our state-of-the-art manufacturing facility is equipped to produce air filters of any size and in any quantity, tailored to your exact specifications. Whether you're dealing with a unique architectural design, a specific environmental requirement, or a challenging installation space, our custom manufacturing service ensures that you have the perfect fit for every project.

##### **Fast and Flexible Production**

We recognize that time is a critical factor in your business. That's why we emphasize speed without compromising on quality. With a lead time of just 48 hours on special size pleated filters, we ensure that your custom orders are fulfilled swiftly, keeping your projects on schedule. Our efficient production processes and dedicated team enable us to deliver these quick turnarounds consistently.

##### **Easy Ordering Process**

Placing a custom filter order with Brookaire is hassle-free. Simply contact us via email or phone with your custom filter request, and our team will take care of the rest. We provide personalized attention to each order, ensuring that all your requirements are accurately met. Our goal is to make the process as smooth and straightforward for you as possible.

##### **Quality That Speaks**

Every custom filter we produce goes through stringent quality checks to ensure that they meet our high standards. Using top-grade materials and precise manufacturing techniques, we ensure that each filter not only fits perfectly but also performs optimally. This commitment to quality means that you can install our filters with confidence, knowing that they will provide the best air quality and system efficiency to your center.

## 04. RESOURCE

We're Your Ultimate Knowledge Resource

### Experts At Your Service

Our strength lies in our large team of HVAC experts, a group of seasoned professionals deeply versed in all facets of HVAC technology and trends. This team is readily available to respond to any queries you might have, offering insights, advice, and solutions at remarkable speed. Whether you're facing a complex installation challenge, need advice on the latest energy-efficient practices, or have a question about system optimization, our experts are here to provide you with the answers you need, when you need them.

### Blogs & Articles

Our regularly updated blog is a treasure trove of information, featuring a wide range of topics. From installation tips and maintenance best practices to insights on the latest HVAC technologies and trends, our blogs are written to enhance your knowledge and skills. Each piece is crafted to provide practical, actionable advice that data centers can apply in virtually every scenario.

### Expert Tips and Guides

Recognizing the diverse challenges faced in the field, our resources include expert tips and comprehensive guides. These resources cover various aspects of data center air filtration requirements, ensuring you have a reliable source of information for quick reference.

### Technical Support and Guidance

Beyond our written resources, we offer personalized technical support and guidance. Our team is equipped to provide detailed explanations, troubleshoot issues and offer bespoke advice that aligns with the specific needs of your facility.



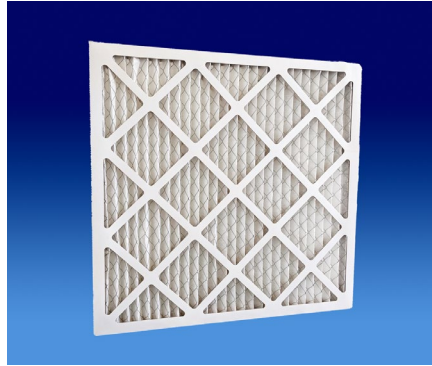
# The Inventory Every Data Center Needs

## Air Filters



### Merv 10, Pleated Air Filter

Brookaire's pleated MERV 10 air filter is the most common style filter used in HVAC systems. These filters are fabricated using a wire backed synthetic media assembled within a beverage board cardboard frame. Pleated MERV 10 air filters come in a vast array of standard size die cut frames in 1", 2" & 4" depths. The pleated style design provides additional surface area of media maximizing the air flow and efficiency. These air filters provide the perfect balance of air flow and efficiency. Pleated MERV 10 filters are commonly used in high end residential and commercial HVAC systems.



### Merv 10, High Capacity Pleated Air Filter

With lower initial resistance and better dust holding capacity, this is the high capacity version of Brookaire's pleated MERV 10 air filter. These filters are fabricated using a wire backed synthetic media assembled within a beverage board cardboard frame. High Capacity Pleated MERV 10 air filters come in a vast array of standard size die cut frames in 1", 2" & 4" depths.

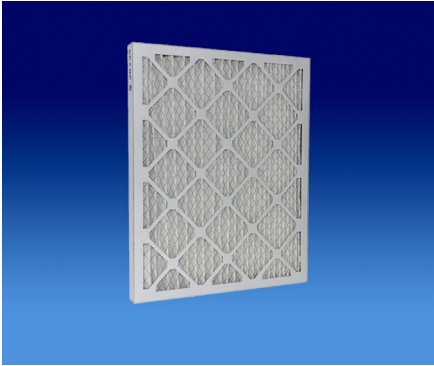
The pleated style design provides additional surface area of media maximizing the air flow and efficiency. These air filters provide the perfect balance of air flow and efficiency. Pleated MERV 10 filters are commonly used in high end residential and commercial HVAC systems.



### Merv 11, Pleated Air Filter

Brookaire's pleated MERV 11 air filter widely used in HVAC systems. The filters are manufactured using a wire backed synthetic media assembled within a beverage board cardboard frame. Pleated MERV 11 air filters come in a vast array of standard size die cut frames in 1", 2" & 4" depths. The pleated style design provides additional surface area of media maximizing the air flow and efficiency.

These air filters provide a great balance of air flow and efficiency. Pleated MERV 11 filters are commonly used in high end residential and superior commercial HVAC systems as an upgrade to standard pleated MERV 8 air filters. They can also be used when the HVAC system's airflow capacity does not allow for MERV 13 use, but higher grade filtration is required. Captures: Legionella, Humidifier dust, lead dust, milled flour, auto emission particles, nebulizer drops, and more! Made in the USA.



### Merv 13, Pleated Air Filter

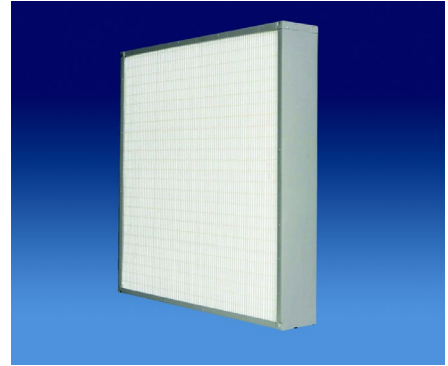
Brookaire's MERV 13 pleated air filters are best in class. Made with synthetic media wire backed and inserted into a sturdy moisture resistance beverage kraft board frame it achieves long service life. This high performance pleated air filter provides the highest initial and sustained efficiency along with a lowest initial pressure drop in its class.

The MERV13 media made with Nanofiber technology enabling great air flow while sustaining high filtration achieving MERV 13 per ANSI/ASHRAE Std. 52.2. These filters are available in 1", 2" and 4" depths in a full range of standard and custom size. MERV 13 pleated filters are used as a pre-filter for high end final filters. Typical Applications: Superior Commercial Buildings, Hospital and Pharmaceutical, Education Facilities, Gyms, Hospitality Captures: All bacteria, droplet nuclei, droplet borne viruses, cooking oil, most smoke (3rd hand smoke), insecticide dust, most face powder, most paint, pigments.



### Ring Panels, Ring Links & Cube Filters

Brookaire's Ring Panels, Ring Links & Cube Filters are made with a graduated density polyester media with a dry tackifier on the downstream side. It is designed to replace pleated and/or fiberglass throwaway filters.

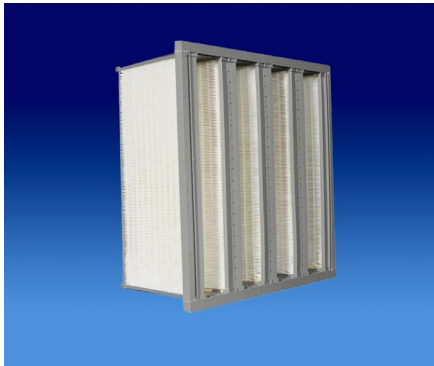


### Mini-Pleat Air Filters

Brookaire Mini-Pleat Air Filters. Synthetic Filter Media, next generation mini pleat compact filters in polyester media, high surface area, high dust holding capacity, low pressure drop, increased filter life & ensured filtration performance with plastic ABS or cardboard die cut frame, best for green building concept and variable volume areas.

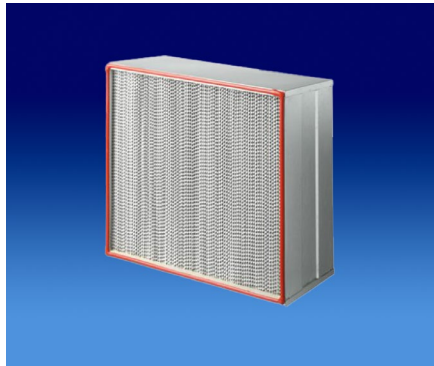
# The Inventory Every Data Center Needs

## Air Filters



### V-Bank Air Filters

Brookaire V-Bank Air Filters. Synthetic Filter Media, Next generation mini pleat compact filters in polyester media, high surface area, high dust holding capacity, low pressure drop, increased filter life & ensured filtration performance with plastic ABS frame, best for green building concept and variable volume areas.

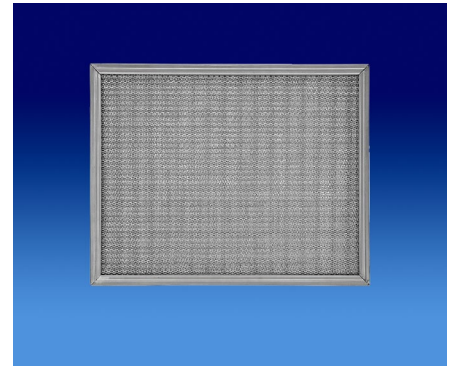


### HEPA Filters

Brookaire's HEPA (High Efficiency Particulate Absorbing) Filters are designed with premium air filter media to maximize the amount of particles removed from the air when installed in an HVAC system.

HEPA filters are commonly used in critical environments like clean rooms for pharmaceuticals, hospitals, food manufacturing, data centers and more.

The use of HEPA filters increases the protection of your HVAC equipment while providing maximum efficiency in removing contaminants from the air. True HEPA air filters are at least 99.97% efficient in capturing particles between 3 - 10 microns.



### Metal Mesh Filters

Brookaire's metal mesh filters are crafted from high-quality aluminum and designed for durability and reusability, especially in high moisture applications.

These washable filters are a cost-effective solution for the first line of defence, and usually seen in outdoor intake applications. They can be washed and reused multiple times, reducing waste and saving on the cost of frequent filter replacements.

# The Inventory Every Data Center Needs

## V-Belts



3L V-Belt



3VX V-Belt



5VX V-Belt



A/4L V-Belt



AX V-Belt



B/5L V-Belt

# The Inventory Every Data Center Needs

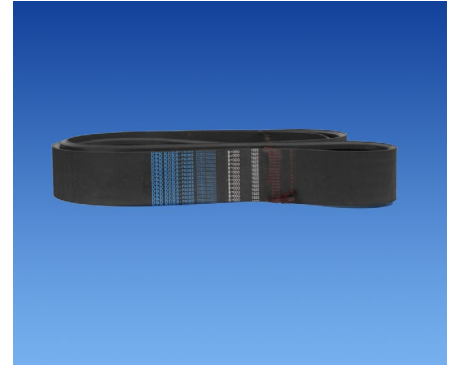
## V-Belts



**BX V-Belt**

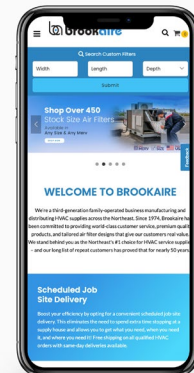
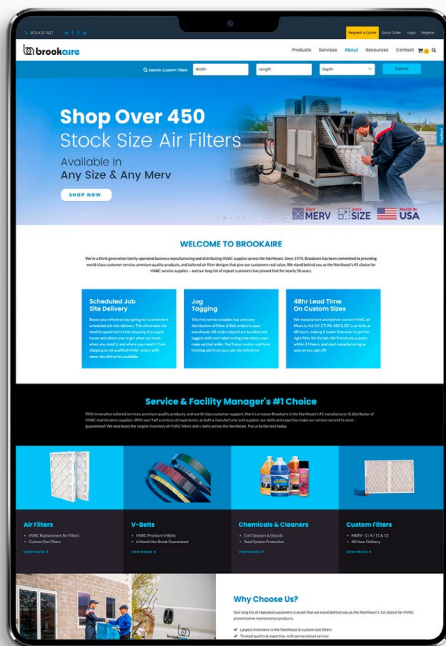


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**Banded Stranded & Cogged V-Belts**

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visit. [www.brookaire.com](http://www.brookaire.com)



# Calling all Data Centers

## Partner with Us Now



### Book a Meeting

Book an introductory meeting with one of our experts to find out how Brookaire can make your life easier!

### H3 Chat With Us

Need an instant answer? Our support agents are ready to assist you online with live chat.

### Call Us Got a question?

Give us a call  
Monday - Friday, 7 AM to 5 PM EST

**(973) 473-7527**



### Email Us

Questions? Feedback? Send us an email to [sales@brookaire.com](mailto:sales@brookaire.com)

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Be sure to check out our official social media pages on Facebook, LinkedIn and Instagram.

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