brookaire

HVAC in the Pharmaceutical Sector

A Decision-Maker's Guide

Air Quality in Pharmaceutical Settings
An Intro for Key Decision Makers

What You Need to Know

As a key decision maker in the pharmaceutical sector, you'll be one of many professionals driving one of the world's most important industries. That is especially true here in the USA, which is currently the world's largest pharmaceutical manufacturer, holding a 42.6% share of the global market, producing medicines worth over $171b USD.

One of the world's most crucial and dynamic sectors, manufacturing and distributing life-saving drugs, medications and vaccines. Few industries have offered such a transformative impact on an international scale. However, with such a global responsibility comes significant challenges. As a decision-maker responsible for maintaining those strict working and storage standards and regulations on which this industry depends, you'll understand these challenges better than anyone.

These challenges are broad-reaching, costly and of the highest importance in regards to the treatment of patients in the USA and beyond. While many of these challenges are relevant to manufacturing processes as a whole, they tend to be exacerbated in the pharmaceutical industry for a number of reasons. Primarily, this is due to the need to maintain critical environments for production with respect to temperature, humidity, room pressurization, cleanliness, containment and other factors. With these challenges in-mind, decision makers are faced with making investments in HVAC systems which are many times greater than the average commercial building to support these processes.

Let's take a look at how some of these challenges are represented through key industry figures and statistics:

The average pharmaceutical plant in the US has an Energy Use Intensity (EUI) of 1,210 kBtu/sq.ft (2,319 kWh/m2). This is in stark contrast to the average commercial office building constructed after 2000, which has an average EUI of 81.4 kBtu/sq.ft (257 kWh/m2) - (Source: Pharmaceutical Engineering)

The industry currently spends more than $1 billion on energy consumption every year, generating more emissions than the automotive industry. - (Source: Science Direct)

The Story Behind the Stats:
What it Means for You

For any person of responsibility in pharmaceutical manufacturing, these statistics make for important reading. Whilst these facts paint a sobering picture of your industry's impact in terms of energy consumption, they do little to reflect the importance of adequate HVAC systems and their pivotal impact in the drug manufacturing process.

This observation highlights that your investment in HVAC isn't only about protecting the health, welfare and comfort of staff working in your facilities. Your considerations must go far beyond those concerns, making HVAC an integral provision of your manufacturing process. It must include systems that can not only control moisture in the air, but also mitigate the contamination of airborne particles by regulating air movements. It must capture and control suspected microorganisms, dust and microbes in order to ensure the sterility on which your processes are based.

Here at Brookaire, we understand the vital importance of HVAC systems in ensuring the necessary favourite conditions for successful pharmaceutical manufacturing. Through this definitive whitepaper, we invite key decision-makers to upgrade their knowledge of these systems. Keep reading to learn more about how our solutions can address many of the challenges you face.

An analogous air handling unit serving an ISO 14644-1:1999 class 8 (EU Grade C in operation) cleanroom in which a pharmaceutical product is being manufactured would typically condition and supply between 20 and 35 ACPH to the cleanroom in a constant volume control strategy. This represents approximately a four to six fold increase in HVAC energy expenditure before tighter temperature and relative humidity control requirements, increased outside air requirements and additional filtration are considered. With the additional energy consumption of the manufacturing systems and processes themselves, it can be easily seen how the overall energy consumption of pharmaceutical facilities becomes far more intensive than their commercial facility counterparts. - (Source: Pharmaceutical Engineering)

Addressing Challenges
In Your Pharmaceutical Facility

As highlighted in the previous section, the HVAC challenges present in the pharmaceutical manufacturing industry are significant. This is especially true in any environment where pharmaceutical products are being manufactured or stored.

Before making any purchasing decisions around your healthcare setting's HVAC solutions, it is critical that you understand the strict requirements you must satisfy. Pharmaceutical facilities are closely supervised by the U.S. food and drug administration (FDA), which requires manufacturing companies to conform to cGMP (current Good Manufacturing Practices). These regulations, which have the force of law, require that manufacturers, processors, and packagers of drugs take proactive steps to ensure that their products are safe, pure, and effective. Below, we've captured some what some of those proactive steps must consider:

Indoor Air Quality Concerns
In pharmaceutical manufacturing environments, indoor air quality is often driven by two key factors: air filtration and air ventilation. To meet the ultra-clean environment required in pharmaceutical production, HVAC systems must incorporate advanced filtration technologies such as HEPA and ULPA filters which are critical for removing fine particulates, microbes, and other airborne contaminants that can compromise product purity and safety. Meanwhile, adequate ventilation can remove airborne contaminants from production areas.

Meeting Diverse & Changing Requirements
In your pharmaceutical manufacturing environment, you will be responsible for maintaining environmental requirements, such as specific temperature, humidity, and cleanliness levels. With this in-mind, your solutions must be able to adapt to customizable settings. Systems must be designed to comply with international, federal, and state regulations, including FDA's cGMP guidelines. These regulations mandate that HVAC systems not only support the proper manufacture and storage of pharmaceuticals but also ensure traceability and accountability in changes or upgrades to the systems.

Balancing Quality & Efficiency
Economic efficiency is paramount in large-scale pharmaceutical production, with the sector currently spending over $171bn USD per year on energy consumption. HVAC systems should therefore be evaluated for their operational and energy efficiency to reduce overhead costs while maintaining the high-quality conditions required for pharmaceutical manufacturing. This includes considering systems with variable speed drives, energy recovery mechanisms, and other modern technologies that reduce energy consumption.

Integration with Other Systems
HVAC systems in pharmaceutical settings should integrate seamlessly with other critical systems, including building management systems (BMS), process control systems, and safety alarms. This integration helps ensure coordinated operations, enhances real-time monitoring, and supports automated adjustments based on predefined environmental parameters. On top of that, to ensure smooth functioning, the HVAC system needs to adhere to standards and norms like GMP (good manufacturing practice), GLP (good laboratory practice), GAMP (good automated manufacturing practice), and GxP (good x practice).

Protection of Sensitive Components
The stability and efficacy of pharmaceutical products can be heavily influenced by environmental conditions. HVAC systems must ensure a controlled environment to protect sensitive manufacturing equipment from temperature fluctuations, humidity, and particulate contamination, which could otherwise lead to equipment malfunction or product degradation.

HVAC Maintenance Requirements
To minimize disruption in high-stakes pharmaceutical environments, HVAC systems should be designed for ease of installation and maintenance. Quick-connect systems, modular components, and clear access points for maintenance staff can help reduce system downtime and labor costs associated with HVAC maintenance.

HVAC Disposal Costs
Selecting HVAC components that are not only high in performance but also environmentally sustainable is vital. Use of components that have a lower carbon footprint and are recyclable can mitigate environmental impact and potentially reduce disposal costs associated with system upgrades or replacements.

How Can You Meet the Challenge?

With such extreme demands facing your pharmaceutical manufacturing facility's air filtration units, it is vital to partner with a HVAC specialist that provides solutions that are capable of meeting these critical needs effectively. That's where Brookaire comes in. We leverage decades of air filtration experience to offer best-in-class solutions for every challenge you face.

Meeting the air quality challenge

- Brookaire provides advanced filtration solutions, including HEPA and ULPA filters, which are crucial for pharmaceutical settings where even the smallest particles can compromise product integrity. Our filters meet stringent efficiency standards, capturing over 99.97% of particulates as small as 0.3 microns. Additionally, our products are designed for optimal air exchange rates, ensuring not only compliance with regulatory standards but also supporting a sterile environment essential for pharmaceutical production. By integrating these high-efficiency air filters into customizable HVAC systems, Brookaire helps maintain the critical cleanliness required in pharmaceutical manufacturing.

Meeting the energy challenge

- To address the dual needs of operational efficiency and quality assurance in pharmaceutical settings, Brookaire offers energy-efficient HVAC products that do not compromise on performance. Our system recommendations include features like variable speed drives and energy recovery ventilators that significantly reduce energy consumption while maintaining the precise environmental control needed for pharmaceutical processes. This approach not only helps lower energy costs but also aligns with sustainability goals by reducing the overall carbon footprint of facilities.

Meeting the diverse & changing requirements challenge

- Brookaire's recommends HVAC systems which are engineered to be highly adaptable, supporting a variety of environmental conditions demanded in pharmaceutical manufacturing. Filtration solutions can be tailored to specific temperature, humidity, and cleanliness requirements, ensuring compliance with FDA's cGMP guidelines. We also recommend the use of modular systems that can easily be upgraded or adjusted as production needs change or as new regulations are enacted, ensuring that pharmaceutical facilities can remain agile and responsive to industry demands.

Meeting the component protection challenge

- Understanding the critical nature of pharmaceutical manufacturing environments, Brookaire recommends HVAC solutions that provide stable and controlled conditions to protect sensitive manufacturing components. This protective environment helps prevent costly downtimes and prolongs the operational lifecycle of essential equipment.

Meeting the maintenance challenge

- Brookaire emphasizes ease of maintenance to ensure minimal disruption in pharmaceutical operations. Our HVAC solutions feature design considerations like accessibility for quick repairs and preventative maintenance. We also offer maintenance services that include regular check-ups and rapid response to any issues, ensuring that HVAC systems operate at peak efficiency with minimal downtime.

Meeting the disposal challenge

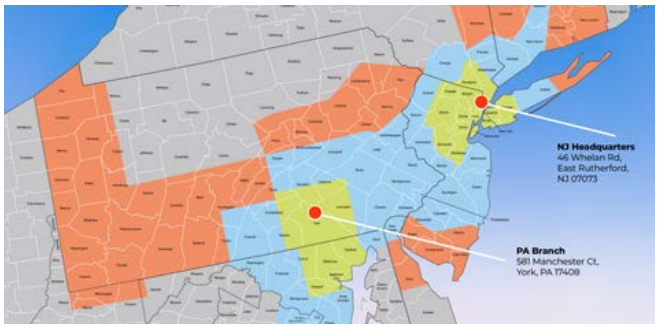
- Recognizing the importance of sustainable practices, Brookaire provides eco-friendly HVAC solutions that minimize disposal costs and environmental impact. Our high-efficiency filters and system components are designed to have longer life spans and are made from materials that are recyclable, reducing waste and disposal challenges. Additionally, our team can assist in planning for end-of-life system recycling, helping pharmaceutical facilities manage disposal responsibly and sustainably.

Brookaire
How We're Helping Pharmaceutical Facilities

Brookaire's extensive range of products delivers the performance, energy efficiency, and durability needed in pharmaceutical manufacturing facilities. Our service extends beyond mere supply; we partner with pharmaceutical companies to elevate their operational efficiency and air quality standards. Explore why Brookaire is more than just an air filter supplier.

01. EFFICIENCY

Enhancing Pharmaceutical Manufacturing



30-Minute Delivery Window
Time is of the essence in pharmaceutical manufacturing. Our precise 30-minute delivery windows ensure your operations face minimal interruptions, helping maintain the critical flow of production activities.

More Information

Scheduled Site Delivery, 24/7
We adapt to your manufacturing schedule, delivering outside standard business hours to accommodate the continuous production cycles typical in pharmaceutical environments.

More Information

Reduce Staff Travel Time
By delivering directly to your site, we eliminate the need for your staff to leave for pickups, allowing them to remain focused on their specialized tasks.

Maximize Staff Efficiency
Our efficient delivery services convert saved time into productive work, optimizing the output of your pharmaceutical manufacturing staff.

Ease of Installation
Brookaire air filters are engineered for compatibility with complex pharmaceutical HVAC systems, ensuring easy installation that doesn't disrupt the sterile environments critical to drug production.

Brookaire
How We're Helping Pharmaceutical Facilities

02. SATISFACTION
Upholding Your Pharmaceutical Facility's Reputation

We Care
We recognize that the reputation of your pharmaceutical facility hinges on maintaining highly controlled environments. Our commitment to quality minimizes operational disruptions and supports compliance with strict regulatory standards.

Highest-Quality Materials
We utilize the finest US-made materials suitable for pharmaceutical applications, ensuring that our products support the rigorous cleanliness required for safe drug production.

Advanced Manufacturing Processess
Our state-of-the-art manufacturing techniques guarantee products meet precise specifications, crucial for maintaining the integrity of pharmaceutical manufacturing processes.

Partnership Approach
We view our relationship with pharmaceutical facilities as a strategic partnership, where your operational success is a testament to our product performance.

03. CUSTOMIZED SOLUTIONS
For Specific Pharmaceutical Needs

Tailored Manufacturing
Our facility can produce air filters of any size and specification, meeting the unique environmental requirements of pharmaceutical production, from labs to cleanrooms..

Create A Filter

Quick and Flexible Production
Recognizing the urgent needs of the pharmaceutical industry, we offer rapid production cycles, ensuring your custom orders are ready within 48 hours, maintaining your facility's efficiency.

Simple Ordering Process
Placing an order for custom filters is straightforward. Provide your specifications, and we handle the rest, from confirmation to production, streamlining your procurement process.

Assured Quality
Every custom filter is rigorously tested to meet high quality standards. Using superior materials and accurate manufacturing, we ensure that each filter performs optimally in your pharmaceutical environment.

04. RESOURCE

Your Premier Knowledge Resource
for Pharmaceutical HVAC Needs

Expert Team Available
Our team of HVAC experts is ready to assist with any queries, offering quick, informed advice and solutions that address the unique challenges of pharmaceutical manufacturing.

Educational Blogs & Articles
We offer a plethora of insightful articles and maintenance tips through our blogs, designed to inform and enhance the operations of pharmaceutical facilities.

Read Our Blog

Guides and Technical Support
Our comprehensive guides and personalized technical support are tailored to the complex needs of pharmaceutical manufacturing, ensuring you have access to expert advice to maintain optimal HVAC performance in your facility.

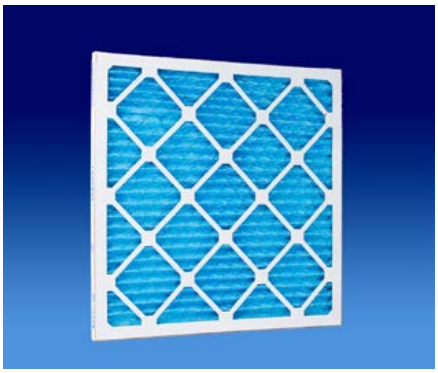
The Inventory Every Pharmaceutical Facility Needs

Air Filters

Merv 10, Pleated Air Filter

Brookaire's pleated MERV 10 air filters are designed to provide optimal air quality in pharmaceutical manufacturing environments. These filters are constructed with a wire-backed synthetic media within a durable beverage board frame, ideal for maintaining clean room conditions by capturing particulates without hindering airflow, crucial for environments demanding high cleanliness levels.

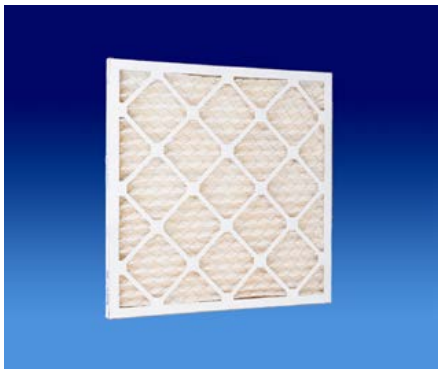
View Filter



Merv 10, High Capacity Pleated Air Filter

Our High Capacity Pleated MERV 10 air filters offer lower resistance and enhanced dust holding capacity, making them suitable for pharmaceutical facilities where air purity is crucial. These filters support stringent regulatory compliance by effectively removing contaminants and maintaining optimal air flow, critical for sensitive pharmaceutical processes.

View Filter



Merv 11, Pleated Air Filter

The MERV 11 filters provide an upgrade in filtration efficiency, capturing finer particulates including bacteria and mold spores that could potentially affect pharmaceutical products. These filters are engineered to maintain environmental control within the stringent parameters required in pharmaceutical manufacturing.

View Filter

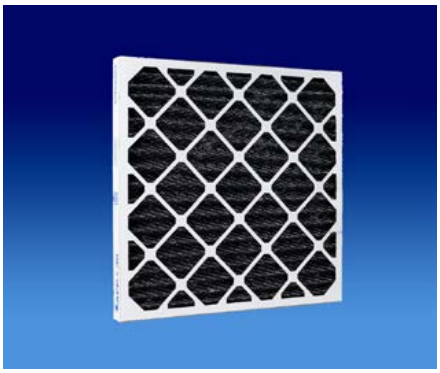
Merv 13, Pleated Air Filter

Our MERV 13 filters are the pinnacle of filtration technology, designed for environments where air purity is non-negotiable. With the capacity to capture more than 90% of airborne particles, including bacteria and virus carriers, these filters are essential for areas in pharmaceutical plants that handle highly sensitive processes.

View Filter

The Inventory Every Pharmaceutical Facility Needs

Air Filters



Carbon Pleated Air Filters

Combining odor control with particulate capture, these filters are perfect for pharmaceutical manufacturing areas where chemical odors and volatile organic compounds are present. They help in maintaining a contaminant-free environment by adsorbing gases and odors along with solid particulates.

View Filter

Ring Panels, Ring Links & Cube Filters

These filters offer versatility and effectiveness in capturing a range of airborne particles. With a graduated density and a tackifier, they ensure that even the smallest particulates are trapped, supporting the stringent cleanliness standards required in pharmaceutical production.

View Filter

Air Filter Media Rolls & Pads

Useful during construction or renovation phases in pharmaceutical facilities, these media rolls and pads can be custom cut to cover air returns or other openings, preventing dust and debris from entering clean areas.

View Filter

Mini-Pleat Air Filters

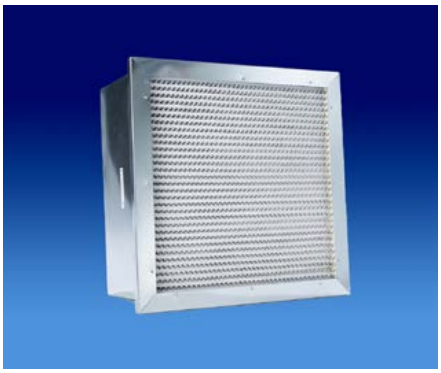
Mini-pleat filters offer high-efficiency filtration with a compact design, reducing space requirements while providing superior air cleaning capabilities. Their high dust holding capacity and low pressure drop make them ideal for pharmaceutical environments where space and efficiency are crucial.

View Filter

Pocket Polyester Bag Filters

These filters are excellent for pharmaceutical applications where varied particulate sizes must be captured. Their extended surface area and depth-loading capacity allow for high efficiency and longer service life, reducing change-outs and maintenance demands.

View Filter



ASHRAE Cell Filters

Designed to meet ASHRAE standards for high-efficiency filtration, these filters are essential in pharmaceutical environments where air quality directly impacts product integrity. They excel in removing a wide range of airborne contaminants, ensuring a controlled environment critical for drug formulation and packaging.

View Filter

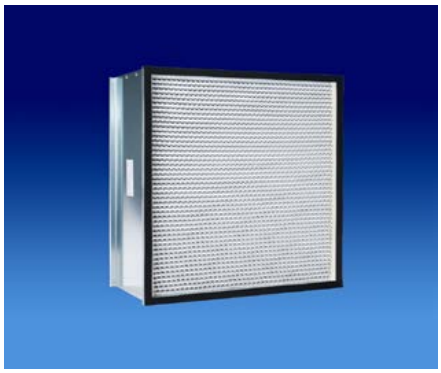
The Inventory Every Pharmaceutical Facility Needs

Air Filters

V-Bank Air Filters

he V-Bank filters' design maximizes the filtering media area, making them suitable for pharmaceutical facilities with high air volume needs. Their efficiency and capacity to handle high airflow rates without sacrificing air quality are essential for maintaining sterile conditions.

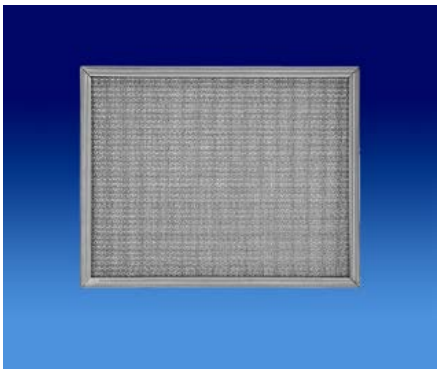
View Filter



HEPA Filters

For ultimate filtration needs, Brookaire's HEPA filters provide maximal efficiency in trapping particulates as small as 0.3 microns. They are crucial in clean rooms and other critical areas within pharmaceutical manufacturing where absolute air purity is required to prevent contamination.

View Filter



Metal Mesh Filters

Reusable and durable, these filters are suited for pharmaceutical manufacturing facilities looking to reduce operational costs and environmental impact. They are particularly useful in systems requiring frequent filter changes due to high particulate environments.

View Filter

The Inventory Every Pharmaceutical Facility Needs

V-Belts

3L V-Belt

View Belt

3VX V-Belt

View Belt

5VX V-Belt

View Belt

A/4L V-Belt

View Belt

AX V-Belt

View Belt

B/5L V-Belt

View Belt

The Inventory Every Pharmaceutical Facility Needs

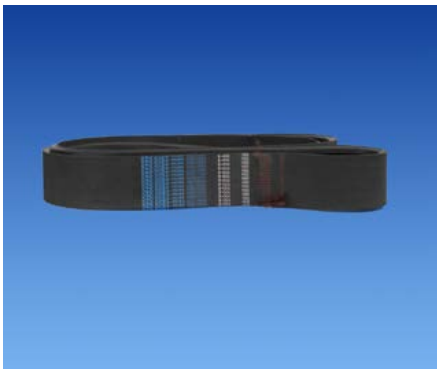
V-Belts

BX V-Belt

View Belt

C/CX V-Belt

View Belt



Banded Stranded & Cogged V-Belts

View Belt

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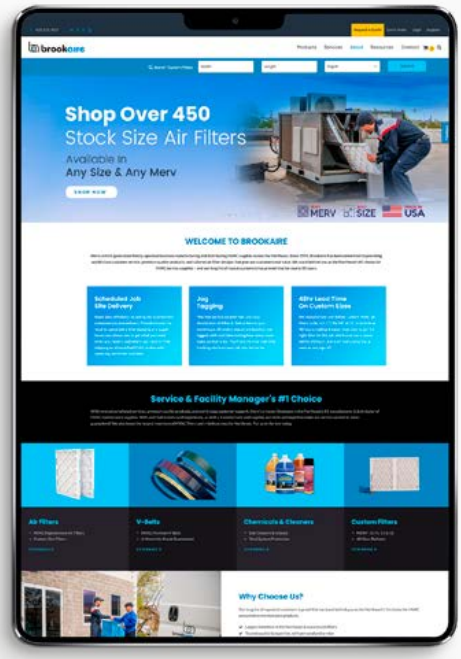
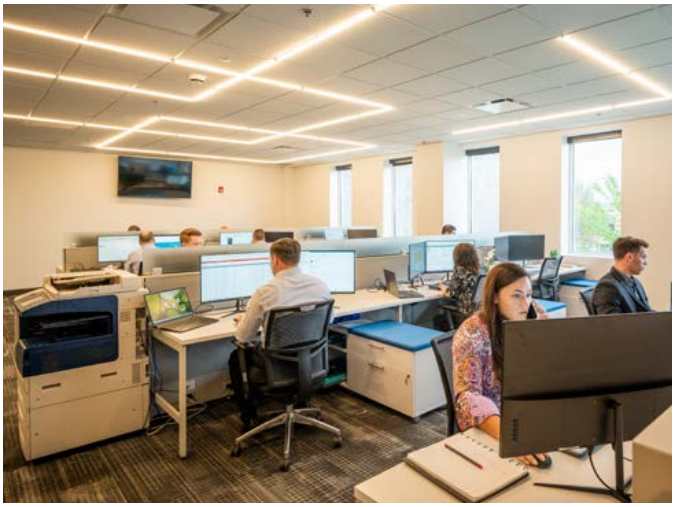


Calling all Pharmaceutical Facilities

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!

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**

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