

INDUSTRIAL/ COMMERCIAL HEATING & HUMIDIFICATION

EFFICIENCY GUIDE

TABLE OF CONTENTS

Introduction	03
System Types	04
Energy-Efficient Technologies	05
Optimizing Heating Efficiency	07
Enhancing Humidification Efficiency	08
CAREL Humidification	09
Regulatory & Environmental Considerations	10
Environmental Impact & Sustainability	11
The Road to Optimal Heating & Humidification	12
Why Choose Lincoln Associates?	14
Lincoln Associates Company Profile	15



INTRODUCTION

Efficient heating and humidification systems are crucial for large industrial and commercial spaces. Properly managed systems not only improve comfort and productivity but also contribute to energy savings and cost reduction. This guide aims to provide strategies and insights into optimizing these systems for maximum efficiency.



COMMERCIAL SPACES

Commercial spaces, such as office buildings, universities, military bases, churches, and healthcare facilities, must prioritize occupant comfort and wellbeing while complying with diverse regulations. Achieving these objectives often involves tailored zoning, indoor air quality considerations, and sustainability initiatives.



INDUSTRIAL SPACES

In mission-critical industries like food production, precise heating and humidification systems are vital for productivity, reducing scrap rates, and stabilizing product quality. Diverse industrial spaces demand robust systems meeting stringent safety standards. Advanced solutions not only optimize productivity but also align with sustainability goals by promoting energy efficiency.



Both industrial and commercial spaces benefit from routine maintenance, ensuring uninterrupted operations while optimizing the performance of heating and humidification systems!

SYSTEM TYPES

DIRECT FIRED

Direct fired heating systems are highly efficient and cost-effective for industrial and commercial spaces. They utilize natural gas or propane burners to heat air directly, which is then distributed throughout the space. These systems are known for their quick response time and ability to provide high-temperature heat. However, they should be used with proper ventilation to avoid indoor air quality issues due to combustion byproducts. Regular maintenance and monitoring are crucial to ensure safety and efficiency.



Direct Fired Unit

INDIRECT FIRED

Indirect fired heating systems are designed to eliminate concerns related to indoor air quality. They use a heat exchanger to heat air indirectly. This method ensures that combustion byproducts are vented outside, improving indoor air quality. While they may have a slightly lower efficiency compared to direct fired systems due to the heat exchange process, the benefits in terms of air quality and safety often outweigh this drawback.



Air Turnover Unit

HOT WATER/STEAM HEATING

Steam and hot water heaters are integral to heating systems, providing warmth in diverse settings. Steam heaters produce vapor by boiling water, circulating it through pipes to radiators, while hot water heaters pump heated water for distribution. These systems play a crucial role in maintaining indoor temperatures, from residential heating to industrial processes, ensuring comfort and efficiency in various applications.



Steam/ Hot Water Unit Heater

INFRARED HEATING

Infrared heating takes the principles of radiant heating further by using specialized heaters that emit electromagnetic waves in the infrared spectrum. These waves heat objects and surfaces, which in turn radiate heat into space. Infrared heating is known for its energy efficiency, precise control, and ability to target specific areas. It is often used in zones with intermittent occupancy or in industrial processes where maintaining a specific temperature is crucial.



Roberts Gordon CORAYVAC®

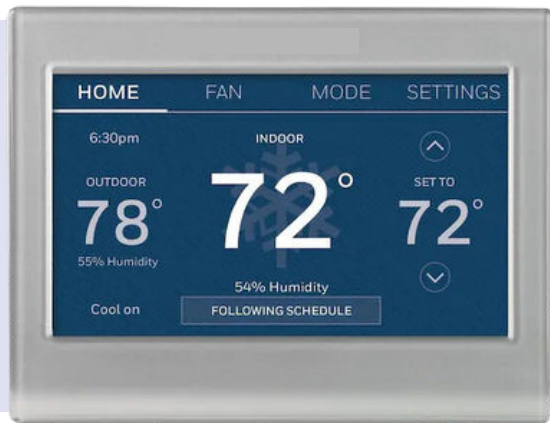
ENERGY-EFFICIENT TECHNOLOGIES

INSULATION & SEALING

Effective insulation and sealing of the building envelope are fundamental to energy efficiency. This prevents heat loss during the heating season and heat gain during the cooling season. Materials such as fiberglass, foam board, and spray foam insulation can be used in walls, roofs, and floors to create a thermal barrier. Proper sealing of gaps, cracks, and joints further enhances the building's efficiency.



PROGRAMMABLE THERMOSTATS

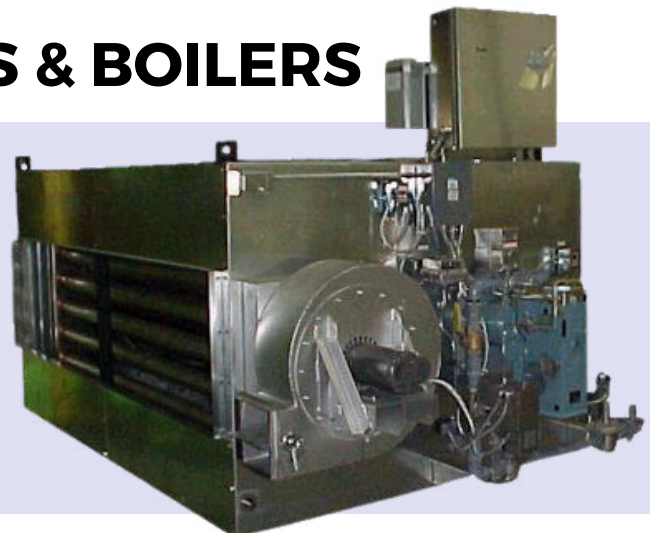


Programmable thermostats allow you to set different temperature profiles based on occupancy schedules.

This technology reduces energy consumption by lowering temperatures during unoccupied hours and raising them when needed. Smart thermostats take this a step further by learning occupant behavior and optimizing settings for comfort and savings.

HIGH-EFFICIENCY FURNACES & BOILERS

Investing in high-efficiency heating equipment, such as condensing furnaces and boilers, can significantly reduce energy consumption. These systems extract more heat from the combustion process, resulting in less wasted energy and lower operating costs.



High Efficiency Condensing Furnace

ENERGY-EFFICIENT TECHNOLOGIES

HEAT RECOVERY SYSTEMS

Heat recovery systems capture waste heat from exhaust air or industrial processes and reuse it for heating purposes. This technology can substantially reduce energy costs by recycling heat that would otherwise be lost.



Energy Recovery Ventilator

HUMIDITY CONTROL SYSTEMS

Humidity control systems manage moisture levels, ensuring comfort, safeguarding materials and equipment, and playing a crucial role in maintaining quality in industries such as pharmaceuticals. Employing advanced technologies for optimal control, they contribute not only to occupant comfort and health but also enhance industrial processes.



CAREL humiDisk



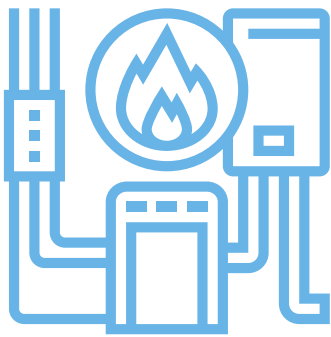
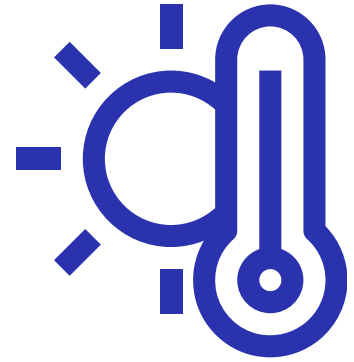
MAINTENANCE BEST PRACTICES

Regular maintenance is essential to ensure the efficiency and longevity of heating and humidification systems. This includes cleaning, inspecting, and tuning equipment. Maintenance schedules should be established and followed diligently to prevent breakdowns and maintain peak performance.

OPTIMIZING HEATING EFFICIENCY

ZONING & TEMPERATURE

Zoning allows for the independent control of temperature in different areas or zones within a building. This approach minimizes energy consumption in unoccupied areas and tailors comfort to occupant needs. Implementing zoning through duct dampers, radiant panels, or variable airflow systems can yield significant energy savings.

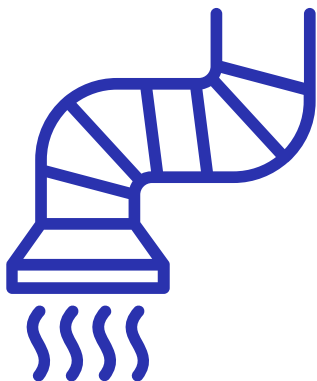
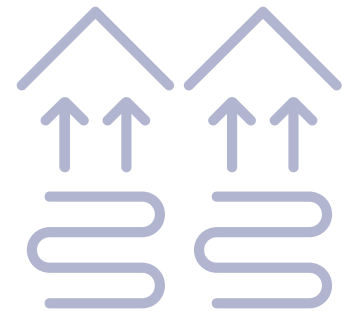


CORRECTLY SIZING YOUR SYSTEM

Properly sizing a heating and humidification system is critical. Undersized systems will struggle to meet demand, leading to discomfort, while oversized systems waste energy and money. Calculate the heat loss and humidification load to determine the right size for your space, considering factors like ventilation requirement, insulation, occupancy, and climate.

RADIANT HEAT CONSIDERATIONS

Radiant heating systems, such as hydronic or electric floor heating, provide superior comfort and efficiency by directly warming occupants and objects. When designing and installing radiant systems, ensure proper insulation below the heating elements to prevent heat loss to the ground. When considering radiant heat as an option versus forced air heaters, the typical gas usage required to heat an entire space with forced air heaters can be 20% to 30% more than radiant heaters. The savings will of course depend on the application.



AIR DISTRIBUTION

Efficient air distribution is vital for even heating and minimizing heat loss. Ductwork should be properly designed, sealed, and insulated to prevent heat leaks. Equipment efficiency can be negated if the air distribution is not engineered or installed properly.

ENHANCING HUMIDIFICATION EFFICIENCY



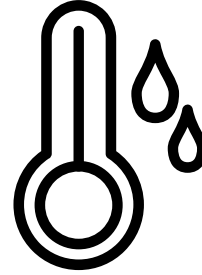
CAREL heaterSteam V2
(Steam)



CAREL MC Multizone
(Atomizing)

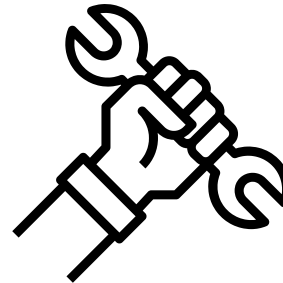
STEAM VS. ATOMIZING HUMIDIFIERS

When choosing a humidification method, consider factors like energy efficiency and control precision. Steam humidifiers provide quick and precise humidity control but may be less energy-efficient. Atomizing humidifiers are highly energy-efficient and offer precise control, making them suitable for many applications. Atomizing humidifiers are extremely energy efficient and are 1/100th of the operating cost of steam humidifiers. The choice depends on specific needs, budget considerations, and the availability of compressed air.



HUMIDITY CONTROL STRATEGIES

To maintain optimal humidity levels, implement strategies such as the use of humidity sensors and controllers. These devices monitor humidity and adjust the humidification system as needed. In larger spaces, multiple relative humidity sensors may be required to report an average between all the sensors.



MONITORING & MAINTENANCE

Regular maintenance of humidification systems is critical to prevent issues like mineral buildup in steam humidifiers or clogged atomizing nozzles. Monitoring humidity levels and system performance ensures that the system operates efficiently, and that occupant comfort is maintained.



Humidity plays a crucial role in maintaining occupant comfort and productivity. In dry conditions, low humidity can lead to discomfort, respiratory issues, and static electricity. On the other hand, excessive humidity can promote mold growth and discomfort. Finding the right balance is essential.

The CAREL logo consists of the word "CAREL" in white, bold, sans-serif capital letters, centered within a red oval. A thin white horizontal line is positioned directly beneath the letters.

HUMIDIFICATION

OVERVIEW

Since 1973, CAREL has been at the cutting edge in the research and development of new technological solutions for air humidity control.

CAREL's product portfolio now comprises all humidification technologies, in order to offer you a high-quality product suited for your application. Humidification and control know-how combine to create reliable humidifiers with advanced control logic, yet that are easy to use and maintain.

ADIABATIC TECHNOLOGY

- ▶ Pressurized Water Humidifiers
- ▶ Ultrasonic Humidifiers
- ▶ Evaporative Cooling Atomisers
- ▶ Compressed Air Water Atomisers
- ▶ Centrifugal Humidifiers

ISOTHERMAL TECHNOLOGY

- ▶ Gas-Fired Humidifiers
- ▶ Heater Humidifiers
- ▶ Immersed Electrode Humidifiers
- ▶ Centralized Steam Distributors
- ▶ Atmospheric Pressure Steam Distributors

humiFog MULTIZONE TOUCH

The humiFog Multizone Touch is a high-performance atomizing adiabatic humidifier that utilizes pressurized energy from a pump and strategically placed nozzles on a frame to atomize treated water into micrometric drops. Operating at a pressure of 70 bar, the volumetric piston pump and special nozzles produce droplets with a diameter of approximately 15 μm , ensuring efficient and accurate humidification.

Key features contributing to its accuracy include:

- An inverter that adjusts the pump's rotation speed and modulation with precision, maintaining accuracy up to 1%.
- Solenoid valves on the rack's edge, dividing the flow rate into steps to meet instantaneous demand.
- The CAREL electronic controller (c.pCO), providing advanced and precise control over system operation and parameters.



AVAILABLE IN THE FOLLOWING SIZES:
150, 300, 500, 800, 1200 L/H.

REGULATORY & ENVIRONMENTAL CONSIDERATIONS

BUILDING CODES

Ensure that your heating and humidification systems comply with local building codes and regulations. These codes often include requirements for equipment efficiency, emissions, safety, and installation standards. Compliance is essential to avoid legal issues and ensure the safety of occupants.

ENVIRONMENTAL REGULATIONS

Be aware of environmental regulations that may apply to your operations. Some jurisdictions have emissions limits for certain types of heating equipment, especially those that burn fossil fuels. Compliance with these regulations may require the use of emissions controls or the adoption of cleaner energy sources.

PERMITS & INSPECTIONS

Obtain the necessary permits for system installation or upgrades and schedule inspections to ensure compliance with local regulations. Failure to do so can result in fines and project delays.

ENERGY EFFICIENCY STANDARDS

Many regions have energy efficiency standards and incentives for industrial and commercial buildings. Consider taking advantage of these programs to upgrade your heating and humidification systems. Energy-efficient upgrades not only reduce operating costs but also align with environmental goals.

ENVIRONMENTAL IMPACT & SUSTAINABILITY



ENERGY

Assess the environmental impact of your chosen energy sources for heating and humidification. Consider transitioning to cleaner energy sources, such as natural gas, electricity from renewable sources, or biomass, to reduce your carbon footprint.



WATER

Be mindful of water consumption in humidification systems. Some regions face water scarcity, and excessive water use can strain local resources. Explore water-efficient humidification technologies and recycling options to minimize water wastage.



WASTE

Properly manage waste generated from heating and humidification systems. Dispose of hazardous materials, such as used oil or chemicals, in accordance with environmental regulations. Implement recycling and waste reduction practices to minimize your environmental impact.



SUSTAINABILITY

Embrace sustainability initiatives within your organization. Develop and implement a sustainability plan that outlines goals for reducing energy consumption, water use, and waste generation. Engage employees in sustainability efforts to foster a culture of environmental responsibility.

THE ROAD TO OPTIMAL HEATING & HUMIDIFICATION EFFICIENCY



CONTINUOUS IMPROVEMENT

Recognize that achieving and maintaining optimal heating and humidification efficiency is an ongoing process. Regularly assess your systems' performance, identify opportunities for improvement, and implement upgrades as needed. Stay informed about emerging technologies and best practices in the field.



MONITORING & DATA ANALYSIS

Invest in monitoring and data analysis tools to gain insights into system performance. Monitoring allows you to detect issues early, optimize settings, and track energy consumption patterns. Data analysis helps you make informed decisions and prioritize efficiency upgrades.



OCCUPANT COMFORT & PRODUCTIVITY

Remember that the ultimate goal of efficient heating and humidification systems is to enhance occupant comfort and productivity. Regularly solicit feedback from building occupants and adjust system settings to meet their needs.



COST-BENEFIT ANALYSIS

When considering system upgrades or changes, conduct a thorough cost-benefit analysis. Evaluate the upfront costs, potential energy savings, maintenance requirements, and expected return on investment (ROI). This analysis helps justify investments in efficiency improvements.




COLLABORATION

Collaborate with professionals in the heating, ventilation, and air conditioning (HVAC) industry (AKA Lincoln Associates!) as well as sustainability experts. Leverage their expertise to design, implement, and maintain systems that align with your organization's efficiency and sustainability goals.


THE ROAD TO OPTIMAL HEATING & HUMIDIFICATION EFFICIENCY

TRAINING & EDUCATION




Ensure that your personnel are adequately trained to operate and maintain heating and humidification systems efficiently. Knowledgeable employees can help identify issues early and make informed decisions to optimize performance.

ADAPTATION



Be prepared to adapt to changing conditions, such as shifts in weather patterns or energy prices. Having flexible heating and humidification systems that can adjust to varying requirements will help you maintain efficiency over time.

INDUSTRY EXPERTISE

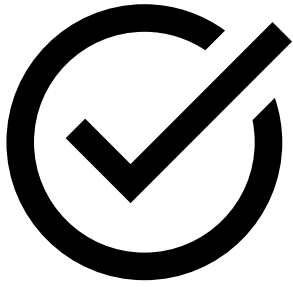


Stay informed about industry trends and emerging technologies in heating and humidification. As advancements occur, consider how they can benefit your organization in terms of both efficiency and sustainability.



In conclusion, the journey to optimal heating and humidification efficiency involves continuous efforts, compliance with regulations, sustainability initiatives, and a commitment to occupant comfort and productivity. By adopting a proactive and adaptive approach, you can achieve long-term energy savings, reduce environmental impact, and create a comfortable and sustainable industrial or commercial environment.

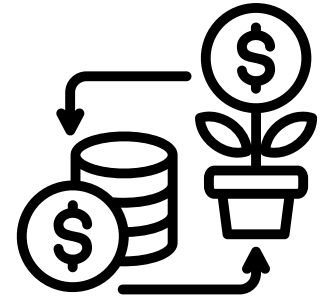
WHY CHOOSE LINCOLN ASSOCIATES?



Application
Qualifying

50+

Years Providing
Engineering
Design Assistance



Assistance
with Energy
ROIs

HEATING/HUMIDIFICATION RELATED VENDORS



- Gas Fired Humidifiers
- Electric Humidifiers



- Isothermal Humidification
- Adiabatic Humidification



- Gas or Electric Infrared Heaters with Zoning Controls



- Heat Pipe Energy Recovery



- Direct and Indirect Fired Heat, Fully Configurable
- 600 to 92,000 CFM



- Steam Coil Modules with Integral Face & Bypass Dampers
- Direct Fired Gas and Hot Water/Steam Forced Air Heaters



- Customizable Electric Heaters



- Air Turnover with Direct and Indirect Fired Heat, Fully Configurable
- 3,000 to 150,000 CFM



WHAT WE DO

CONSULTING

Our consultative sales approach focuses on understanding your needs and providing custom solutions that consistently exceed expectations. We aim to create long-lasting partnerships by offering valuable insights and ensuring our products and services align with your goals.

DESIGN & INTEGRATION

Our team of engineers designs your custom HVAC solution, seamlessly integrating diverse product lines as needed to optimize performance and efficiency for your project or application. Our strong vendor relationships guarantee access to top-quality equipment and support throughout the process.

DELIVERING VALUE THROUGH ENGINEERING SINCE 1972

Since 1972, Lincoln Associates has been a top HVAC & Refrigeration equipment representative across the Southeast. Our experienced engineers specialize in custom system integration for industrial and commercial end users, contractors, and engineers.

We represent a wide range of equipment manufacturers including refrigeration, heating, humidification, air purification, cooling, and dehumidification. Serving primarily Georgia, Alabama, Tennessee, Florida, and South Carolina, we guide our clients from project start to finish.

AREAS OF EXPERTISE



Industrial Dehumidification



Custom Air Handling Equipment



Medium & Low Temp Refrigeration



Process Chillers



Infrared Heating Systems



DOAS & Make-Up Air Systems



Replacement DX, Fluid & Steam Coils



Mission Critical HVAC Equipment



Air Rotation Units



Air Curtains

51

**YEARS IN
BUSINESS**

5K+

**HAPPY
CLIENTS**

10

**EXPERIENCED
ENGINEERS**

30+

**TRUSTED
VENDORS**



770.425.1500



admin@lincolnassoc.com



www.lincolnassoc.com



800 Battery Ave SE
Atlanta, GA 30339

OUR PARTNERS



OUR LOCATIONS

AUGUSTA OFFICE

☎ 706.755.3305
 ✉ tlewis@lincolnnassoc.com
 📍 2473 Perimeter Pkwy, Ste 112
 Augusta, GA 30909

CORPORATE OFFICE

☎ 770.425.1500
 ✉ admin@lincolnnassoc.com
 📍 800 Battery Ave SE
 Atlanta, GA 30339

ST. PETERSBURG OFFICE

☎ 727.506.5152
 ✉ rspark@lincolnnassoc.com
 📍 111 Second Avenue NE, Ste 701
 St. Petersburg, FL 33701

SCOTTSBORO OFFICE

☎ 770.372.7206
 ✉ mgarner@lincolnnassoc.com

BRUNSWICK OFFICE

☎ 912.288.7867
 ✉ ssullens@lincolnnassoc.com