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Monitoring Seasonal Impacts on Mobile Home AC Efficiency

How SEER Ratings Impact Energy Efficiency in Mobile Homes

Monitoring the efficiency of air conditioning (AC) systems in mobile homes is a critical aspect of maintaining comfort and energy efficiency throughout the year. Mobile homes, often characterized by their lightweight construction and limited insulation compared to traditional houses, are particularly susceptible to fluctuations in temperature. As the seasons change, so too does the demand placed on AC systems, making it essential to monitor their performance regularly.

One of the primary reasons for monitoring AC efficiency in mobile homes is to manage energy consumption effectively. Air conditioners can account for a significant portion of a home's energy use, especially during peak summer months when they are running constantly to maintain a comfortable indoor environment. By keeping an eye on how well your AC is functioning, homeowners can identify potential issues early on, such as refrigerant leaks or clogged filters, which can reduce efficiency and increase energy usage. HVAC warranties can save mobile home owners from unexpected repair costs **mobile home hvac duct** expert. Addressing these problems promptly not only helps keep utility bills in check but also reduces the environmental impact associated with excessive energy consumption.

Furthermore, monitoring AC efficiency plays a vital role in extending the lifespan of the unit. Regular maintenance checks can help identify wear and tear that might lead to more serious malfunctions if left unattended. For instance, detecting problems like failing compressors or worn-out fan motors early can prevent costly repairs or even premature replacement of the entire system. This proactive approach ensures that mobile home residents are not caught off guard by unexpected breakdowns during extreme weather conditions when reliable cooling is most needed.

Seasonal variations also necessitate close attention to AC performance in mobile homes. During transitional periods like spring and fall, when temperatures fluctuate significantly between day and night, an efficient AC system must be able to adapt quickly without compromising comfort or increasing costs unnecessarily. Monitoring how your system handles these changes provides valuable insights into its overall health and readiness for more demanding seasons.

Moreover, understanding seasonal impacts on AC efficiency allows homeowners to make informed decisions about other aspects of home management. For example, if it's observed that certain times of year strain the system more than others, additional insulation or strategic landscaping might be implemented to provide natural cooling benefits and reduce reliance on mechanical systems.

In conclusion, monitoring air conditioning efficiency in mobile homes is not merely about ensuring comfort; it is fundamentally linked to responsible energy management, cost savings, equipment longevity, and preparedness for seasonal changes. By prioritizing regular assessments of their AC systems' performance throughout the year, mobile homeowners can enjoy a consistently comfortable living environment while minimizing both expenses and ecological footprints.

The Relationship Between SEER Ratings and Cooling Costs —

Seasonal variations can significantly impact the performance of air conditioning (AC) systems in mobile homes, necessitating continuous monitoring and adjustments to ensure optimal efficiency. Mobile homes, by design, often lack the robust insulation found in traditional houses, making them more susceptible to external temperature fluctuations. This susceptibility means that as seasons change, so too does the demand on AC systems to maintain a comfortable indoor climate.

During the sweltering months of summer, AC units must work harder to counteract the intense heat. The high temperatures increase thermal gain through thin walls and windows, causing the AC system to consume more energy as it struggles to keep interiors cool. This heightened demand not only escalates electricity bills but also accelerates wear and tear on the unit, potentially shortening its lifespan.

Conversely, in cooler seasons like autumn and spring, the milder weather provides a respite for AC systems. These periods often see reduced usage as natural ventilation becomes a viable alternative for maintaining comfort within mobile homes. However, these transitional seasons present their own challenges; fluctuating temperatures can make it difficult to determine when it's necessary to run the AC versus opening windows or utilizing fans.

Winter introduces another set of considerations. While heating is typically prioritized during colder months, some regions may experience warm spells that necessitate sporadic use of air conditioning. Insufficient usage during winter can lead to maintenance issues being overlooked until peak season hits again-an oversight that can prove costly both financially and in terms of comfort.

Monitoring seasonal impacts on mobile home AC efficiency involves several strategies aimed at optimizing performance year-round. Regular maintenance checks are crucial; these should include cleaning or replacing filters, inspecting ductwork for leaks or blockages, and ensuring refrigerant levels are adequate. Additionally, investing in programmable thermostats allows homeowners greater control over their energy consumption by setting specific times for cooling based on habit patterns rather than constant use.

Furthermore, improving insulation within mobile homes can mitigate some of the detrimental effects of seasonal changes on AC performance. Simple steps such as adding window film or using heavy drapes can significantly reduce thermal gain during summer while retaining warmth in winter.

In conclusion, understanding and adapting to seasonal variations is key to maintaining efficient air conditioning performance in mobile homes. Through vigilant monitoring and proactive measures such as regular maintenance and enhanced insulation practices, homeowners can ensure their AC systems operate effectively throughout the year while managing costs and prolonging equipment life.

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Choosing the Right SEER Rating for Your Mobile Home HVAC System

The efficiency of an air conditioning (AC) system is a topic of paramount importance, especially for mobile home owners who often grapple with the challenges posed by fluctuating seasonal temperatures. Monitoring and assessing AC efficiency across different seasons is critical not only for ensuring comfort but also for optimizing energy consumption and reducing utility costs. This essay explores various methods for evaluating AC efficiency during different seasons, with a particular focus on mobile homes.

Firstly, understanding the unique challenges that mobile homes face in terms of insulation and structural design is essential. Unlike traditional homes, mobile homes often have less robust insulation, which can lead to significant thermal loss or gain depending on the season. This makes it imperative to assess AC efficiency accurately to maintain a comfortable living environment.

One effective method for assessing AC efficiency is through energy audits. An energy audit involves a comprehensive evaluation of how much energy your AC system consumes relative to its cooling output. This can be done by comparing electricity bills over different seasons and correlating them with temperature data to identify patterns of inefficiency. By doing so, homeowners can pinpoint specific times when their AC systems are underperforming or being over-utilized.

Thermal imaging technology offers another innovative approach to monitoring AC efficiency. By using infrared cameras, homeowners can detect areas where cool air might be escaping from their mobile homes or where heat is penetrating inside during summer months. Thermal imaging helps in identifying poor insulation points or leaks that need sealing, thus enhancing the overall performance of the AC system throughout various seasons.

Moreover, regular maintenance and inspections play a crucial role in sustaining optimal AC performance year-round. Seasonal check-ups before extreme weather conditions set in can help identify any wear and tear or potential issues that might affect efficiency. For instance, cleaning or replacing air filters ensures unobstructed airflow, while checking refrigerant levels guarantees that the system runs smoothly without overexertion.

Smart thermostats also offer a modern solution for maintaining efficient climate control in mobile homes across different seasons. These devices learn homeowner's preferences over time and adjust cooling schedules automatically based on occupancy patterns and weather forecasts. By providing real-time data on energy usage and enabling remote adjustments via smartphone apps, smart thermostats empower homeowners to optimize their AC systems proactively.

Finally, considering supplementary solutions such as window treatments or reflective coatings could enhance seasonal efficiency further by reducing solar heat gain during summer months while retaining warmth in winter.

In conclusion, assessing the efficiency of an air conditioning system through various methods-ranging from energy audits and thermal imaging to regular maintenance checks-is vital for managing seasonal impacts effectively within mobile homes. As technology advances continue offering new tools like smart thermostats alongside traditional techniques like insulation improvements; homeowners are better equipped than ever before not only preserve comfort but also achieve significant savings all year long amidst changing climatic conditions globally impacting everyone today!

Factors Influencing SEER Rating Effectiveness in Mobile Homes

Maintaining optimal air conditioning functionality in mobile homes across various climates presents a unique set of challenges. Mobile homes, by their nature, often have less insulation and different construction standards compared to traditional houses, making them particularly susceptible to the whims of seasonal changes. As temperatures rise and fall with the seasons, mobile home occupants must be vigilant in monitoring how these fluctuations impact AC efficiency.

One primary challenge is the varying thermal demands that come with different climates. In regions with hot summers, air conditioners must work overtime to maintain comfortable interior temperatures. This increased demand can lead to wear and tear on AC units, potentially shortening their lifespan if not properly maintained. Frequent use also results in higher energy consumption, which can become financially burdensome for homeowners.

Conversely, in colder climates or during the winter months, maintaining an efficient AC system involves ensuring that it remains functional despite limited use. Extended periods of inactivity can lead to mechanical issues such as stagnant refrigerant or seized components when the unit is finally needed again. Therefore, regular maintenance checks are crucial even when the system isn't actively cooling the home.

Humidity levels pose another significant challenge across different environments. High humidity can strain an air conditioning unit's capacity to dehumidify indoor air effectively while cooling it. This dual demand not only reduces efficiency but also exacerbates mold growth risks-a concern especially pertinent in mobile homes due to their compact nature and potential for moisture accumulation.

Moreover, dust and debris accumulation represent persistent problems regardless of climate but are often aggravated by specific seasonal conditions such as pollen during spring or dry particulates in arid regions during summer. These contaminants can clog filters and impair airflow, leading to reduced efficiency and increased energy costs as units struggle to achieve desired temperature settings.

The structural characteristics of mobile homes themselves also play a role in these challenges. Poorly sealed windows or doors can allow conditioned air to escape easily or let outside air intrude, forcing the AC system into overdrive just to maintain a consistent climate inside-a problem compounded by extreme weather conditions typical of certain seasons.

To mitigate these challenges and ensure optimal functionality of mobile home AC systems year-round, homeowners should adopt proactive monitoring strategies. Regular inspection and cleaning of filters are essential steps that improve airflow and overall system performance while reducing energy consumption. Additionally, investing in programmable thermostats allows for better regulation of indoor temperatures based on occupancy patterns-helping balance comfort with cost-efficiency.

Seasonal HVAC inspections by professionals can preemptively identify potential issues before they escalate into costly repairs or replacements-ensuring that systems remain operational regardless of external temperatures or humidity levels encountered throughout the year.

In conclusion, while maintaining optimal AC functionality within mobile homes across varied climates certainly presents its fair share of difficulties-from thermal demands dictated by regional weather patterns to inherent structural vulnerabilities-these challenges are surmountable through diligent upkeep and strategic management practices tailored specifically towards enhancing both efficiency and longevity under any seasonal condition encountered along life's journey within these cozy abodes on wheels.

Comparing SEER Ratings Across Different Mobile Home Cooling Systems

In the dynamic world of mobile homes, where flexibility and adaptability reign supreme, ensuring optimal air conditioning efficiency throughout changing seasons is not just a convenience but a necessity. Mobile homes often face unique challenges when it comes to temperature control due to their construction and mobility. As such, innovative solutions for enhancing seasonal AC efficiency are critical. By monitoring seasonal impacts on mobile home AC systems, homeowners can achieve both comfort and energy savings.

One of the key factors influencing the efficiency of air conditioning in mobile homes is insulation. Unlike traditional homes, mobile homes may have less robust insulation, leading to higher thermal exchange with the external environment. During summer months, when temperatures soar, inadequate insulation can cause cool air to escape rapidly, forcing AC units to work overtime. Conversely, in colder months, poor insulation may allow cold drafts that counteract heating efforts. Therefore, one effective solution is upgrading insulation materials and techniques tailored specifically for mobile home designs.

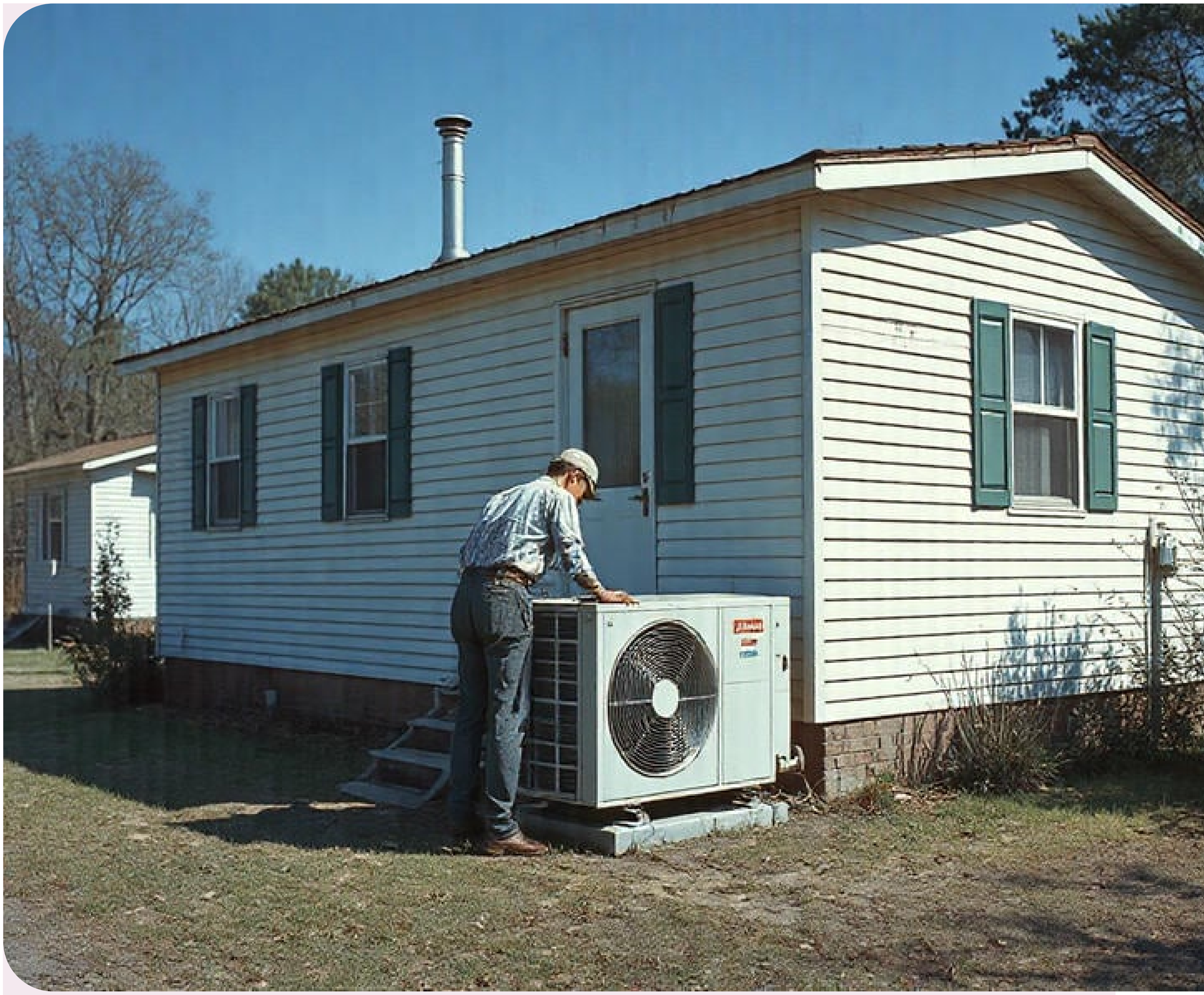
Another innovative approach involves leveraging smart technology for real-time monitoring and control of AC systems. Smart thermostats equipped with sensors can provide invaluable data on temperature fluctuations inside and outside the home. These devices allow homeowners to adjust settings remotely via smartphone apps or even automate changes based on pre-set conditions or weather forecasts. This level of control ensures that the system operates only when necessary, reducing energy usage and wear-and-tear on equipment.

Furthermore, regular maintenance plays a significant role in maintaining AC efficiency across seasons. Simple practices like cleaning or replacing filters every month during peak usage periods can prevent clogs that force systems to work harder than needed. Additionally, scheduling professional inspections at least once a year can help detect issues early-such as refrigerant leaks or worn-out components-that might otherwise lead to reduced performance.

An emerging trend worth considering is integrating renewable energy sources into mobile home setups. Solar panels offer a sustainable way to power air conditioning units while reducing reliance on traditional electricity grids. By harnessing solar energy during sunny periods-often when cooling needs are highest-homeowners can enjoy lower utility bills and contribute positively towards environmental conservation.

Lastly, educating residents about efficient cooling practices remains crucial for maximizing results from these innovations. Simple behavioral changes like closing blinds during hot afternoons or using fans alongside AC units for more even distribution of cool air can significantly enhance overall system effectiveness without additional costs.

In conclusion, enhancing seasonal AC efficiency in mobile homes requires a multifaceted approach combining technological advancements with practical strategies tailored specifically for this living style's unique demands. Through better insulation solutions; adoption of smart technologies; diligent maintenance routines; integration with renewable energies; and informed user behavior-mobile homeowners stand poised not only improve their indoor comfort but also realize tangible savings along their journey through varying seasons year-round.



Tips for Maintaining Optimal Performance of High-SEER Rated Systems

In the realm of mobile home living, maintaining a comfortable indoor environment is crucial, yet challenging due to the unique nature of these dwellings. The efficiency of HVAC systems in mobile homes is particularly impacted by seasonal changes, making it imperative to monitor and understand these variations. Through real-world case studies, we can gain valuable insights into how different seasons affect mobile home air conditioning (AC) systems and inform strategies for optimization.

One noteworthy case study comes from a community in Arizona, where scorching summers pose significant challenges for mobile home residents. In this region, temperatures often soar above 100 degrees Fahrenheit, placing immense stress on AC units. A detailed examination revealed that during peak summer months, AC systems in mobile homes struggled to maintain desired temperature levels due to inadequate insulation typical of older models. This inefficiency not only increased energy consumption but also resulted in frequent system breakdowns.

To address these issues, some residents opted for upgrading insulation and sealing leaks around windows and doors. By doing so, they significantly reduced the workload on their AC systems. Over time, these improvements led to lower energy bills and enhanced comfort indoors during the harsh summer months-demonstrating how preemptive measures can mitigate seasonal impacts on HVAC efficiency.

Conversely, a case study from Minnesota illustrates how winter conditions affect mobile home heating systems. Here, sub-zero temperatures present challenges quite opposite to those found in Arizona. Mobile homes often experience heat loss due to thin walls and poor insulation-a problem exacerbated by icy winds common in northern climates. Residents reported uneven heating within their homes and higher utility costs as heaters worked overtime to maintain warmth.

Through monitoring and data collection over several winters, researchers identified the importance of regular maintenance checks before the onset of cold weather. Ensuring that heating elements are functioning optimally and replacing any worn-out parts proved vital in enhancing system efficiency. Moreover, adding skirting around the base of mobile homes helped reduce heat loss significantly-a simple yet effective measure that improved overall thermal performance.

These case studies underscore the critical role that environmental factors play in determining HVAC efficiency within mobile homes across different regions. They highlight the necessity for tailored solutions based on local climates-whether it's enhancing insulation against summer heat or fortifying against winter's chill.

Monitoring seasonal impacts allows homeowners and technicians alike to anticipate potential issues before they escalate into costly repairs or replacements. Furthermore, adopting energy-efficient practices not only benefits individual households financially but also contributes positively towards broader environmental sustainability goals.

Ultimately, understanding these real-world examples emphasizes proactive management as key to optimizing HVAC systems' functionality throughout varying seasons-ensuring that regardless of external conditions, mobile home environments remain comfortable sanctuaries year-round.

About Air conditioning

This article is about cooling of air. For the Curved Air album, see Air Conditioning (album). For a similar device capable of both cooling and heating, see heat pump. "a/c" redirects here. For the abbreviation used in banking and book-keeping, see Account (disambiguation). For other uses, see AC.

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There are various types of air conditioners. Popular examples include: Window-mounted air conditioner (Suriname, 1955); Ceiling-mounted cassette air conditioner (China, 2023); Wall-mounted air conditioner (Japan, 2020); Ceiling-mounted console (Also called ceiling suspended) air conditioner (China, 2023); and portable air conditioner (Vatican City, 2018).

Air conditioning, often abbreviated as **A/C** (US) or **air con** (UK),[1] is the process of removing heat from an enclosed space to achieve a more comfortable interior temperature (sometimes referred to as 'comfort cooling') and in some cases also strictly controlling the humidity of internal air. Air conditioning can be achieved using a mechanical 'air conditioner' or by other methods, including passive cooling and ventilative cooling.[2][3] Air conditioning is a member of a family of systems and techniques that provide heating, ventilation, and air conditioning (HVAC).[4] Heat pumps are similar in many ways to air conditioners, but use a reversing valve to allow them both to heat and to cool an enclosed space.[5]

Air conditioners, which typically use vapor-compression refrigeration, range in size from small units used in vehicles or single rooms to massive units that can cool large buildings.[6] Air source heat pumps, which can be used for heating as well as cooling, are becoming increasingly common in cooler climates.

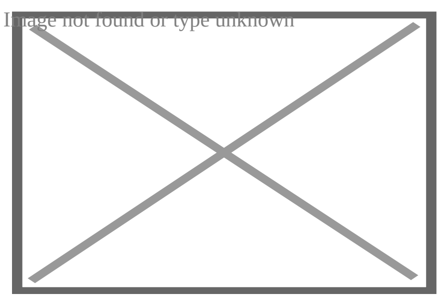
Air conditioners can reduce mortality rates due to higher temperature.[7] According to the International Energy Agency (IEA) 1.6 billion air conditioning units were used globally in 2016.[8] The United Nations called for the technology to be made more sustainable to mitigate climate change and for the use of alternatives, like passive cooling, evaporative cooling, selective shading, windcatchers, and better thermal insulation.

History

[edit]

Air conditioning dates back to prehistory.[9] Double-walled living quarters, with a gap between the two walls to encourage air flow, were found in the ancient city of Hamoukar, in modern Syria.[10] Ancient Egyptian buildings also used a wide variety of passive air-conditioning techniques.[11] These became widespread from the Iberian Peninsula through North Africa, the Middle East, and Northern India.[12]

Passive techniques remained widespread until the 20th century when they fell out of fashion and were replaced by powered air conditioning. Using information from engineering studies of traditional buildings, passive techniques are being revived and modified for 21st-century architectural designs.[13][12]



An array of air conditioner condenser units outside a commercial office building

Air conditioners allow the building's indoor environment to remain relatively constant, largely independent of changes in external weather conditions and internal heat loads. They also enable deep plan buildings to be created and have allowed people to live comfortably in hotter parts of the world.[14]

Development

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Preceding discoveries

[edit]

In 1558, Giambattista della Porta described a method of chilling ice to temperatures far below its freezing point by mixing it with potassium nitrate (then called "nitre") in his popular science book *Natural Magic*.[15][16][17] In 1620, Cornelis Drebbel demonstrated "Turning Summer into Winter" for James I of England, chilling part of the Great Hall of Westminster Abbey with an apparatus of troughs and vats.[18] Drebbel's contemporary Francis Bacon, like della Porta a believer in science communication, may not have been present at the demonstration, but in a book published later the same year, he described it as "experiment of artificial freezing" and said that "Nitre (or rather its spirit) is very cold, and hence nitre or salt when added to snow or ice intensifies the cold of the latter, the nitre by adding to its cold, but the salt by supplying activity to the cold of the snow."[15]

In 1758, Benjamin Franklin and John Hadley, a chemistry professor at the University of Cambridge, conducted experiments applying the principle of evaporation as a means to cool an object rapidly. Franklin and Hadley confirmed that the evaporation of highly volatile liquids (such as alcohol and ether) could be used to drive down the temperature of an object past the freezing point of water. They experimented with the bulb of a mercury-in-glass thermometer as their object. They used a bellows to speed up the evaporation. They lowered the temperature of the thermometer bulb down to ?14 °C (7 °F) while the ambient temperature was 18 °C (64 °F). Franklin noted that soon after they passed the freezing point of water 0 °C (32 °F), a thin film of ice formed on the surface of the thermometer's bulb and that the ice mass was about 6 mm (1?4 in) thick when they stopped the experiment upon reaching ?14 °C (7 °F). Franklin concluded: "From this experiment, one may see the possibility of freezing a man to death on a warm summer's day."[19]

The 19th century included many developments in compression technology. In 1820, English scientist and inventor Michael Faraday discovered that compressing and liquefying ammonia could chill air when the liquefied ammonia was allowed to evaporate.[20] In 1842, Florida physician John Gorrie used compressor technology to create ice, which he used to cool air for his patients in his hospital in Apalachicola, Florida. He hoped to eventually use his ice-making machine to regulate the temperature of buildings.[20][21] He envisioned centralized air conditioning that could cool entire cities. Gorrie was granted a patent in 1851,[22] but following the death of his main backer, he was not able to realize his invention.[23] In 1851, James Harrison created the first mechanical ice-making machine in Geelong, Australia, and was granted a patent for an ether vapor-compression refrigeration system in 1855 that produced three tons of ice per day.[24] In 1860, Harrison established a second ice company. He later entered the debate over competing against the American advantage of ice-refrigerated beef sales to the United Kingdom.[24]

First devices

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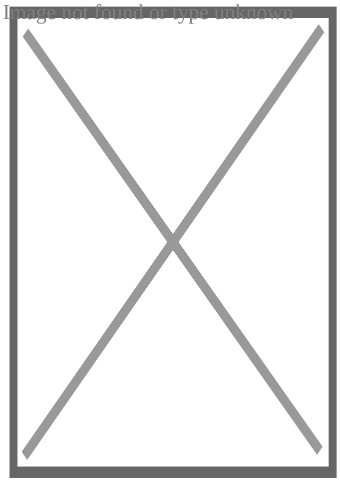


Willis Carrier, who is credited with building the first modern electrical air conditioning unit

Electricity made the development of effective units possible. In 1901, American inventor Willis H. Carrier built what is considered the first modern electrical air conditioning unit.[25][26][27][28] In 1902, he installed his first air-conditioning system, in the Sackett-Wilhelms Lithographing & Publishing Company in Brooklyn, New York.[29] His invention controlled both the temperature and humidity, which helped maintain consistent paper dimensions and ink alignment at the printing plant. Later, together with six other employees, Carrier formed The Carrier Air Conditioning Company of America, a business that in 2020 employed 53,000 people and was valued at $18.6 billion.[30][31]

In 1906, Stuart W. Cramer of Charlotte, North Carolina, was exploring ways to add moisture to the air in his textile mill. Cramer coined the term "air conditioning" in a patent claim which he filed that year, where he suggested that air conditioning was analogous to "water conditioning", then a well-known process for making textiles easier to process.[32] He combined moisture with ventilation to "condition" and change the air in the factories; thus, controlling the humidity that is necessary in textile plants. Willis Carrier adopted the term and incorporated it into the name of his company.[33]

Domestic air conditioning soon took off. In 1914, the first domestic air conditioning was installed in Minneapolis in the home of Charles Gilbert Gates. It is, however, possible that the considerable device (c. 2.1 m × 1.8 m × 6.1 m; 7 ft × 6 ft × 20 ft) was never used, as the house remained uninhabited[20] (Gates had already died in October 1913.)

In 1931, H.H. Schultz and J.Q. Sherman developed what would become the most common type of individual room air conditioner: one designed to sit on a window ledge. The units went on sale in 1932 at US$10,000 to $50,000 (the equivalent of $200,000 to $1,100,000 in 2023.)[20] A year later, the first air conditioning systems for cars were offered for sale.[34] Chrysler Motors introduced the first practical semi-portable air conditioning unit in 1935,[35] and Packard became the first automobile manufacturer to offer an air conditioning unit in its cars in 1939.[36]

Further development

[edit]

Innovations in the latter half of the 20th century allowed more ubiquitous air conditioner use. In 1945, Robert Sherman of Lynn, Massachusetts, invented a portable, in-window air conditioner that cooled, heated, humidified, dehumidified, and filtered the air.[37] The first inverter air conditioners were released in 1980–1981.[38][39]

In 1954, Ned Cole, a 1939 architecture graduate from the University of Texas at Austin, developed the first experimental "suburb" with inbuilt air conditioning in each house. 22 homes were developed on a flat, treeless track in northwest Austin, Texas, and the community was christened the 'Austin Air-Conditioned Village.' The residents were subjected to a year-long study of the effects of air conditioning led by the nation’s premier air conditioning companies, builders, and social scientists. In addition, researchers from UT’s Health Service and Psychology Department studied the effects on the "artificially cooled humans." One of the more amusing discoveries was that each family reported being troubled with scorpions, the leading theory being that scorpions sought cool, shady places. Other reported changes in lifestyle were that mothers baked more, families ate heavier foods, and they were more apt to choose hot drinks.[40][41]

Air conditioner adoption tends to increase above around $10,000 annual household income in warmer areas.[42] Global GDP growth explains around 85% of increased air condition adoption by 2050, while the remaining 15% can be explained by climate change.[42]

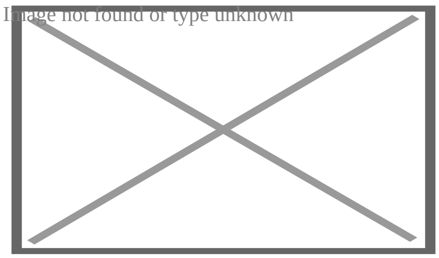
As of 2016 an estimated 1.6 billion air conditioning units were used worldwide, with over half of them in China and USA, and a total cooling capacity of 11,675 gigawatts.[8][43] The International Energy Agency predicted in 2018 that the number of air conditioning units would grow to around 4 billion units by 2050 and that the total cooling capacity would grow to around 23,000 GW, with the biggest increases in India and China.[8] Between 1995 and 2004, the proportion of urban households in China with air conditioners increased from 8% to 70%.[44] As of 2015, nearly 100 million homes, or about 87% of US households, had air conditioning systems.[45] In 2019, it was estimated that 90% of new single-family homes constructed in the US included air conditioning (ranging from 99% in the South to 62% in the West).[46][47]

Operation

[edit]

Operating principles

[edit]
Main article: Vapor-compression refrigeration



A simple stylized diagram of the refrigeration cycle: 1) condensing coil, 2) expansion valve, 3) evaporator coil, 4) compressor

Cooling in traditional air conditioner systems is accomplished using the vapor-compression cycle, which uses a refrigerant's forced circulation and phase change between gas and liquid to transfer heat.[48][49] The vapor-compression cycle can occur within a unitary, or packaged piece of equipment; or within a chiller that is connected to terminal cooling equipment (such as a fan coil unit in an air handler) on its evaporator side and heat rejection equipment such as a cooling tower on its condenser side. An air source heat pump shares many components with an air conditioning system, but includes a reversing valve, which allows the unit to be used to heat as well as cool a space.[50]

Air conditioning equipment will reduce the absolute humidity of the air processed by the system if the surface of the evaporator coil is significantly cooler than the dew point of the surrounding air. An air conditioner designed for an occupied space will typically achieve a 30% to 60% relative humidity in the occupied space.[51]

Most modern air-conditioning systems feature a dehumidification cycle during which the compressor runs. At the same time, the fan is slowed to reduce the evaporator temperature and condense more water. A dehumidifier uses the same refrigeration cycle but incorporates both the evaporator and the condenser into the same air path; the air first passes over the evaporator coil, where it is cooled[52] and dehumidified before passing over the condenser coil, where it is warmed again before it is released back into the room.[*citation needed*]

Free cooling can sometimes be selected when the external air is cooler than the internal air. Therefore, the compressor does not need to be used, resulting in high cooling efficiencies for these times. This may also be combined with seasonal thermal energy storage.[53]

Heating

[edit]
Main article: Heat pump

Some air conditioning systems can reverse the refrigeration cycle and act as an air source heat pump, thus heating instead of cooling the indoor environment. They are also commonly referred to as "reverse cycle air conditioners". The heat pump is significantly more energy-efficient than electric resistance heating, because it moves energy from air or groundwater to the heated space and the heat from purchased electrical energy. When the heat pump is in heating mode, the indoor evaporator coil switches roles and becomes the condenser coil, producing heat. The outdoor condenser unit also switches roles to serve as the evaporator and discharges cold air (colder than the ambient outdoor air).

Most air source heat pumps become less efficient in outdoor temperatures lower than 4 °C or 40 °F.[54] This is partly because ice forms on the outdoor unit's heat exchanger coil, which blocks air flow over the coil. To compensate for this, the heat pump system must temporarily switch back into the regular air conditioning mode to switch the outdoor evaporator coil *back* to the condenser coil, to heat up and defrost. Therefore, some heat pump systems will have electric resistance heating in the indoor air path that is activated only in this mode to compensate for the temporary indoor air cooling, which would otherwise be uncomfortable in the winter.

Newer models have improved cold-weather performance, with efficient heating capacity down to ?14 °F (?26 °C).[55][54][56] However, there is always a chance that the humidity that condenses on the heat exchanger of the outdoor unit could freeze, even in models that have improved cold-weather performance, requiring a defrosting cycle to be performed.

The icing problem becomes much more severe with lower outdoor temperatures, so heat pumps are sometimes installed in tandem with a more conventional form of heating, such as an electrical heater, a natural gas, heating oil, or wood-burning fireplace or central heating, which is used instead of or in addition to the heat pump during harsher winter temperatures. In this case, the heat pump is used efficiently during milder temperatures, and the system is switched to the conventional heat source when the outdoor temperature is lower.

Performance

[edit]

Main articles: coefficient of performance, Seasonal energy efficiency ratio, and European seasonal energy efficiency ratio

The coefficient of performance (COP) of an air conditioning system is a ratio of useful heating or cooling provided to the work required.[57][58] Higher COPs equate to lower operating costs. The COP usually exceeds 1; however, the exact value is highly dependent on operating conditions, especially absolute temperature and relative temperature between sink and system, and is often graphed or averaged against expected conditions.[59] Air conditioner equipment power in the U.S. is often described in terms of "tons of refrigeration", with each approximately equal to the cooling power of one short ton (2,000 pounds (910 kg) of ice melting in a 24-hour period. The value is equal to 12,000 BTU_{IT} per hour, or 3,517 watts.[60] Residential central air systems are usually from 1 to 5 tons (3.5 to 18 kW) in capacity.[*citation needed*]

The efficiency of air conditioners is often rated by the seasonal energy efficiency ratio (SEER), which is defined by the Air Conditioning, Heating and Refrigeration Institute in its 2008 standard AHRI 210/240, *Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment*.[61] A similar standard is the European seasonal energy efficiency ratio (ESEER).[*citation needed*]

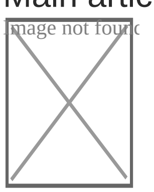
Efficiency is strongly affected by the humidity of the air to be cooled. Dehumidifying the air before attempting to cool it can reduce subsequent cooling costs by as much as 90 percent. Thus, reducing dehumidifying costs can materially affect overall air conditioning costs.[62]

Control system

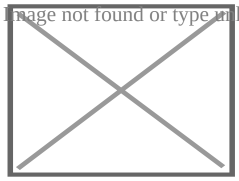
[edit]

Wireless remote control

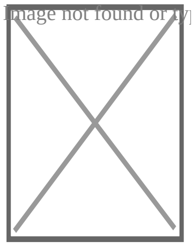
[edit]
Main articles: Remote control and Infrared blaster

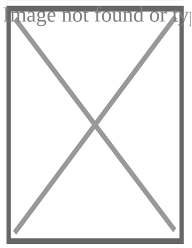


A wireless remote controller



The infrared transmitting LED on the remote





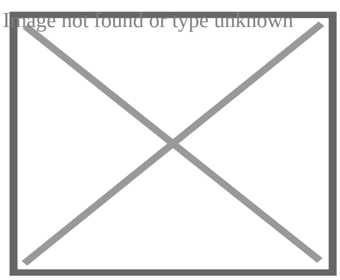
The infrared receiver on the air conditioner

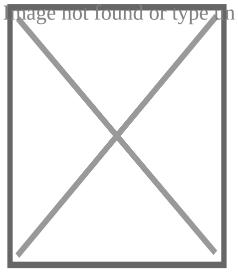
This type of controller uses an infrared LED to relay commands from a remote control to the air conditioner. The output of the infrared LED (like that of any infrared remote) is invisible to the human eye because its wavelength is beyond the range of visible light (940 nm). This system is commonly used on mini-split air conditioners because it is simple and portable. Some window and ducted central air conditioners uses it as well.

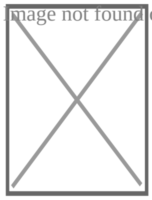
Wired controller

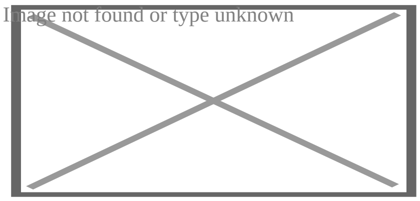
[edit]

Main article: Thermostat









Several wired controllers (Indonesia, 2024)

A wired controller, also called a "wired thermostat," is a device that controls an air conditioner by switching heating or cooling on or off. It uses different sensors to measure temperatures and actuate control operations. Mechanical thermostats commonly use bimetallic strips, converting a temperature change into mechanical displacement, to actuate control of the air conditioner. Electronic thermostats, instead, use a thermistor or other semiconductor sensor, processing temperature change as electronic signals to control the air conditioner.

These controllers are usually used in hotel rooms because they are permanently installed into a wall and hard-wired directly into the air conditioner unit, eliminating the need for batteries.

Types

[edit]

Types	Typical Capacity*	Air supply	Mounting	Typical application
Mini-split	small – large	Direct	Wall	Residential
Window	very small – small	Direct	Window	Residential
Portable	very small – small	Direct / Ducted	Floor	Residential, remote areas

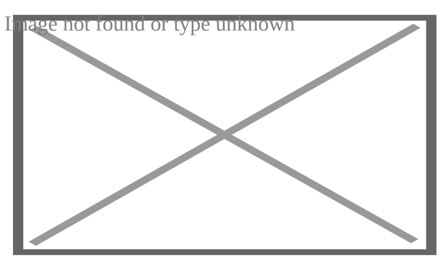
Ducted (individual)	small – very large	Ducted	Ceiling	Residential, commercial
Ducted (central)	medium – very large	Ducted	Ceiling	Residential, commercial
Ceiling suspended	medium – large	Direct	Ceiling	Commercial
Cassette	medium – large	Direct / Ducted	Ceiling	Commercial
Floor standing	medium – large	Direct / Ducted	Floor	Commercial
Packaged	very large	Direct / Ducted	Floor	Commercial
Packaged RTU (Rooftop Unit)	very large	Ducted	Rooftop	Commercial

* where the typical capacity is in kilowatt as follows:

- very small: <1.5 kW
- small: 1.5–3.5 kW
- medium: 4.2–7.1 kW
- large: 7.2–14 kW
- very large: >14 kW

Mini-split and multi-split systems

[edit]



Evaporator, indoor unit, or terminal, side of a ductless split-type air conditioner

Ductless systems (often mini-split, though there are now ducted mini-split) typically supply conditioned and heated air to a single or a few rooms of a building, without ducts and in a decentralized manner.[63] Multi-zone or multi-split systems are a common application of ductless systems and allow up to eight rooms (zones or locations) to be conditioned independently from each other, each with its indoor unit and simultaneously from a single outdoor unit.

The first mini-split system was sold in 1961 by Toshiba in Japan, and the first wall-mounted mini-split air conditioner was sold in 1968 in Japan by Mitsubishi Electric, where small home sizes motivated their development. The Mitsubishi model was the first air conditioner with a cross-flow fan.[64][65][66] In 1969, the first mini-split air conditioner was sold in the US.[67] Multi-zone ductless systems were invented by Daikin in 1973, and variable refrigerant flow systems (which can be thought of as larger multi-split systems) were also invented by Daikin in 1982. Both were first sold in Japan.[68] Variable refrigerant flow systems when compared with central plant cooling from an air handler, eliminate the need for large cool air ducts, air handlers, and chillers; instead cool refrigerant is transported through much smaller pipes to the indoor units in the spaces to be conditioned, thus allowing for less space above dropped ceilings and a lower structural impact, while also allowing for more individual and independent temperature control of spaces. The outdoor and indoor units can be spread across the building.[69] Variable refrigerant flow indoor units can also be turned off individually in unused spaces.[*citation needed*] The lower start-up power of VRF's DC inverter compressors and their inherent DC power requirements also allow VRF solar-powered heat pumps to be run using DC-providing solar panels.

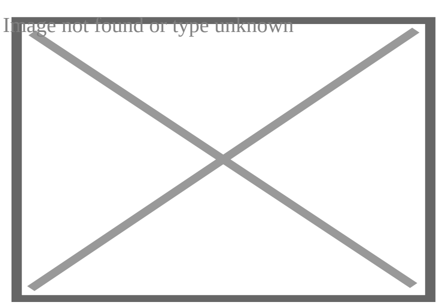
Ducted central systems

[edit]

Split-system central air conditioners consist of two heat exchangers, an outside unit (the condenser) from which heat is rejected to the environment and an internal heat exchanger (the evaporator, or Fan Coil Unit, FCU) with the piped refrigerant being circulated between the two. The FCU is then connected to the spaces to be cooled by ventilation ducts.[70] Floor standing air conditioners are similar to this type of air conditioner but sit within spaces that need cooling.

Central plant cooling

[edit]
See also: Chiller



Industrial air conditioners on top of the shopping mall *Passage* in Linz, Austria

Large central cooling plants may use intermediate coolant such as chilled water pumped into air handlers or fan coil units near or in the spaces to be cooled which then duct or deliver cold air into the spaces to be conditioned, rather than ducting cold air directly to these spaces from the plant, which is not done due to the low density and heat capacity of air, which would require impractically large ducts. The chilled water is cooled by chillers in the plant, which uses a refrigeration cycle to cool water, often transferring its heat to the atmosphere even in liquid-cooled chillers through the use of cooling towers. Chillers may be air- or liquid-cooled.[71][72]

Portable units

[edit]

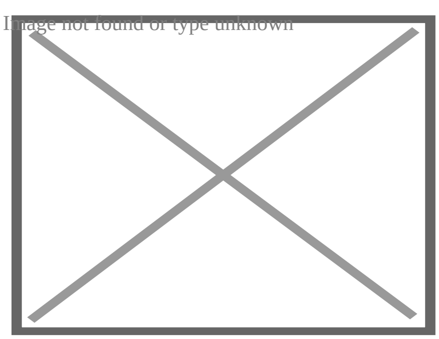
A portable system has an indoor unit on wheels connected to an outdoor unit via flexible pipes, similar to a permanently fixed installed unit (such as a ductless split air conditioner).

Hose systems, which can be *monoblock* or *air-to-air*, are vented to the outside via air ducts. The *monoblock* type collects the water in a bucket or tray and stops when full. The *air-to-air* type re-evaporates the water, discharges it through the ducted hose, and can run continuously. Many but not all portable units draw indoor air and expel it outdoors through a single duct, negatively impacting their overall cooling efficiency.

Many portable air conditioners come with heat as well as a dehumidification function.[73]

Window unit and packaged terminal

[edit]



Through-the-wall PTAC units, University Motor Inn, Philadelphia

Main article: Packaged terminal air conditioner

The packaged terminal air conditioner (PTAC), through-the-wall, and window air conditioners are similar. These units are installed on a window frame or on a wall opening. The unit usually has an internal partition separating its indoor and outdoor sides, which contain the unit's condenser and evaporator, respectively. PTAC systems may be adapted to provide heating in cold weather, either directly by using an electric strip, gas, or other heaters, or by reversing the refrigerant flow to heat the interior and draw heat from the exterior air, converting the air conditioner into a heat pump. They may be installed in a wall opening with the help of a special sleeve on the wall and a custom grill that is flush with the wall and window air conditioners can also be installed in a window, but without a custom grill.[74]

Packaged air conditioner

[edit]

Packaged air conditioners (also known as self-contained units)[75][76] are central systems that integrate into a single housing all the components of a split central system, and deliver air, possibly through ducts, to the spaces to be cooled. Depending on their construction they may be outdoors or indoors, on roofs (rooftop units),[77][78] draw the air to be conditioned from inside or outside a building and be water or air-cooled. Often, outdoor units are air-cooled while indoor units are liquid-cooled using a cooling tower.[70][79][80][81][82][83]

Types of compressors

[edit]

Compressor types	Common applications	Typical capacity	Efficiency	Durability	Repairability
Reciprocating	Refrigerator, Walk-in freezer, portable air conditioners	small – large	very low (small capacity) medium (large capacity)	very low	medium
Rotary vane	Residential mini splits	small	low	low	easy

Scroll	Commercial and central systems, VRF	medium	medium	medium	easy
Rotary screw	Commercial chiller	medium – large	medium	medium	hard
Centrifugal	Commercial chiller	very large	medium	high	hard
Maglev Centrifugal	Commercial chiller	very large	high	very high	very hard

Reciprocating

[edit]
Main article: Reciprocating compressor

This compressor consists of a crankcase, crankshaft, piston rod, piston, piston ring, cylinder head and valves. [*citation needed*]

Scroll

[edit]
Main article: Scroll compressor

This compressor uses two interleaving scrolls to compress the refrigerant.[84] it consists of one fixed and one orbiting scrolls. This type of compressor is more efficient because it has 70 percent less moving parts than a reciprocating compressor. [*citation needed*]

Screw

[edit]
Main article: Rotary-screw compressor

This compressor use two very closely meshing spiral rotors to compress the gas. The gas enters at the suction side and moves through the threads as the screws rotate. The meshing rotors force the gas through the compressor, and the gas exits at the end of the screws. The working area is the inter-lobe volume between the male and female rotors. It is larger at the intake end, and decreases along the length of the rotors until the exhaust port. This change in volume is the compression. [*citation needed*]

Capacity modulation technologies

[edit]

There are several ways to modulate the cooling capacity in refrigeration or air conditioning and heating systems. The most common in air conditioning are: on-off cycling, hot gas bypass, use or not of liquid injection, manifold configurations of multiple compressors, mechanical modulation (also called digital), and inverter technology. [*citation nee*

Hot gas bypass

[edit]

Hot gas bypass involves injecting a quantity of gas from discharge to the suction side. The compressor will keep operating at the same speed, but due to the bypass, the refrigerant mass flow circulating with the system is reduced, and thus the cooling capacity. This naturally causes the compressor to run uselessly during the periods when the bypass is operating. The turn down capacity varies between 0 and 100%.[85]

Manifold configurations

[edit]

Several compressors can be installed in the system to provide the peak cooling capacity. Each compressor can run or not in order to stage the cooling capacity of the unit. The turn down capacity is either 0/33/66 or 100% for a trio configuration and either 0/50 or 100% for a tandem.[*citation needed*]

Mechanically modulated compressor

[edit]

This internal mechanical capacity modulation is based on periodic compression process with a control valve, the two scroll set move apart stopping the compression for a given time period. This method varies refrigerant flow by changing the average time of compression, but not the actual speed of the motor. Despite an excellent turndown ratio – from 10 to 100% of the cooling capacity, mechanically modulated scrolls have high energy consumption as the motor continuously runs.[*citation needed*]

Variable-speed compressor

[edit]

Main article: Inverter compressor

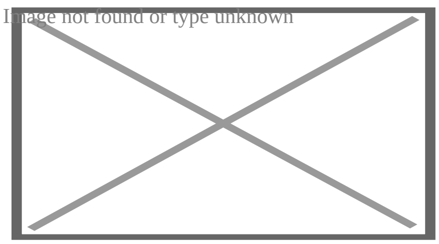
This system uses a variable-frequency drive (also called an Inverter) to control the speed of the compressor. The refrigerant flow rate is changed by the change in the speed of the compressor. The turn down ratio depends on the system configuration and manufacturer. It modulates from 15 or 25% up to 100% at full capacity with a single inverter from 12 to 100% with a hybrid tandem. This method is the most efficient way to modulate an air conditioner's capacity. It is up to 58% more efficient than a fixed speed system.[*citation needed*]

Impact

[edit]

Health effects

[edit]



Rooftop condenser unit fitted on top of an Osaka Municipal Subway 10 series subway carriage. Air conditioning has become increasingly prevalent on public transport vehicles as a form of climate control, and to ensure passenger comfort and drivers' occupational safety and health.

In hot weather, air conditioning can prevent heat stroke, dehydration due to excessive sweating, electrolyte imbalance, kidney failure, and other issues due to hyperthermia.[8][86] Heat waves are the most lethal type of weather phenomenon in the United States.[87][88] A 2020 study found that areas with lower use of air conditioning correlated with higher rates of heat-related mortality and hospitalizations.[89] The August 2003 France heatwave resulted in approximately 15,000 deaths, where 80% of the victims were over 75 years old. In response, the French government required all retirement homes to have at least one air-conditioned room at 25 °C (77 °F) per floor during heatwaves.[8]

Air conditioning (including filtration, humidification, cooling and disinfection) can be used to provide a clean, safe, hypoallergenic atmosphere in hospital operating rooms and other environments where proper atmosphere is critical to patient safety and well-being. It is sometimes recommended for home use by people with allergies, especially mold.[90][91] However, poorly maintained water cooling towers can promote the growth and spread of microorganisms such as *Legionella pneumophila*, the infectious agent responsible for Legionnaires' disease. As long as the cooling tower is kept clean (usually by means of a chlorine treatment), these health hazards can be avoided or reduced. The state of New York has codified requirements for registration, maintenance, and testing of cooling towers to protect against Legionella.[92]

Economic effects

[edit]

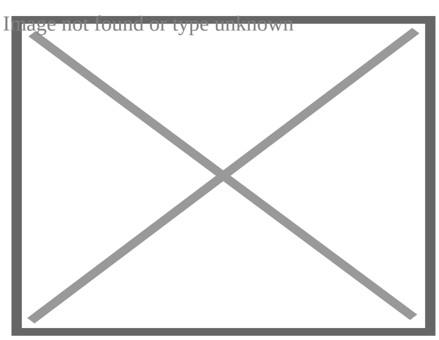
First designed to benefit targeted industries such as the press as well as large factories, the invention quickly spread to public agencies and administrations with studies with claims of increased productivity close to 24% in places equipped with air conditioning.[93]

Air conditioning caused various shifts in demography, notably that of the United States starting from the 1970s. In the US, the birth rate was lower in the spring than during other seasons until the 1970s but this difference then declined since then.[94] As of 2007, the Sun Belt contained 30% of the total US population while it was inhabited by 24% of Americans at the beginning of the 20th century.[95] Moreover, the summer mortality rate in the US, which had been higher in regions subject to a heat wave during the summer, also evened out.[7]

The spread of the use of air conditioning acts as a main driver for the growth of global demand of electricity.[96] According to a 2018 report from the International Energy Agency (IEA), it was revealed that the energy consumption for cooling in the United States, involving 328 million Americans, surpasses the combined energy consumption of 4.4 billion people in Africa, Latin America, the Middle East, and Asia (excluding China).[8] A 2020 survey found that an estimated 88% of all US households use AC, increasing to 93% when solely looking at homes built between 2010 and 2020.[97]

Environmental effects

[edit]



Air conditioner farm in the facade of a building in Singapore

Space cooling including air conditioning accounted globally for 2021 terawatt-hours of energy usage in 2016 with around 99% in the form of electricity, according to a 2018 report on air-conditioning efficiency by the International Energy Agency.[8] The report predicts an increase of electricity usage due to space cooling to around 6200 TWh by

2050,[8][98] and that with the progress currently seen, greenhouse gas emissions attributable to space cooling will double: 1,135 million tons (2016) to 2,070 million tons.[8] There is some push to increase the energy efficiency of air conditioners. United Nations Environment Programme (UNEP) and the IEA found that if air conditioners could be twice as effective as now, 460 billion tons of GHG could be cut over 40 years.[99] The UNEP and IEA also recommended legislation to decrease the use of hydrofluorocarbons, better building insulation, and more sustainable temperature-controlled food supply chains going forward.[99]

Refrigerants have also caused and continue to cause serious environmental issues, including ozone depletion and climate change, as several countries have not yet ratified the Kigali Amendment to reduce the consumption and production of hydrofluorocarbons.[100] CFCs and HCFCs refrigerants such as R-12 and R-22, respectively, used within air conditioners have caused damage to the ozone layer,[101] and hydrofluorocarbon refrigerants such as R-410A and R-404A, which were designed to replace CFCs and HCFCs, are instead exacerbating climate change.[102] Both issues happen due to the venting of refrigerant to the atmosphere, such as during repairs. HFO refrigerants, used in some if not most new equipment, solve both issues with an ozone damage potential (ODP) of zero and a much lower global warming potential (GWP) in the single or double digits vs. the three or four digits of hydrofluorocarbons.[103]

Hydrofluorocarbons would have raised global temperatures by around 0.3–0.5 °C (0.5–0.9 °F) by 2100 without the Kigali Amendment. With the Kigali Amendment, the increase of global temperatures by 2100 due to hydrofluorocarbons is predicted to be around 0.06 °C (0.1 °F).[104]

Alternatives to continual air conditioning include passive cooling, passive solar cooling, natural ventilation, operating shades to reduce solar gain, using trees, architectural shades, windows (and using window coatings) to reduce solar gain.[*citation needed*]

Social effects

[edit]

Socioeconomic groups with a household income below around $10,000 tend to have a low air conditioning adoption,[42] which worsens heat-related mortality.[7] The lack of cooling can be hazardous, as areas with lower use of air conditioning correlate with higher rates of heat-related mortality and hospitalizations.[89] Premature mortality in NYC is projected to grow between 47% and 95% in 30 years, with lower-income and vulnerable populations most at risk.[89] Studies on the correlation between heat-related mortality and hospitalizations and living in low socioeconomic locations can be traced in Phoenix, Arizona,[105] Hong Kong,[106] China,[106] Japan,[107] and Italy.[108][109]

Additionally, costs concerning health care can act as another barrier, as the lack of private health insurance during a 2009 heat wave in Australia, was associated with heat-related hospitalization.[109]

Disparities in socioeconomic status and access to air conditioning are connected by some to institutionalized racism, which leads to the association of specific marginalized communities with lower economic status, poorer health, residing in hotter neighborhoods, engaging in physically demanding labor, and experiencing limited access to cooling technologies such as air conditioning.[109] A study overlooking Chicago, Illinois, Detroit, and Michigan found that black households were half as likely to have central air conditioning units when compared to their white counterparts.[110] Especially in cities, Redlining creates heat islands, increasing temperatures in certain parts of the city.[109] This is due to materials heat-absorbing building materials and pavements and lack of vegetation and shade coverage.[111] There have been initiatives that provide cooling solutions to low-income communities, such as public cooling spaces.[8][111]

Other techniques

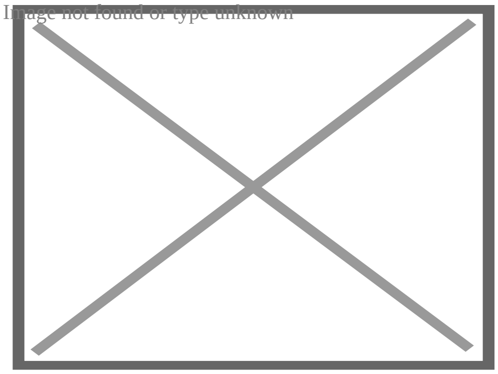
[edit]

Buildings designed with passive air conditioning are generally less expensive to construct and maintain than buildings with conventional HVAC systems with lower energy demands.[112] While tens of air changes per hour, and cooling of tens of degrees, can be achieved with passive methods, site-specific microclimate must be taken into account, complicating building design.[12]

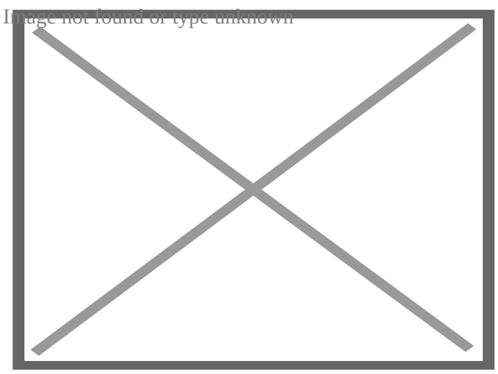
Many techniques can be used to increase comfort and reduce the temperature in buildings. These include evaporative cooling, selective shading, wind, thermal convection, and heat storage.[113]

Passive ventilation

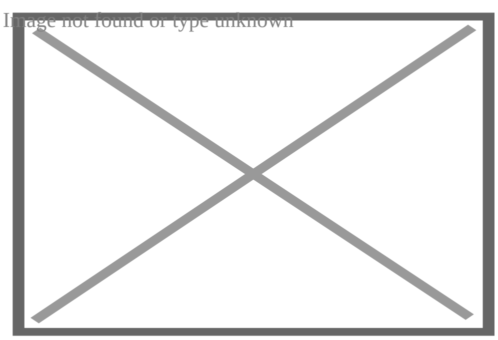
[edit]
This section is an excerpt from Passive ventilation.[edit]



The ventilation system of a regular earthship



Dogtrot houses are designed to maximise natural ventilation.



A roof turbine ventilator, colloquially known as a 'Whirly Bird' is an application of wind driven ventilation.

Passive ventilation is the process of supplying air to and removing air from an indoor space without using mechanical systems. It refers to the flow of external air to an indoor space as a result of pressure differences arising from natural forces.

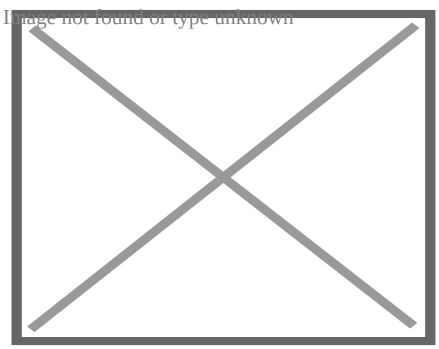
There are two types of natural ventilation occurring in buildings: *wind driven ventilation* and *buoyancy-driven ventilation*. Wind driven ventilation arises from the different pressures created by wind around a building or structure, and openings being formed on the perimeter which then permit flow through the building. Buoyancy-driven ventilation occurs as a result of the directional buoyancy force that results from temperature differences between the interior and exterior.[114]

Since the internal heat gains which create temperature differences between the interior and exterior are created by natural processes, including the heat from people, and wind effects are variable, naturally ventilated buildings are sometimes called "breathing buildings".

Passive cooling

[edit]

This section is an excerpt from Passive cooling.[edit]

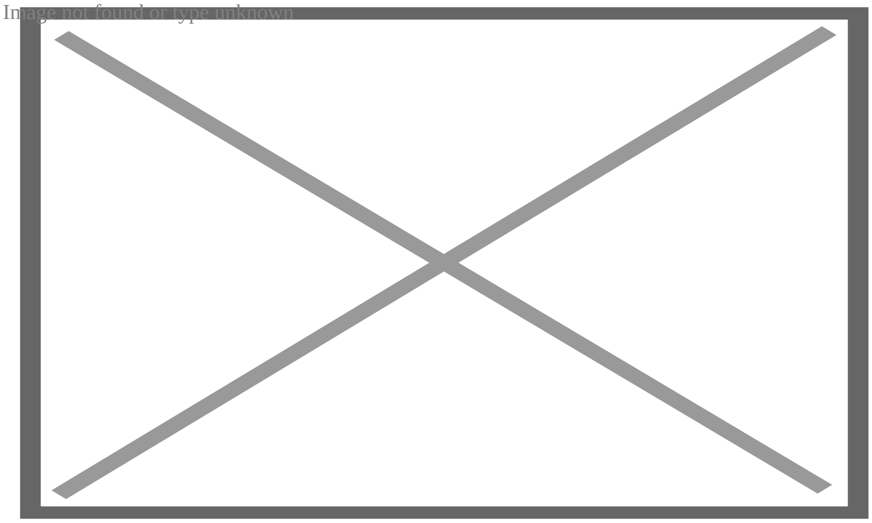


A traditional Iranian solar cooling design using a wind tower

Passive cooling is a building design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low or no energy consumption.[115][116] This approach works either by preventing heat from entering the interior (heat gain prevention) or by removing heat from the building (natural cooling).[117]

Natural cooling utilizes on-site energy, available from the natural environment, combined with the architectural design of building components (e.g. building envelope), rather than mechanical systems to dissipate heat.[118] Therefore, natural cooling depends not only on the architectural design of the building but on how the site's natural resources are used as heat sinks (i.e. everything that absorbs or dissipates heat). Examples of on-site heat sinks are the upper atmosphere (night sky), the outdoor air (wind), and the earth/soil.

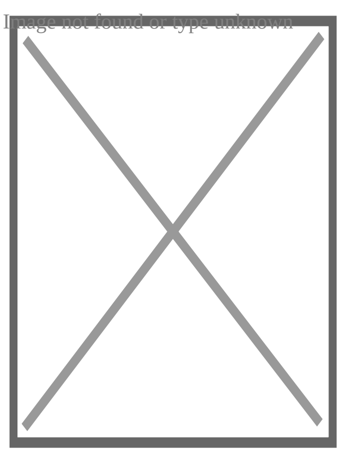
Passive cooling is an important tool for design of buildings for climate change adaptation – reducing dependency on energy-intensive air conditioning in warming environments.[119][120]



A pair of short windcatchers (*malqaf*) used in traditional architecture; wind is forced down on the windward side and leaves on the leeward side (*cross-ventilation*). In the absence of wind, the circulation can be driven with evaporative cooling in the inlet (which is also designed to catch dust). In the center, a *shuksheika* (roof lantern vent), used to shade the qa'a below while allowing hot air rise out of it (*stack effect*).[11]

Daytime radiative cooling

[edit]



Passive daytime radiative cooling (PDRC) surfaces are high in solar reflectance and heat emittance, cooling with zero energy use or pollution.[121]

Passive daytime radiative cooling (PDRC) surfaces reflect incoming solar radiation and heat back into outer space through the infrared window for cooling during the daytime. Daytime radiative cooling became possible with the ability to suppress solar heating using photonic structures, which emerged through a study by Raman et al. (2014).[122] PDRCs can come in a variety of forms, including paint coatings and films, that are designed to be high in solar reflectance and thermal emittance.[121][123]

PDRC applications on building roofs and envelopes have demonstrated significant decreases in energy consumption and costs.[123] In suburban single-family residential areas, PDRC application on roofs can potentially lower energy costs by 26% to 46%.[124] PDRCs are predicted to show a market size of ~$27 billion for indoor space cooling by 2025 and have undergone a surge in research and development since the 2010s.[125][126]

Fans

[edit]
Main article: Ceiling fan

Hand fans have existed since prehistory. Large human-powered fans built into buildings include the punkah.

The 2nd-century Chinese inventor Ding Huan of the Han dynasty invented a rotary fan for air conditioning, with seven wheels 3 m (10 ft) in diameter and manually powered by prisoners.[127]
:ÃƒÆ’Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ’Ã¢â‚¬Â ÃƒÂ¢Ã¢â€šÂ¬Ã¢â€žÂ¢ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã
In 747, Emperor Xuanzong (r. 712–762) of the Tang dynasty (618–907) had the Cool Hall (*Liang Dian*
ÃƒÆ’Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ’Ã¢â‚¬Â ÃƒÂ¢Ã¢â‚¬Å¡Ã‚Â¬Ã¢â‚¬Å¾Ã‚Â¢ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â‚¬Å¡Ã‚Â¬Ã
) built in the imperial palace, which the *Tang Yulin* describes as having water-powered fan wheels for air conditioning as well as rising jet streams of water from fountains. During the subsequent Song dynasty (960–1279), written sources mentioned the air conditioning rotary fan as even more widely used.[127]
:ÃƒÆ’Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ’Ã¢â‚¬Â ÃƒÂ¢Ã¢â€šÂ¬Ã¢â€žÂ¢ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã

Thermal buffering

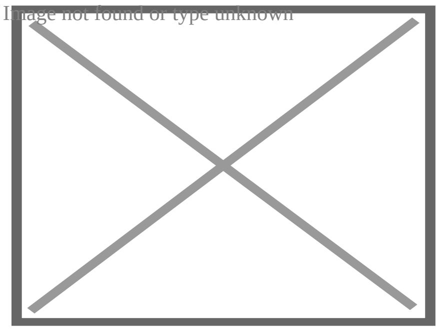
[edit]

In areas that are cold at night or in winter, heat storage is used. Heat may be stored in earth or masonry; air is drawn past the masonry to heat or cool it.[13]

In areas that are below freezing at night in winter, snow and ice can be collected and stored in ice houses for later use in cooling.[13] This technique is over 3,700 years old in the Middle East.[128] Harvesting outdoor ice during winter and transporting and storing for use in summer was practiced by wealthy Europeans in the early 1600s,[15] and became popular in Europe and the Americas towards the end of the 1600s.[129] This practice was replaced by mechanical compression-cycle icemakers.

Evaporative cooling

[edit]
Main article: Evaporative cooler



An evaporative cooler

In dry, hot climates, the evaporative cooling effect may be used by placing water at the air intake, such that the draft draws air over water and then into the house. For this reason, it is sometimes said that the fountain, in the architecture of hot, arid climates, is like the fireplace in the architecture of cold climates.[11] Evaporative cooling also makes the air more humid, which can be beneficial in a dry desert climate.[130]

Evaporative coolers tend to feel as if they are not working during times of high humidity, when there is not much dry air with which the coolers can work to make the air as cool as possible for dwelling occupants. Unlike other types of air conditioners, evaporative coolers rely on the outside air to be channeled through cooler pads that cool the air before it reaches the inside of a house through its air duct system; this cooled outside air must be allowed to push the warmer air within the house out through an exhaust opening such as an open door or window.[131]

See also

[edit]

- Air filter
- Air purifier
- Cleanroom
- Crankcase heater
- Energy recovery ventilation
- Indoor air quality
- Particulates

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External links

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- U.S. patent 808,897 Carrier's original patent
- U.S. patent 1,172,429
- U.S. patent 2,363,294
- *Scientific American*, "Artificial Cold", 28 August 1880, p. 138
- *Scientific American*, "The Presidential Cold Air Machine", 6 August 1881, p. 84

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Heating, ventilation, and air conditioning

Fundamental concepts	○ Air changes per hour ○ Bake-out ○ Building envelope ○ Convection ○ Dilution ○ Domestic energy consumption ○ Enthalpy ○ Fluid dynamics ○ Gas compressor ○ Heat pump and refrigeration cycle ○ Heat transfer ○ Humidity ○ Infiltration ○ Latent heat ○ Noise control ○ Outgassing ○ Particulates ○ Psychrometrics ○ Sensible heat ○ Stack effect ○ Thermal comfort ○ Thermal destratification ○ Thermal mass ○ Thermodynamics ○ Vapour pressure of water

Technology	◦ Absorption-compression heat pump ◦ Absorption refrigerator ◦ Air barrier ◦ Air conditioning ◦ Antifreeze ◦ Automobile air conditioning ◦ Autonomous building ◦ Building insulation materials ◦ Central heating ◦ Central solar heating ◦ Chilled beam ◦ Chilled water ◦ Constant air volume (CAV) ◦ Coolant ◦ Cross ventilation ◦ Dedicated outdoor air system (DOAS) ◦ Deep water source cooling ◦ Demand controlled ventilation (DCV) ◦ Displacement ventilation ◦ District cooling ◦ District heating ◦ Electric heating ◦ Energy recovery ventilation (ERV) ◦ Firestop ◦ Forced-air ◦ Forced-air gas ◦ Free cooling ◦ Heat recovery ventilation (HRV) ◦ Hybrid heat ◦ Hydronics ◦ Ice storage air conditioning ◦ Kitchen ventilation ◦ Mixed-mode ventilation ◦ Microgeneration ◦ Passive cooling ◦ Passive daytime radiative cooling ◦ Passive house ◦ Passive ventilation ◦ Radiant heating and cooling ◦ Radiant cooling ◦ Radiant heating ◦ Radon mitigation ◦ Refrigeration ◦ Renewable heat ◦ Room air distribution ◦ Solar air heat ◦ Solar combisystem ◦ Solar cooling

- Air conditioner inverter
- Air door
- Air filter
- Air handler
- Air ionizer
- Air-mixing plenum
- Air purifier
- Air source heat pump
- Attic fan
- Automatic balancing valve
- Back boiler
- Barrier pipe
- Blast damper
- Boiler
- Centrifugal fan
- Ceramic heater
- Chiller
- Condensate pump
- Condenser
- Condensing boiler
- Convection heater
- Compressor
- Cooling tower
- Damper
- Dehumidifier
- Duct
- Economizer
- Electrostatic precipitator
- Evaporative cooler
- Evaporator
- Exhaust hood
- Expansion tank
- Fan
- Fan coil unit
- Fan filter unit
- Fan heater
- Fire damper
- Fireplace
- Fireplace insert
- Freeze stat
- Flue
- Freon
- Fume hood
- Furnace
- Gas compressor
- Gas heater
- Gasoline heater
- Grease duct

Measurement and control	◦ Air flow meter ◦ Aquastat ◦ BACnet ◦ Blower door ◦ Building automation ◦ Carbon dioxide sensor ◦ Clean air delivery rate (CADR) ◦ Control valve ◦ Gas detector ◦ Home energy monitor ◦ Humidistat ◦ HVAC control system ◦ Infrared thermometer ◦ Intelligent buildings ◦ LonWorks ◦ Minimum efficiency reporting value (MERV) ◦ Normal temperature and pressure (NTP) ◦ OpenTherm ◦ Programmable communicating thermostat ◦ Programmable thermostat ◦ Psychrometrics ◦ Room temperature ◦ Smart thermostat ◦ Standard temperature and pressure (STP) ◦ Thermographic camera ◦ Thermostat ◦ Thermostatic radiator valve
Professions, trades, and services	◦ Architectural acoustics ◦ Architectural engineering ◦ Architectural technologist ◦ Building services engineering ◦ Building information modeling (BIM) ◦ Deep energy retrofit ◦ Duct cleaning ◦ Duct leakage testing ◦ Environmental engineering ◦ Hydronic balancing ◦ Kitchen exhaust cleaning ◦ Mechanical engineering ◦ Mechanical, electrical, and plumbing ◦ Mold growth, assessment, and remediation ◦ Refrigerant reclamation ◦ Testing, adjusting, balancing

Industry organizations	◦ AHRI ◦ AMCA ◦ ASHRAE ◦ ASTM International ◦ BRE ◦ BSRIA ◦ CIBSE ◦ Institute of Refrigeration ◦ IIR ◦ LEED ◦ SMACNA ◦ UMC
Health and safety	◦ Indoor air quality (IAQ) ◦ Passive smoking ◦ Sick building syndrome (SBS) ◦ Volatile organic compound (VOC)
See also	◦ ASHRAE Handbook ◦ Building science ◦ Fireproofing ◦ Glossary of HVAC terms ◦ Warm Spaces ◦ World Refrigeration Day ◦ Template:Home automation ◦ Template:Solar energy

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Home appliances

- Air conditioner
- Air fryer
- Air ioniser
- Air purifier
- Barbecue grill
- Blender
  - Immersion blender
- Bread machine
- Bug zapper
- Coffee percolator
- Clothes dryer
  - combo
- Clothes iron
- Coffeemaker
- Dehumidifier
- Dishwasher
  - drying cabinet
- Domestic robot
  - comparison
- Deep fryer
- Electric blanket
- Electric drill
- Electric kettle
- Electric knife
- Electric water boiler
- Electric heater
- Electric shaver
- Electric toothbrush
- Epilator
- Espresso machine
- Evaporative cooler
- Food processor
- Fan
  - attic
  - bladeless
  - ceiling
  - Fan heater
  - window

Types

- Freezer
- Garbage disposer
- Hair dryer
- Hair iron
- Humidifier
- Icemaker
- Ice cream maker
- Induction cooker
- Instant hot water dispenser
- Juicer

See also

- Appliance plug
- Appliance recycling

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Roofs

Roof shapes

- Arched roof
- Barrel roof
- Board roof
- Bochka roof
- Bow roof
- Butterfly roof
- Clerestory
- Conical roof
- Dome
- Flat roof
- Gable roof
- Gablet roof
- Gambrel roof
- Half-hipped roof
- Hip roof
- Onion dome
- Mansard roof
- Pavilion roof
- Rhombic roof
- Ridged roof
- Saddle roof
- Sawtooth roof
- Shed roof
- Tented roof

Cross-gabled roof

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Roof elements

- Air conditioning unit
- Attic
- Catslide
- Chimney
- Collar beam
- Dormer
- Eaves
- Flashing
- Gable
- Green roof
- Gutter
- Hanging beam
- Joist
- Lightning rod
- Loft
- Purlin
- Rafter
- Ridge vent
- Roof batten
- Roof garden
- Roofline
- Roof ridge
- Roof sheeting
- Roof tiles
- Roof truss
- Roof window
- Skylight
- Soffit
- Solar panels
- Spire
- Weathervane
- Wind brace

Electronics

Branches	◦ Analogue electronics ◦ Digital electronics ◦ Electronic engineering ◦ Instrumentation ◦ Microelectronics ◦ Optoelectronics ◦ Power electronics ◦ Printed electronics ◦ Semiconductor ◦ Schematic capture ◦ Thermal management
Advanced topics	◦ 2020s in computing ◦ Atomtronics ◦ Bioelectronics ◦ List of emerging electronics ◦ Failure of electronic components ◦ Flexible electronics ◦ Low-power electronics ◦ Molecular electronics ◦ Nanoelectronics ◦ Organic electronics ◦ Photonics ◦ Piezotronics ◦ Quantum electronics ◦ Spintronics

Electronic equipment

- Air conditioner
- Central heating
- Clothes dryer
- Computer/Notebook
- Camera
- Dishwasher
- Freezer
- Home robot
- Home cinema
- Home theater PC
- Information technology
- Cooker
- Microwave oven
- Mobile phone
- Networking hardware
- Portable media player
- Radio
- Refrigerator
- Robotic vacuum cleaner
- Tablet
- Telephone
- Television
- Water heater
- Video game console
- Washing machine

Applications	○ Audio equipment
	○ Automotive electronics
	○ Avionics
	○ Control system
	○ Data acquisition
	○ e-book
	○ e-health
	○ Electromagnetic warfare
	○ Electronics industry
	○ Embedded system
	○ Home appliance
	○ Home automation
	○ Integrated circuit
	○ Home appliance
	    ○ Consumer electronics
	    ○ Major appliance
	    ○ Small appliance
	○ Marine electronics
	○ Microwave technology
	○ Military electronics
	○ Multimedia
	○ Nuclear electronics
	○ Open-source hardware
	○ Radar and Radio navigation
	○ Radio electronics
	○ Terahertz technology
	○ Wired and Wireless Communications

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About Room air distribution

Room air distribution is characterizing how air is introduced to, flows through, and is removed from spaces.[1] HVAC airflow in spaces generally can be classified by two different types: *mixing* (or dilution) and *displacement*.

Mixing systems

[edit]

Mixing systems generally supply air such that the **supply air** mixes with the **room air** so that the **mixed air** is at the room design temperature and humidity. In cooling mode, the cool supply air, typically around 55 °F (13 °C) (saturated) at design conditions, exits an outlet at high velocity. The high-velocity supply air stream causes turbulence causing the room air to mix with the supply air. Because the entire room is near-fully mixed, temperature variations are small while the contaminant concentration is fairly uniform throughout the entire room. Diffusers are normally used as the air outlets to create the high-velocity supply air stream. Most often, the air outlets and inlets are placed in the ceiling. Supply diffusers in the ceiling are fed by fan coil units in the ceiling void or by air handling units in a remote plant room. The fan coil or handling unit takes in **return** air from the ceiling void and mix this with fresh air and cool, or heat it, as required to achieve the room design conditions. This arrangement is known as 'conventional room air distribution'.[2]

Outlet types

[edit]

- Group A1: In or near the ceiling that discharge air horizontally[3]
- Group A2: Discharging horizontally that are not influenced by an adjacent surface[3]
- Group B: In or near the floor that discharge air vertically in a linear jet[3]
- Group C: In or near the floor that discharge air vertically in a spreading jet[3]
- Group D: In or near the floor that discharge air horizontally[3]
- Group E: Project supply air vertically downward[3]

Displacement ventilation

[edit]
Main article: Displacement ventilation

Displacement ventilation systems supply air directly to the **occupied zone**. The air is supplied at low velocities to cause minimal induction and mixing. This system is used for ventilation and cooling of large high spaces, such as auditorium and atria, where energy may be saved if only the occupied zone is treated rather than trying to control the conditions in the entire space.

Displacement room airflow presents an opportunity to improve both the thermal comfort and indoor air quality (IAQ) of the occupied space. It also takes advantage of the difference in air density between an upper contaminated zone and a lower clean zone. Cool air is supplied at low velocity into the lower zone. Convection from heat sources creates vertical air motion into the upper zone where high-level return inlets extract the air. In most cases these convection heat sources are also the contamination sources (e.g., people, equipment, or processes), thereby carrying the contaminants up to the upper zone, away from the occupants.

The displacement outlets are usually located at or near the floor with the air supply designed so the air flows smoothly across the floor. Where there is a heat source (such as people, lighting, computers, electrical equipment, etc.) the air will rise, pulling the cool supply air up with it and moving contaminants and heat from the occupied zone to the return or exhaust grilles above. By doing so, the air quality in the occupied zone is generally superior to that achieved with mixing room air distribution.

Since the conditioned air is supplied directly into the occupied space, supply air temperatures must be higher than mixing systems (usually above 63 °F or 17 °C) to avoid cold draughts at the floor. By introducing the air at supply air temperatures close to the room temperature and low outlet velocity a high level of thermal comfort can be provided with displacement ventilation.

See also

[edit]

- Dilution (equation)
- Duct (HVAC)
- HVAC
- Lev door
- Underfloor air distribution
- Indoor air quality
- Thermal comfort
- Air conditioning
- ASHRAE
- SMACNA

References

[edit]

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2. **^** *Designer's Guide to Ceiling-Based Room Air Diffusion*, Rock and Zhu, ASHRAE, Inc., Atlanta, GA, USA, 2002
3. ^ ***a b c d e f*** ASHRAE Handbook: Fundamentals, 2021

Fundamental concepts	◦ Air changes per hour ◦ Bake-out ◦ Building envelope ◦ Convection ◦ Dilution ◦ Domestic energy consumption ◦ Enthalpy ◦ Fluid dynamics ◦ Gas compressor ◦ Heat pump and refrigeration cycle ◦ Heat transfer ◦ Humidity ◦ Infiltration ◦ Latent heat ◦ Noise control ◦ Outgassing ◦ Particulates ◦ Psychrometrics ◦ Sensible heat ◦ Stack effect ◦ Thermal comfort ◦ Thermal destratification ◦ Thermal mass ◦ Thermodynamics ◦ Vapour pressure of water

Technology	○ Absorption-compression heat pump ○ Absorption refrigerator ○ Air barrier ○ Air conditioning ○ Antifreeze ○ Automobile air conditioning ○ Autonomous building ○ Building insulation materials ○ Central heating ○ Central solar heating ○ Chilled beam ○ Chilled water ○ Constant air volume (CAV) ○ Coolant ○ Cross ventilation ○ Dedicated outdoor air system (DOAS) ○ Deep water source cooling ○ Demand controlled ventilation (DCV) ○ Displacement ventilation ○ District cooling ○ District heating ○ Electric heating ○ Energy recovery ventilation (ERV) ○ Firestop ○ Forced-air ○ Forced-air gas ○ Free cooling ○ Heat recovery ventilation (HRV) ○ Hybrid heat ○ Hydronics ○ Ice storage air conditioning ○ Kitchen ventilation ○ Mixed-mode ventilation ○ Microgeneration ○ Passive cooling ○ Passive daytime radiative cooling ○ Passive house ○ Passive ventilation ○ Radiant heating and cooling ○ Radiant cooling ○ Radiant heating ○ Radon mitigation ○ Refrigeration ○ Renewable heat ○ Room air distribution ○ Solar air heat ○ Solar combisystem ○ Solar cooling

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- Centrifugal fan
- Ceramic heater
- Chiller
- Condensate pump
- Condenser
- Condensing boiler
- Convection heater
- Compressor
- Cooling tower
- Damper
- Dehumidifier
- Duct
- Economizer
- Electrostatic precipitator
- Evaporative cooler
- Evaporator
- Exhaust hood
- Expansion tank
- Fan
- Fan coil unit
- Fan filter unit
- Fan heater
- Fire damper
- Fireplace
- Fireplace insert
- Freeze stat
- Flue
- Freon
- Fume hood
- Furnace
- Gas compressor
- Gas heater
- Gasoline heater
- Grease duct

Measurement and control

- Air flow meter
- Aquastat
- BACnet
- Blower door
- Building automation
- Carbon dioxide sensor
- Clean air delivery rate (CADR)
- Control valve
- Gas detector
- Home energy monitor
- Humidistat
- HVAC control system
- Infrared thermometer
- Intelligent buildings
- LonWorks
- Minimum efficiency reporting value (MERV)
- Normal temperature and pressure (NTP)
- OpenTherm
- Programmable communicating thermostat
- Programmable thermostat
- Psychrometrics
- Room temperature
- Smart thermostat
- Standard temperature and pressure (STP)
- Thermographic camera
- Thermostat
- Thermostatic radiator valve

Professions, trades, and services

- Architectural acoustics
- Architectural engineering
- Architectural technologist
- Building services engineering
- Building information modeling (BIM)
- Deep energy retrofit
- Duct cleaning
- Duct leakage testing
- Environmental engineering
- Hydronic balancing
- Kitchen exhaust cleaning
- Mechanical engineering
- Mechanical, electrical, and plumbing
- Mold growth, assessment, and remediation
- Refrigerant reclamation
- Testing, adjusting, balancing

Industry organizations	○ AHRI ○ AMCA ○ ASHRAE ○ ASTM International ○ BRE ○ BSRIA ○ CIBSE ○ Institute of Refrigeration ○ IIR ○ LEED ○ SMACNA ○ UMC
Health and safety	○ Indoor air quality (IAQ) ○ Passive smoking ○ Sick building syndrome (SBS) ○ Volatile organic compound (VOC)
See also	○ ASHRAE Handbook ○ Building science ○ Fireproofing ○ Glossary of HVAC terms ○ Warm Spaces ○ World Refrigeration Day ○ Template:Home automation ○ Template:Solar energy

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Things To Do in Oklahoma County

Photo

Museum of Osteology

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Oklahoma City Zoo

4.5 (14305)

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Oklahoma Railway Museum

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Photo

Martin Park Nature Center

4.7 (2457)

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Oklahoma National Guard Museum

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Sanctuary Asia

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Driving Directions in Oklahoma County

Driving Directions From (DTW) Drew's Tobacco World to Durham Supply Inc

Driving Directions From Days Inn by Wyndham Oklahoma City/Moore to Durham Supply Inc

Driving Directions From Bob Moore Ford to Durham Supply Inc

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97.4774449!2d35.3963954!3e2

Driving Directions From OKC Underground to Durham Supply Inc

Driving Directions From Oklahoma Railway Museum to Durham Supply Inc

Driving Directions From USS Oklahoma Anchor Memorial to Durham Supply Inc

Driving Directions From Bricktown Water Taxi to Durham Supply Inc

Driving Directions From USS Oklahoma Anchor Memorial to Durham Supply Inc

Driving Directions From Oklahoma City Zoo to Durham Supply Inc

https://www.google.com/maps/dir/Lighthouse/Durham+Supply+Inc/@35.565183,-97.578676,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sunknown!2m2!1d-97.578676!2d35.565183!1m5!1m1!1sChIJCUnZ1UoUsocRpJXqm8cX514!2m2!1d-97.4774449!2d35.3963954!3e0

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Reviews for Durham Supply Inc

Durham Supply Inc

Image not found or type unknown

Crystal Dawn

(1)

I would give 0 stars. This isnTHE WORST company for heating and air. I purchased a home less than one year ago and my ac has gone out twice and these people refuse to repair it although I AM UNDER WARRANTY!!!! They say it’s an environmental issue and they can’t fix it or even try to or replace my warrantied air conditioning system.

Durham Supply Inc

Image not found or type unknown

Noel Vandy

(5)

Thanks to the hard work of Randy our AC finally got the service it needed. These 100 degree days definitely feel long when your house isn't getting cool anymore. We were so glad when Randy came to work on the unit, he had all the tools and products he needed with him and it was all good and running well when he left. With a long drive to get here and only few opportunities to do so, we are glad he got it done in 1 visit. Now let us hope it will keep running well for a good while.

Durham Supply Inc

Image not found or type unknown

K Moore

(1)

No service after the sale. I purchased a sliding patio door and was given the wrong size sliding screen door. After speaking with the salesman and manager several times the issue is still not resolved and, I was charged full price for an incomplete door. They blamed the supplier for all the issues…and have offered me nothing to resolve this.

Durham Supply Inc

Image not found or type unknown

Jennifer Williamson

(5)

First we would like to thank you for installing our air conditioning unit! I’d like to really brag about our technician, Mack, that came to our home to install our unit in our new home. Mack was here for most of the day and throughly explained everything we had a question about. By the late afternoon, we had cold air pumping through our vents and we couldn’t have been more thankful. I can tell you, I would be very lucky to have a technician like Mack if this were my company. He was very very professional, kind, and courteous. Please give Mack a pat on the back and stay rest assured that Mack is doing a great job and upholding your company name! Mack, if you see this, great job!! Thanks for everything you did!! We now have a new HVAC company in the event we need one. We will also spread the word to others!!

Durham Supply Inc

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Salest

(5)

Had to make a quick run for 2 sets of ?? door locks for front and back door.. In/ out in a quick minute! They helped me right away. ?? Made sure the 2 sets had the same ? keys. The ? bathroom was clean and had everything I needed. ? ?. Made a quick inquiry about a random item... they quickly looked it up and gave me pricing. Great ? job ?

Monitoring Seasonal Impacts on Mobile Home AC Efficiency**View GBP**

Check our other pages :

- **Calculating Long Term Benefits of Efficient Mobile Home Furnaces**
- **Validating Experience Through Field Tests in Mobile Home HVAC**
- **Learning About Continuing Education for Mobile Home Furnace Repair**
- **Evaluating ROI of Efficient Upgrades in Mobile Home Air Conditioning**
- **Exploring Common Certifications Required for Mobile Home HVAC Service**

Frequently Asked Questions

How do seasonal changes affect the efficiency of mobile home air conditioning systems?

Seasonal changes impact AC efficiency due to variations in outdoor temperatures and humidity levels. In hotter months, AC units may work harder to cool the interior, reducing efficiency. Conversely, milder weather can lead to more efficient operation.

What factors should be monitored to assess AC efficiency in mobile homes across different seasons?

Key factors include energy consumption, indoor temperature stability, system runtime duration, and maintenance needs like filter replacements and coil cleaning.

How can mobile home owners improve their AC system’s efficiency during extreme seasonal conditions?

Owners can improve efficiency by ensuring proper insulation, using programmable thermostats, performing regular maintenance checks, sealing ductwork leaks, and utilizing fans for better air circulation.

Are there specific maintenance practices that enhance AC performance throughout the year in mobile homes?

Yes, regular practices such as changing filters monthly or as needed, cleaning coils bi-annually, checking refrigerant levels annually, and inspecting ducts for leaks can significantly enhance performance year-round.

Royal Supply Inc

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Google Business Profile

Company Website : **https://royal-durhamsupply.com/locations/oklahoma-city-oklahoma/**

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