Mobile Homes

- **Considering Weight Distribution on Mobile Home Roofs**
  Considering Weight Distribution on Mobile Home Roofs Analyzing Space Limitations for Duct Installation Minimizing Vibrations through Effective Mounting Checking for Clearances near Windows and Doors Verifying Electrical Capacity for New Units Inspecting Crawl Spaces before Major Installations Protecting Exterior Components from Windy Conditions Resolving Access Issues in Narrow Hallways Planning Around Existing Plumbing or Gas Lines Prioritizing Safety in Confined Work Areas Ensuring Adequate Ventilation for Heat Pumps Mitigating Moisture Risks in Humid Climates
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  Comparing Basic and Extended Coverage Options Reviewing Part Replacement Clauses in Detail Understanding Labor Inclusions in Contracts Assessing Multi year Agreements for Homeowners Outlining Limitations of Warranty Claims Inspecting Renewal Terms for Ongoing Coverage Checking Deductible Requirements for Repairs Estimating Future Costs through Contract Analysis Tracking Service Visits Outlined in Agreements Selecting Clauses that Cover Seasonal Tuneups Transferring Warranty Benefits to New Owners Planning Budget Strategies for Contract Renewals
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When considering the installation of a new HVAC system in a mobile home, one crucial aspect that demands attention is verifying the electrical capacity to support the unit. Mobile home HVAC systems must comply with local building codes **Mobile Home Furnace Installation** technician. Mobile homes present unique challenges in terms of space and infrastructure, which makes it essential for homeowners and technicians alike to assess whether the existing electrical system can handle the demands of a modern HVAC unit.

Firstly, understanding the power needs of an HVAC system is central to this task. These systems typically require a substantial amount of electricity to operate efficiently, particularly during peak heating or cooling periods. A mismatch between an HVAC system's requirements and a home's electrical capacity can lead to inadequate performance, frequent breaker trips, or even potential safety hazards such as overheating wires or electrical fires.

The initial step in verifying electrical capacity involves examining the main electrical panel to determine its amperage rating. Most mobile homes are equipped with panels rated between 100 to 200 amps. The current draw from all household appliances must be calculated and added up; ideally, this should not exceed about 80% of the panel's total capacity at any given time. If an HVAC system pushes this limit, upgrading the panel may be necessary.

Moreover, it's also important to consider whether there are sufficient circuits available for installing an HVAC unit. Each component of an HVAC system including compressors, fans, and thermostats requires its dedicated circuit breaker for safe operation. A licensed electrician can conduct a thorough assessment to determine if additional circuits need installation or if existing ones are capable.

Another factor influencing electrical requirements is the energy efficiency rating of prospective HVAC units. Modern systems often come with higher SEER (Seasonal Energy Efficiency Ratio) ratings than older models. While these units tend to use less energy overall and provide cost savings on utility bills over time, they might still have specific startup power demands that necessitate careful examination against available electrical supply.

Furthermore, local building codes and regulations frequently stipulate minimum standards for wiring and breaker size when installing new appliances such as HVAC systems in mobile homes. Compliance with these codes is mandatory not only for safety but also for ensuring any future inspections pass without issues.

In conclusion, verifying electrical capacity before installing a new HVAC system in a mobile home is imperative for both operational efficiency and safety assurance. This process involves checking amperage limits on existing panels, ensuring sufficient circuit availability, considering energy consumption relative to unit ratings, and adhering strictly to local building codes. By taking these steps diligently with professional guidance where needed, homeowners can enjoy enhanced comfort without compromising their home's integrity or safety standards.

In the ever-evolving landscape of modern development, one cannot overstate the importance of thoroughly assessing existing electrical infrastructure, especially when considering the integration of new units. As cities expand, technology advances, and energy demands escalate, ensuring that our electrical systems can accommodate these changes becomes crucial. This essay explores the intricacies involved in verifying electrical capacity for new units by assessing current infrastructure.

To begin with, a comprehensive assessment of existing electrical infrastructure is fundamental to avoid potential pitfalls associated with overloading systems. Electrical grids designed decades ago may not be equipped to handle today's sophisticated technologies and increased energy consumption. By conducting a detailed analysis, stakeholders can identify weaknesses within the system that might hinder future expansion or compromise safety. This step is critical in preventing outages or even catastrophic failures that could arise from unanticipated demand on an aging grid.

Additionally, understanding the current capacity involves evaluating components such as transformers, circuit breakers, and wiring systems. Each element plays a vital role in determining whether additional load can be supported without significant upgrades or replacement. For instance, transformers must be analyzed for their ability to manage extra load without overheating or reducing efficiency. Similarly, wiring systems should be inspected for compliance with contemporary standards to ensure they are capable of handling increased power flow safely.

Another essential aspect is regulatory compliance and safety standards. Regulatory bodies set forth guidelines that dictate how much load an infrastructure can bear before it requires upgrades or enhancements. These regulations are designed not only to protect equipment but also to ensure public safety and reliability of supply. Assessing existing infrastructure against these guidelines helps in identifying any necessary modifications required before integrating new units.

Furthermore, technological advancements offer innovative solutions to enhance existing infrastructures' capabilities without total overhaul. Smart grid technologies allow for real-time monitoring and management of electricity distribution networks, offering insights into consumption patterns and areas where efficiency improvements are possible. Investing in such technologies can provide a more accurate picture of available capacity and facilitate better decision-making regarding the addition of new units.

Finally, stakeholder collaboration is key in this process; city planners, utility companies, engineers, and policymakers must work together to develop strategies that balance growth with sustainability and efficiency. Open communication ensures all parties have a clear understanding of objectives and constraints involved in upgrading or expanding electrical infrastructures.

In conclusion, verifying electrical capacity for new units by assessing existing infrastructure is an intricate yet indispensable task in today's rapidly advancing world. It ensures reliability and safety while paving the way for innovation and growth within communities. Through thorough analysis coupled with strategic planning and collaboration among stakeholders, we can successfully navigate challenges posed by increasing energy demands while maintaining robust electric networks fit for future needs.

Posted by on

Considerations for maintaining structural integrity during HVAC installation

When considering the installation of new HVAC units, a critical step is calculating the load demand to ensure that the existing electrical system can support the additional energy requirements. This process involves assessing both the current capacity and future demands to prevent overloading circuits, which could lead to inefficiencies or even safety hazards.

The first step in verifying electrical capacity is to conduct a thorough assessment of the building's existing electrical infrastructure. This includes examining circuit breakers, wiring systems, and panels to understand their current loads and limitations. It's essential to know the maximum load each component can handle to avoid oversizing or undersizing issues that might compromise system performance or safety.

Once you have a clear picture of your current electrical setup, it's time to calculate the load demand for the new HVAC units. This involves determining their power requirements, typically measured in watts or kilowatts. The specifications for these units should provide details like starting power (the surge required when turning on) and running power (the continuous amount needed during operation).

It's also crucial to consider diversity factors-an understanding that not all equipment runs at full load simultaneously-which can significantly affect total power consumption calculations. By applying diversity factors correctly, you can more accurately estimate realistic power usage scenarios rather than worst-case ones.

Moreover, seasonal variations and peak usage times should be factored into your calculations. HVAC systems often experience higher demand during extreme weather conditions due to increased heating or cooling needs. Ensuring that your electrical capacity calculations account for these peaks will help maintain performance standards throughout seasons.

After estimating these demands, compare them against your existing system's capabilities. If discrepancies arise where demand exceeds supply, you'll need modifications such as upgrading circuit breakers or adding additional wiring paths before installing new units.

In conclusion, calculating load demand for new HVAC units requires careful analysis of both existing infrastructure and anticipated needs. By taking into account various factors like starting/running powers, diversity considerations, seasonal variations along with comparing them against current capacities-you ensure seamless integration without compromising efficiency nor safety standards within any building environment looking towards enhanced climate control solutions through modernized HVAC installations.

Strategies for evenly distributing weight across the roof when adding or upgrading HVAC systems

Identifying potential upgrades for electrical systems, particularly in the context of verifying electrical capacity for new units, is an essential task that demands careful consideration and planning. As society continues to evolve with technological advancements and increased energy consumption, the need to ensure that electrical systems are capable of supporting new installations becomes increasingly critical. This essay explores the importance of evaluating current electrical capacities and proposes strategies for effectively upgrading these systems to accommodate new units.

At its core, verifying electrical capacity involves assessing whether existing infrastructure can handle additional loads imposed by new equipment or extensions. The process begins with a comprehensive audit of the current system, taking into account factors such as load demand, circuit protection, wiring integrity, and overall system resilience. This assessment is crucial because it identifies potential weaknesses or limitations within the existing setup that could lead to inefficiencies or even failures if left unaddressed.

One of the first steps in identifying potential upgrades is conducting a detailed analysis of energy consumption patterns. By understanding how energy is currently being utilized within a facility, engineers can pinpoint areas where efficiency improvements are possible. For instance, if certain equipment is outdated or consumes excessive power compared to newer models, replacing them with more efficient alternatives can significantly reduce strain on the system and free up capacity for additional units.

Another important aspect involves considering future growth projections. It's not enough to simply address immediate needs; planners must also anticipate future demands that may arise from business expansion or changes in usage patterns. This forward-thinking approach ensures that any upgrades made today will continue to support operational requirements well into the future.

Once these evaluations have been conducted, attention turns towards implementing necessary upgrades. This might involve augmenting existing circuits with higher-capacity wiring or installing advanced circuit breakers capable of handling increased loads without compromising safety standards. In some cases, it may even necessitate upgrading transformers or distribution panels altogether to ensure seamless integration with modern technologies.

Furthermore, embracing smart technology solutions can play a pivotal role in optimizing electrical systems for new units. The adoption of smart meters and sensors enables real-time monitoring of energy usage, providing valuable insights into consumption trends and allowing for more precise load management. With this data-driven approach, facilities can make informed decisions regarding when and how much power should be allocated to different areas.

In conclusion, identifying potential upgrades for electrical systems when verifying capacity for new units is an indispensable process that involves thorough evaluation and strategic planning. By understanding current usage patterns and anticipating future needs while incorporating state-of-the-art technologies where appropriate, businesses can create robust infrastructures capable of supporting their evolving operations efficiently and sustainably over time. Ultimately investing effort upfront pays dividends downline ensuring uninterrupted functionality thereby safeguarding productivity profits alongside peace mind stakeholders alike through reliable resilient energizing environments all around us today tomorrow beyond!

Potential risks of improper weight distribution on mobile home roofs and HVAC efficiency

When embarking on the construction or integration of new units within any infrastructure, one cannot overstate the importance of verifying electrical capacity. This process ensures that the electrical systems are capable of handling the anticipated load without compromising safety or functionality. Safety considerations in this context are pivotal and multifaceted, dictating not only the success of the project but also the well-being of all individuals involved.

At its core, verifying electrical capacity is about understanding and evaluating the limits of an existing electrical system against the demands posed by new installations. This involves a detailed assessment to determine whether current circuits can support additional loads, and if necessary, upgrading components to prevent overloads that could lead to hazards such as fires or equipment failures. A meticulous approach is essential because even minor oversights can lead to catastrophic consequences.

One primary safety consideration is ensuring compliance with relevant codes and standards. Regulatory frameworks such as the National Electrical Code (NEC) in the United States provide guidelines for safe electrical design, installation, and inspection. Adhering to these codes helps mitigate risks associated with overloaded circuits or inadequate grounding practices. Engaging qualified professionals who are familiar with these standards ensures that all aspects of electrical capacity validation are conducted correctly.

Another critical factor involves thorough testing and inspection throughout various stages of implementation. Before introducing any new unit into an existing system, it's imperative to conduct a series of tests to validate that all components function safely under expected operating conditions. Load testing checks whether transformers and circuit breakers can handle increased demands without exceeding their rated capacities, while insulation resistance tests ensure there are no hidden faults that could compromise safety.

Moreover, risk assessment plays a key role in identifying potential hazards related to increased electrical loads. By systematically analyzing scenarios where failures might occur-such as power surges or short circuits-engineers can implement preventive measures like surge protection devices or advanced circuit monitoring systems designed to detect anomalies before they escalate into serious issues.

Lastly, effective training for personnel involved in managing these systems is crucial for maintaining safety over time. Educating staff about safe operational procedures and emergency response protocols enhances their ability to handle unexpected situations promptly and effectively-minimizing risks associated with human error.

In conclusion, verifying electrical capacity for new units involves a comprehensive evaluation focused on safeguarding both infrastructure integrity and human lives. By considering regulatory compliance, conducting rigorous testing, performing thorough risk assessments, and ensuring adequate training levels among personnel-stakeholders can confidently navigate complexities inherent in expanding electrical capacities while prioritizing safety every step along the way.

Guidelines for professional assessment and installation to ensure balanced weight

distribution

When considering the installation of new electrical units, whether in a residential setting or a commercial environment, verifying adequate electrical supply is paramount to ensure safety, efficiency, and functionality. This process involves several crucial steps that help ascertain whether the existing electrical infrastructure can support additional load demands without compromising performance or safety.

The first step in verifying electrical capacity is conducting a comprehensive assessment of the current electrical system. This involves examining the main service panel to determine its amperage rating and available circuit slots. Understanding the panel's capacity is essential because it dictates how much additional load it can safely handle. For instance, if you're planning to install high-demand appliances like HVAC systems or electric vehicle chargers, knowing your panel's limits helps prevent overloading and potential hazards such as tripped breakers or fires.

Once the existing system's capacity is clear, the next step involves calculating the anticipated load of the new units. This calculation requires a thorough understanding of each unit's power requirements, typically expressed in watts or kilowatts. By summing up these values and comparing them against your current system's unused capacity, you can determine if your setup can handle the new demand or if an upgrade is necessary.

Another critical step is considering future needs alongside current installations. While an immediate need may be satisfied by existing capacity, planning for future expansions can save time and resources down the line. For example, if there's potential for adding more units later on, it might be wise to upgrade your system now rather than repeatedly revisiting your infrastructure with each new addition.

Additionally, it's vital to review local codes and regulations during this process. Building codes often dictate specific requirements for electrical installations to ensure safety standards are met. Consulting with a licensed electrician or engineer who understands these regulations ensures compliance and avoids legal issues that could arise from non-compliance.

Finally, conducting a professional inspection before proceeding with any installations provides peace of mind and confirms that all calculations and assumptions are accurate. A certified electrician not only validates your findings but also offers expert advice on potential upgrades or modifications needed for optimal performance.

In conclusion, verifying adequate electrical supply when installing new units involves careful analysis of current systems, precise load calculations for proposed additions, foresight regarding future needs, adherence to local regulations, and professional inspections. These steps collectively ensure that any new installation operates safely within its designated environment while providing reliable service without compromising safety standards.

About Mobile home

This article is about the prefabricated structure. For the vehicle, see Recreational vehicle. For other uses, see Mobile home (disambiguation).
"Static Caravan" redirects here. For the record label, see Static Caravan Recordings.
"House on wheels" redirects here. For the South Korean variety show, see House on Wheels.

Globe icon.
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The examples and perspective in this article **deal primarily with the United States and do not represent a worldwide view of the subject**. You may improve this article, discuss the issue on the talk page, or create a new article, as appropriate. *(April 2017) (Learn how and when to remove this message)*

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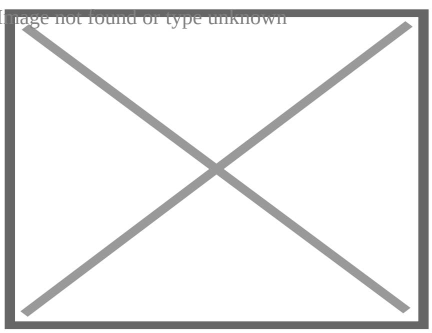

Mobile homes with detached single car garages

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Part of a series on

Living spaces

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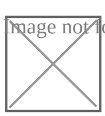

Main

- House: detached
- semi-detached
- terraced
- Apartment
- Bungalow
- Cottage
- Ecohouse
- Green home
- Housing project
- Human outpost
- I-house
- Ranch
- Tenement
- Condominium
- Mixed-use development
- Hotel
- Hostel
- Castle
- Public housing
- Squat
- Flophouse
- Shack
- Slum
- Shanty town
- Villa

Issues

- Affordability
- Affordability in the United States
- Executive housing
- Environmental:
- design
- planning
- racism
- Environmental security
- Eviction
- Fair housing
- Healthiness
- Homelessness
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- Housing discrimination
- Housing stress
- Overpopulation
- Housing inequality
- Home ownership
- Luxury apartments
- Ownership equity
- Permit
- Rent
- Subprime lending
- Subsidized housing
- Sustainable:
- architecture
- development
- living
- Sustainable city
- Toxic hotspot
- Vagrancy

Society and politics

- Housing First
- Housing subsidy
- NIMBY
- Rapid Re-Housing
- Real estate appraisal
- Real estate bubble
- Real estate economics
- Real estate investing
- Redlining
- Rent regulation
- Right to housing
- Rent control
- Rent strike
- Tenants union
- YIMBY

Other

- Alternative lifestyle
- Assisted living
- Boomtown
- Cottage homes
- Eco-cities
- Ecovillage
- Foster care
- Green building
- Group home
- Halfway house
- Healthy community design
- Homeless shelter
- Hospital
- Local community
- Log house
- Natural building
- Nursing home
- Orphanage
- Prison
- Psychiatric hospital
- Residential care
- Residential treatment center
- Retirement community
- Retirement home
- Supportive housing
- Supported living

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Housing portal

A **mobile home** (also known as a **house trailer**, **park home**, **trailer**, or **trailer home**) is a prefabricated structure, built in a factory on a permanently attached chassis before being transported to site (either by being towed or on a trailer). Used as permanent homes, or for holiday or temporary accommodation, they are often left permanently or semi-permanently in one place, but can be moved, and may be required to move from time to time for legal reasons.

Mobile homes share the same historic origins as travel trailers, but today the two are very different, with travel trailers being used primarily as temporary or vacation homes. Behind the cosmetic work fitted at installation to hide the base, mobile homes have strong trailer frames, axles, wheels, and tow-hitches.

History

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In the United States, this form of housing goes back to the early years of cars and motorized highway travel.[1] It was derived from the travel trailer (often referred to during the early years as "house trailers" or "trailer coaches"), a small unit with wheels attached permanently, often used for camping or extended travel. The original rationale for this type of housing was its mobility. Units were initially marketed primarily to people whose lifestyle required mobility. However, in the 1950s, the homes began to be marketed primarily as an inexpensive form of housing designed to be set up and left in a location for long periods of time or even permanently installed with a masonry foundation. Previously, units had been eight feet or fewer in width, but in 1956, the 10-foot (3.0 m) wide home ("ten-wide") was introduced, along with the new term "mobile home".[2]

The homes were given a rectangular shape, made from pre-painted aluminum panels, rather than the streamlined shape of travel trailers, which were usually painted after assembly. All of this helped increase the difference between these homes and home/travel trailers. The smaller, "eight-wide" units could be moved simply with a car, but the larger, wider units ("ten-wide", and, later, "twelve-wide") usually required the services of a professional trucking company, and, often, a special moving permit from a state highway department. During the late 1960s and early 1970s, the homes were made even longer and wider, making the mobility of the units more difficult. Nowadays, when a factory-built home is moved to a location, it is usually kept there permanently and the mobility of the units has considerably decreased. In some states, mobile homes have been taxed as personal property if the wheels remain attached, but as real estate if the wheels are removed. Removal of the tongue and axles may also be a requirement for real estate classification.

Manufactured home

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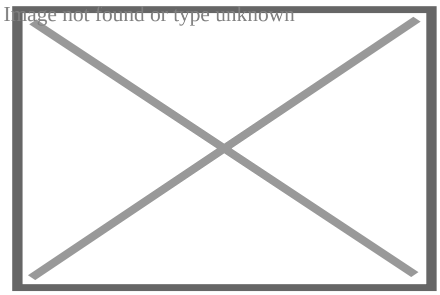
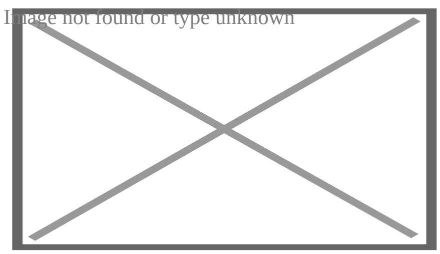
Main article: Manufactured housing



Example of a modern manufactured home in New Alexandria, Pennsylvania. 28 by 60 feet (8.5 m × 18.3 m)



Manufactured home foundation

Mobile homes built in the United States since June 1976, legally referred to as manufactured homes, are required to meet FHA certification requirements and come with attached metal certification tags. Mobile homes permanently installed on owned land are rarely mortgageable, whereas FHA code manufactured homes are mortgageable through VA, FHA, and Fannie Mae.

Many people who could not afford a traditional site-built home, or did not desire to commit to spending a large sum of money on housing, began to see factory-built homes as a viable alternative for long-term housing needs. The units were often marketed as an alternative to apartment rental. However, the tendency of the units of this era to depreciate rapidly in resale value[*citation needed*] made using them as collateral for loans much riskier than traditional home loans. Terms were usually limited to less than the thirty-year term typical of the general home-loan market, and interest rates were considerably higher.[*citation* In that way, mobile home loans resembled motor vehicle loans more than traditional home mortgage loans.

Construction and sizes

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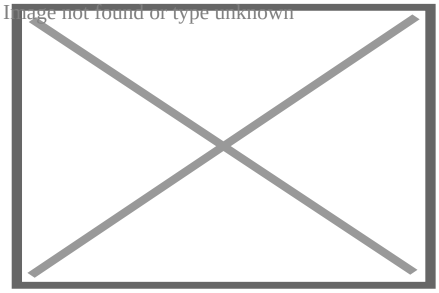


Exterior wall assemblies being set in place during manufacture

Mobile homes come in two major sizes, *single-wides* and *double-wides*. Single-wides are 18 feet (5.5 m) or less in width and 90 feet (27 m) or less in length and can be towed to their site as a single unit. Double-wides are 20 feet (6.1 m) or more wide and are 90 feet (27 m) in length or less and are towed to their site in two separate units, which are then joined. *Triple-wides* and even homes with four, five, or more units are also built but less frequently.

While site-built homes are rarely moved, single-wide owners often "trade" or sell their home to a dealer in the form of the reduction of the purchase of a new home. These "used" homes are either re-sold to new owners or to park owners who use them as inexpensive rental units. Single-wides are more likely to be traded than double-wides because removing them from the site is easier. In fact, only about 5% of all double-wides will ever be moved.[*citation needed*]

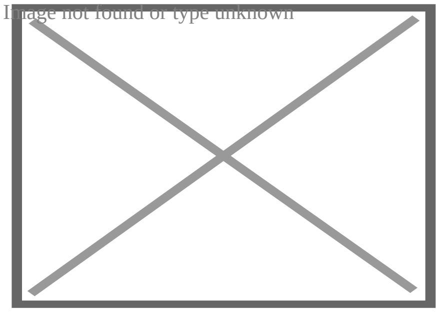
While an EF1 tornado might cause minor damage to a site-built home, it could do significant damage to a factory-built home, especially an older model or one that is not properly secured. Also, structural components (such as windows) are typically weaker than those in site-built homes.[3] 70 miles per hour (110 km/h) winds can destroy a mobile home in a matter of minutes. Many brands offer optional hurricane straps, which can be used to tie the home to anchors embedded in the ground.

Regulations

[edit]

United States

[edit]



Home struck by tornado

In the United States, mobile homes are regulated by the US Department of Housing and Urban Development (HUD), via the Federal National Manufactured Housing Construction and Safety Standards Act of 1974. This national regulation has allowed many manufacturers to distribute nationwide because they are immune to the jurisdiction of local building authorities.[4] [5]
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By contrast, producers of modular homes must abide by state and local building codes. There are, however, wind zones adopted by HUD that home builders must follow. For example, statewide, Florida is at least wind zone 2. South Florida is wind zone 3, the strongest wind zone. After Hurricane Andrew in 1992, new standards were adopted for home construction. The codes for building within these wind zones were significantly amended, which has greatly increased their durability. During the 2004 hurricanes in Florida, these standards were put to the test, with great success. Yet, older models continue to face the exposed risk to high winds because of the attachments applied such as carports, porch and screen room additions. Such areas are exposed to "wind capture" which apply extreme force to the underside of the integrated roof panel systems, ripping the fasteners through the roof pan causing a series of events which destroys the main roof system and the home.

The popularity of the factory-built homes caused complications the legal system was not prepared to handle. Originally, factory-built homes tended to be taxed as vehicles rather than real estate, which resulted in very low property tax rates for their inhabitants. That caused local governments to reclassify them for taxation purposes.

However, even with that change, rapid depreciation often resulted in the home occupants paying far less in property taxes than had been anticipated and budgeted. The ability to move many factory-built homes rapidly into a relatively small area resulted in strains to the infrastructure and governmental services of the affected areas, such as inadequate water pressure and sewage disposal, and highway congestion. That led jurisdictions to begin placing limitations on the size and density of developments.

Early homes, even those that were well-maintained, tended to depreciate over time, much like motor vehicles. That is in contrast to site-built homes which include the land they are built on and tend to appreciate in value. The arrival of mobile homes in an area tended to be regarded with alarm, in part because of the devaluation of the housing potentially spreading to preexisting structures.

This combination of factors has caused most jurisdictions to place zoning regulations on the areas in which factory-built homes are placed, and limitations on the number and density of homes permitted on any given site. Other restrictions, such as minimum size requirements, limitations on exterior colors and finishes, and foundation mandates have also been enacted. There are many jurisdictions that will not allow the placement of any additional factory-built homes. Others have strongly limited or forbidden all single-wide models, which tend to depreciate more rapidly than modern double-wide models.

Apart from all the practical issues described above, there is also the constant discussion about legal fixture and chattels and so the legal status of a trailer is or could be affected by its incorporation to the land or not. This sometimes involves such factors as whether or not the wheels have been removed.

North Carolina

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The North Carolina Board of Transportation allowed 14-foot-wide homes on the state's roads, but until January 1997, 16-foot-wide homes were not allowed. 41 states allowed 16-foot-wide homes, but they were not sold in North Carolina. Under a trial program approved January 10, 1997, the wider homes could be delivered on specific roads at certain times of day and travel 10 mph below the speed limit, with escort vehicles in front and behind.[6][7] Eventually, all homes had to leave the state on interstate highways.[8]

In December 1997, a study showed that the wider homes could be delivered safely, but some opponents still wanted the program to end.[9] On December 2, 1999, the NC Manufactured Housing Institute asked the state Board of Transportation to expand the program to allow deliveries of 16-foot-wide homes within North Carolina.[8] A month later, the board extended the pilot program by three months but did not vote to allow shipments within the state.[10] In June 2000, the board voted to allow 16-foot-side homes to be shipped to other states on more two-lane roads, and to allow shipments in the state east of US 220. A third escort was required, including a law enforcement officer on two-lane roads.[11]

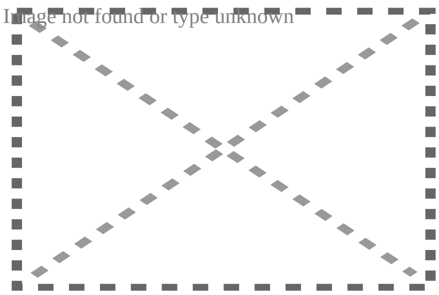
New York

[edit]

In New York State, the Homes and Community Renewal agency tracks mobile home parks and provides regulations concerning them. For example, the agency requires park owners to provide residents with a $15,000 grant if residents are forced to move when the land is transferred to a new owner. Residents are also granted the right of first refusal for a sale of the park, however, if the owner does not evict tenants for five years, the land sale can go ahead. State law also restricts the annual increase in land lot fee to a cap of 3 percent, unless the landowner demonstrates hardship in a local court, and can then raise the land lot fee by up to 6 percent in a year.[12]

Mobile home parks

[edit]
Main article: Trailer park



Meadow Lanes Estates Mobile Home Park, Ames, Iowa, August 2010, during a flood

Mobile homes are often sited in land lease communities known as trailer parks (also 'trailer courts', 'mobile home parks', 'mobile home communities', 'manufactured home communities', 'factory-built home communities' etc.); these communities allow homeowners to rent space on which to place a home. In addition to providing space, the site often provides basic utilities such as water, sewer, electricity, or natural gas and other amenities such as mowing, garbage removal, community rooms, pools, and playgrounds.

There are over 38,000[13] trailer parks in the United States ranging in size from 5 to over 1,000 home sites. Although most parks appeal to meeting basic housing needs, some communities specialize towards certain segments of the market. One subset of mobile home parks, retirement communities, restrict residents to those age 55 and older. Another subset of mobile home parks, seasonal communities, are located in popular vacation destinations or are used as a location for summer homes. In New York State, as of 2019, there were 1,811 parks with 83,929 homes.[12]

Newer homes, particularly double-wides, tend to be built to much higher standards than their predecessors and meet the building codes applicable to most areas. That has led to a reduction in the rate of value depreciation of most used units.[14]

Additionally, modern homes tend to be built from materials similar to those used in site-built homes rather than inferior, lighter-weight materials. They are also more likely to physically resemble site-built homes. Often, the primary differentiation in appearance is that factory-built homes tend to have less of a roof slope so that they can be readily transported underneath bridges and overpasses.[*citation needed*]

The number of double-wide units sold exceeds the number of single-wides, which is due in part to the aforementioned zoning restrictions. Another reason for higher sales is the spaciousness of double-wide units, which are now comparable to site-built homes. Single-wide units are still popular primarily in rural areas, where there are fewer restrictions. They are frequently used as temporary housing in areas affected by natural disasters when restrictions are temporarily waived.[*citation needed*]

Another recent trend has been parks in which the owner of the mobile home owns the lot on which their unit is parked. Some of these communities simply provide land in a homogeneous neighborhood, but others are operated more like condominiums with club homes complete with swimming pools and meeting rooms which are shared by all of the residents, who are required to pay membership fees and dues.

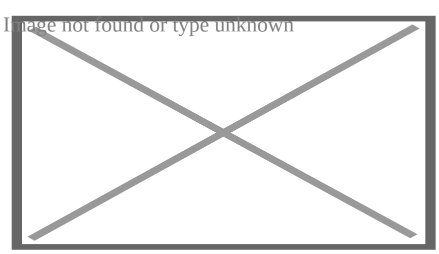
By country

[edit]

Mobile home (or mobile-homes) are used in many European campgrounds to refer to fixed caravans, purpose-built cabins, and even large tents, which are rented by the week or even year-round as cheap accommodation, similar to the US concept of a trailer park. Like many other US loanwords, the term is not used widely in Britain.[*citation needed*]

United Kingdom

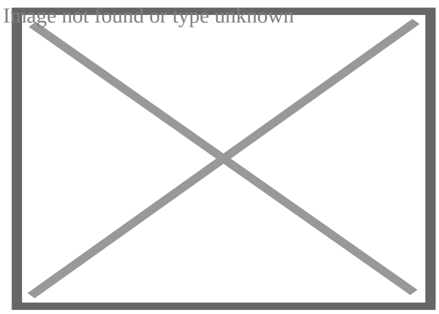
[edit]



A mobile home marketed as a holiday home

Mobile Homes or Static Caravans are popular across the United Kingdom. They are more commonly referred to as Park Homes or Leisure Lodges, depending on if they are marketed as a residential dwelling or as a second holiday home residence.

Residential Mobile homes (park homes) are built to the BS3632 standard. This standard is issued by the British Standards Institute. The institute is a UK body who produce a range of standards for businesses and products to ensure they are fit for purpose. The majority of residential parks in the UK have a minimum age limit for their residents, and are generally marketed as retirement or semi-retirement parks. Holiday Homes, static caravans or holiday lodges aren't required to be built to BS3632 standards, but many are built to the standard.



A static caravan park on the cliffs above Beer, Devon, England

In addition to mobile homes, static caravans are popular across the UK. Static caravans have wheels and a rudimentary chassis with no suspension or brakes and are therefore transported on the back of large flatbed lorries, the axle and wheels being used for movement to the final location when the static caravan is moved by tractor or 4×4. A static caravan normally stays on a single plot for many years and has many of the modern conveniences normally found in a home.

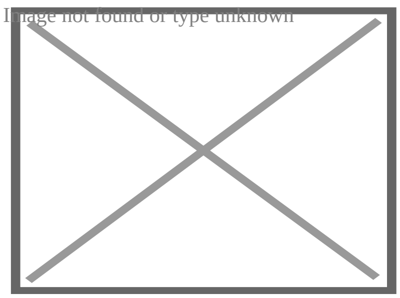
Mobile homes are designed and constructed to be transportable by road in one or two sections. Mobile homes are no larger than 20 m × 6.8 m (65 ft 7 in × 22 ft 4 in) with an internal maximum height of 3.05 m (10 ft 0 in). Legally, mobile homes can still be defined as "caravans".

Static holiday caravans generally have sleeping accommodation for 6 to 10 people in 2, 3 or 4 bedrooms and on convertible seating in the lounge referred to as a 'pull out bed'. They tend towards a fairly "open-plan" layout, and while some units are double glazed and centrally heated for year-round use, cheaper models without double glazing or central heating are available for mainly summer use. Static caravan holiday homes are intended for leisure use and are available in 10 and 12 ft (3.0 and 3.7 m) widths, a small number in 13 and 14 ft (4.0 and 4.3 m) widths, and a few 16 ft (4.9 m) wide, consisting of two 8 ft (2.4 m) wide units joined. Generally, holiday homes are clad in painted steel panels, but can be clad in PVC, timber or composite materials. Static caravans are sited on caravan parks where the park operator of the site leases a plot to the caravan owner. There are many holiday parks in the UK in which one's own static caravan can be owned. There are a few of these parks in areas that are prone to flooding and anyone considering buying a sited static caravan needs to take particular care in checking that their site is not liable to flooding.

Static caravans can be rented on an ad-hoc basis or purchased. Purchase prices range from £25,000 to £100,000. Once purchased, static caravans have various ongoing costs including insurance, site fees, local authority rates, utility charges, winterisation and depreciation. Depending on the type of caravan and the park these costs can range from £1,000 to £40,000 per year.[15] Some park owners used to have unfair conditions in their lease contracts but the Office of Fair Trading has produced a guidance document available for download called Unfair Terms in Holiday Caravan Agreements which aims to stop unfair practices.

Israel

[edit]
Main article: Caravan (Israel)



Posting of *caravan* in Mitzpe Hila, Israel, 1982

Many Israeli settlements and outposts are originally composed of caravans (Hebrew: ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â§ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•Ã *caravan*; pl. ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â§ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•Ã *caravanim*). They are constructed of light metal, are not insulated but can be outfitted with heating and air-conditioning units, water lines, recessed lighting, and floor tiling to function in a full-service capacity. Starting in 2005, prefabricated homes, named *caravillas* (Hebrew: ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â§ÃƒÆ’Ã†â€™ÃƒÂ¢Ã¢â€šÂ¬Ã¢â‚¬Â•Ã), a portmanteau of the words caravan, and villa, begin to replace mobile homes in many Israeli settlements.

Difference from modular homes

[edit]
Main article: Modular home

Because of similarities in the manufacturing process, some companies build both types in their factories. Modular homes are transported on flatbed trucks rather than being towed, and lack axles and an automotive-type frame. However, some modular homes are towed behind a semi-truck or toter on a frame similar to that of a trailer. The home is usually in two pieces and is hauled by two separate trucks. Each frame has five or more axles, depending on the size of the home. Once the home has reached its location, the axles and the tongue of the frame are then removed, and the home is set on a concrete foundation by a large crane.

Both styles are commonly referred to as factory-built housing, but that term's technical use is restricted to a class of homes regulated by the Federal National Mfd. Housing Construction and Safety Standards Act of 1974.

Most zoning restrictions on the homes have been found to be inapplicable or only applicable to modular homes. That occurs often after considerable litigation on the topic by affected jurisdictions and by plaintiffs failing to ascertain the difference. Most modern modulars, once fully assembled, are indistinguishable from site-built homes. Their roofs are usually transported as separate units. Newer modulars also come with roofs that can be raised during the setting process with cranes. There are also modulars with 2 to 4 storeys.

Gallery

[edit]

Construction starts with the frame.

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  Construction starts with the frame.

Interior wall assemblies are attached.

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  Interior wall assemblies are attached.

Roof assembly is set atop home.

○

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Roof assembly is set atop home.

Drywall is completed.

○

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Drywall is completed.

Home is ready for delivery to site.

○

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Home is ready for delivery to site.

- A modern "triple wide" home, designed to look like an adobe home

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A modern "triple wide" home, designed to look like an adobe home

A mobile home is being moved, California.

- Image not found or type unknown
  A mobile home
  is being moved,
  California.
- A mobile home being prepared for transport

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  A mobile home being
  prepared for transport

See also

[edit]

- Image not found or type unknown Housing portal
- All Parks Alliance for Change
- Campervan
- Construction trailer
- Houseboat
- Manufactured housing
- Modular home
- Motorhome
- Nomadic wagons
- Recreational vehicle
- Reefer container housing units
- Small house movement
- Trailer (vehicle)
- Trailer Park Boys
- Trailer trash
- Vardo
- Prefabricated home

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External links

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Wikimedia Commons has media related to ***Mobile homes***.

- Regulating body in the UK
- US Federal Manufactured Home Construction and Safety Standards

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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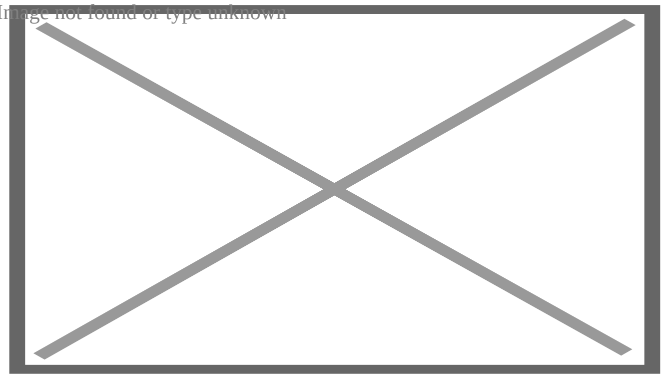


There are various types of air conditioners. Popular examples include: Window-mounted air conditioner (Suriname, 1955); Ceiling-mounted cassette air conditioner (China, 2023); Wall-mounted air conditioner (Japan, 2020); Ceiling-mounted console (Also called ceiling suspended) air conditioner (China, 2023);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

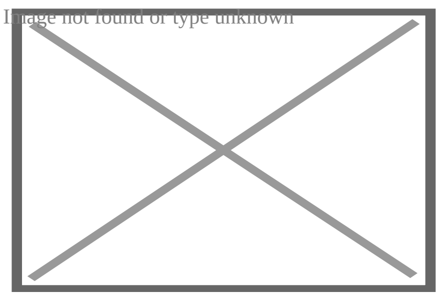
Air conditioners can reduce mortality rates due to higher temperature.[7] According to the International Energy Agency (IEA) 1.6 billion air conditioning units were used globally in 2016.[8] The United Nations called for the technology to be made more sustainable to mitigate climate change and for the 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

[edit]

Preceding discoveries

[edit]

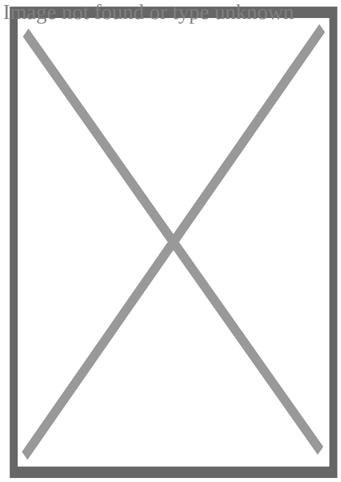
In 1558, Giambattista della Porta described a method of chilling ice to temperatures far below its freezing point by mixing it with potassium nitrate (then called "nitre") in his popular science book *Natural Magic*.[15][16][17] In 1620, Cornelis Drebbel demonstrated "Turning Summer into Winter" for 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

[edit]



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]

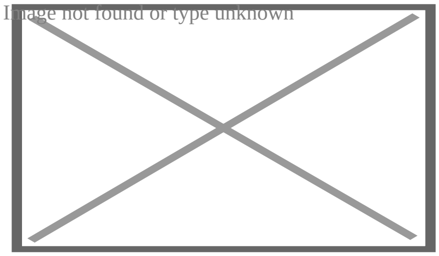
As of 2016 an estimated 1.6 billion air conditioning units were used worldwide, with over half of them in China and USA, and a total cooling capacity of 11,675 gigawatts.[8][43] The International Energy Agency predicted in 2018 that the number of air conditioning units would grow to around 4 billion 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*

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*]

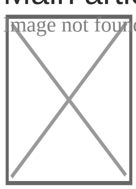
Efficiency is strongly affected by the humidity of the air to be cooled. Dehumidifying the air before attempting to cool it can reduce subsequent cooling costs by as much as 90 percent. Thus, reducing dehumidifying costs can materially affect overall air conditioning costs.[62]

Control system

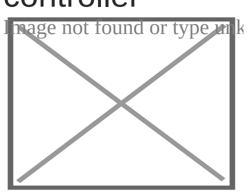
[edit]

Wireless remote control

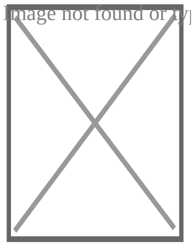
[edit]
Main articles: Remote control and Infrared blaster

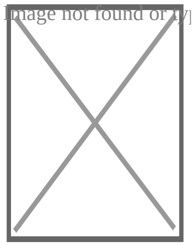


A wireless remote controller



The infrared transmitting LED on the remote





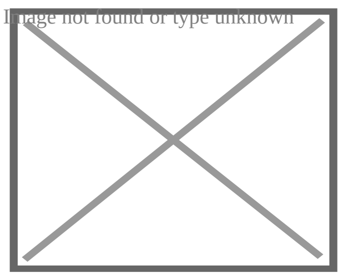
The infrared receiver on the air conditioner

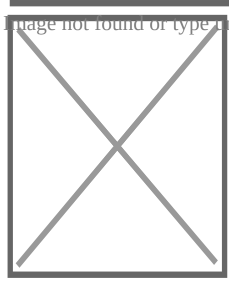
This type of controller uses an infrared LED to relay commands from a remote control to the air conditioner. The output of the infrared LED (like that of any infrared remote) is invisible to the human eye because its wavelength is beyond the range of visible light (940 nm). This system is commonly used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

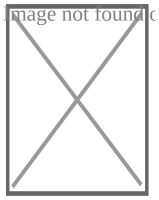
Wired controller

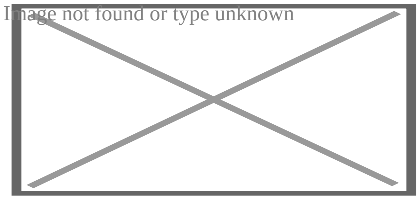
[edit]

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

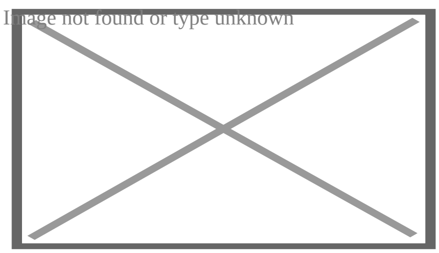
Floor standing	medium – large	Direct / Ducted	Floor	Commercial
Packaged	very large	Direct / Ducted	Floor	Commercial
Packaged RTU (Rooftop Unit)	very large	Ducted	Rooftop	Commercial

* 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.

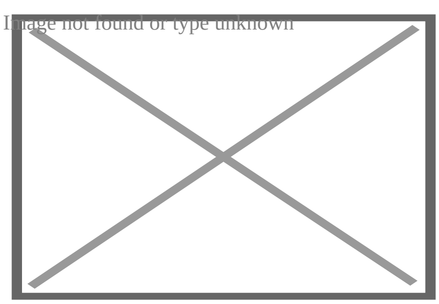
Ducted central systems

[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]

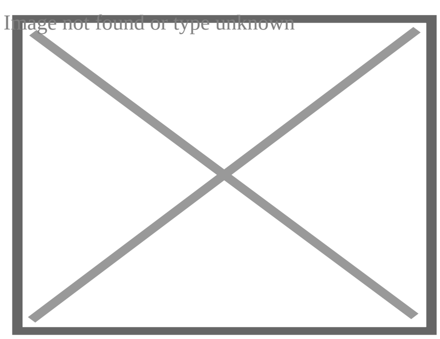
A portable system has an indoor unit on wheels connected to an outdoor unit via flexible pipes, similar to a permanently fixed installed unit (such as a ductless split air conditioner).

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 needed*]

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

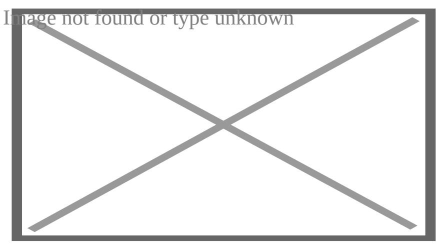
This system uses a variable-frequency drive (also called an Inverter) to control the speed of the compressor. The refrigerant flow rate is changed by the change in the speed of the compressor. The turn down ratio depends on the system configuration and manufacturer. It modulates from 15 or 25% up to 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]

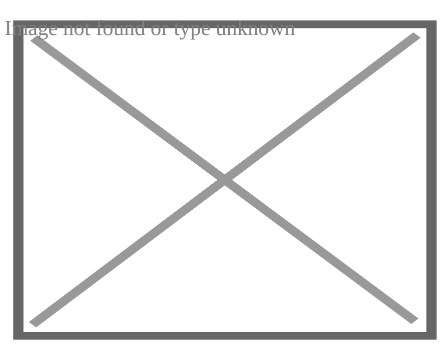
First designed to benefit targeted industries such as the press as well as large factories, the invention quickly spread to public agencies and administrations with studies with claims of increased productivity close to 24% in places equipped with air conditioning.[93]

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

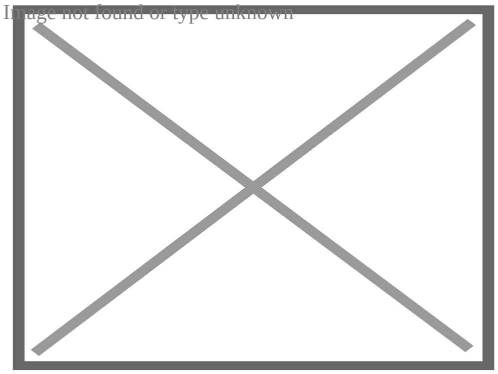
[edit]

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]

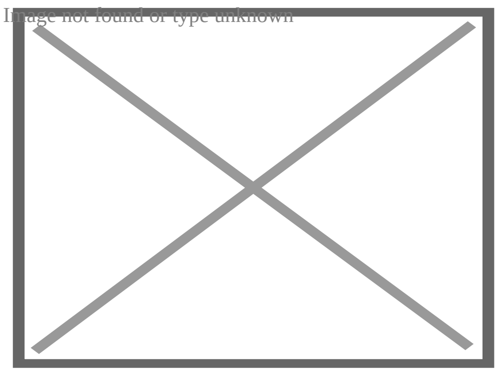
Many techniques can be used to increase comfort and reduce the temperature in buildings. These include evaporative cooling, selective shading, wind, thermal convection, and heat storage.[113]

Passive ventilation

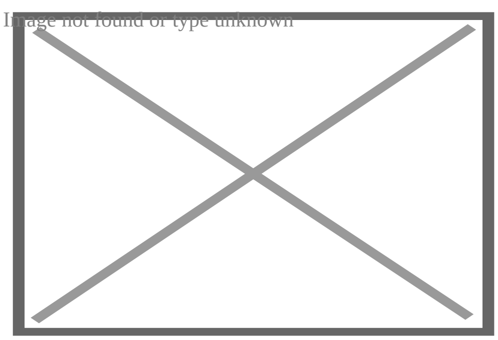
[edit]
This section is an excerpt from Passive ventilation.[edit]



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.

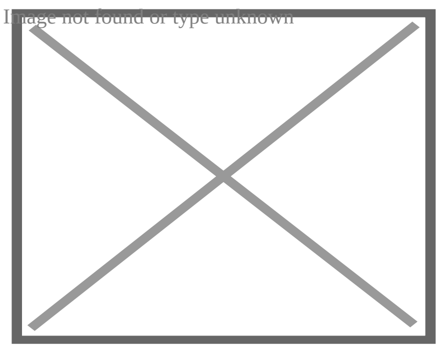
There are two types of natural ventilation occurring in buildings: *wind driven ventilation* and *buoyancy-driven ventilation*. Wind driven ventilation arises from the different pressures created by wind around a building or structure, and openings being formed on the perimeter which then permit flow 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]

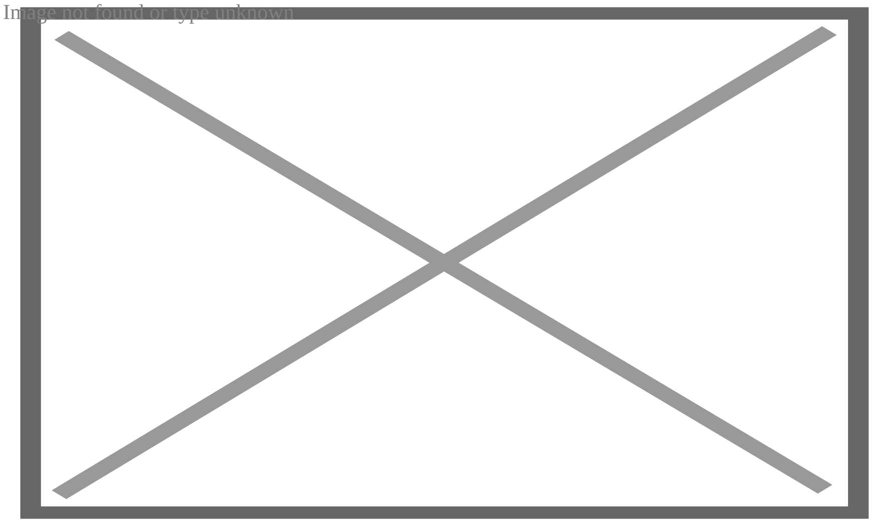


A traditional Iranian solar cooling design using a wind tower

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.

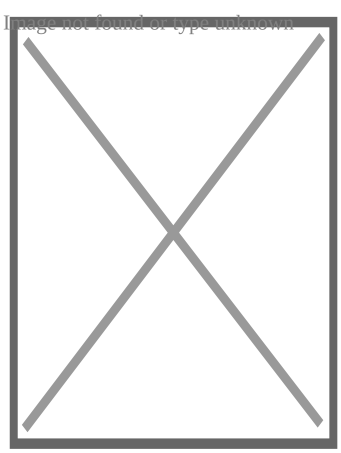
Passive cooling is an important tool for design of buildings for climate change adaptation – reducing dependency on energy-intensive air conditioning in warming environments.[119][120]



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]
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In 747, Emperor Xuanzong (r. 712–762) of the Tang dynasty (618–907) had the Cool Hall (*Liang Dian* ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¦ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â¶ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â¼ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚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]
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Thermal buffering

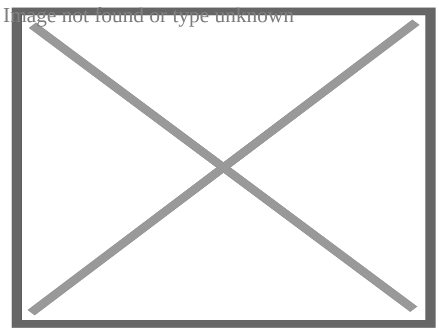
[edit]

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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Look up ***Cassette air conditioner*** in Wiktionary, the free dictionary.

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Wikiversity has learning resources about ***Refrigeration and air conditioning***

- 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
- Solar heating
- Thermal insulation

- 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
- Grille
- Ground-coupled heat exchanger

Components

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
- Kitchen hood
- Kitchen stove

See also

- Appliance plug
- Appliance recycling

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 Royal Supply South

Things To Do in Arapahoe County

Photo

Morrison Nature Center

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Photo

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Colorado Freedom Memorial

4.8 (191)

Photo

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Meow Wolf Denver | Convergence Station

4.5 (14709)

Photo

Big Blue Bear

4.6 (1429)

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History Colorado Center

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Molly Brown House Museum

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Driving Directions in Arapahoe County

Driving Directions From Costco Wholesale to Royal Supply South

Driving Directions From Regal River Point to Royal Supply South

Driving Directions From Tandy Leather South Denver - 151 to Royal Supply South

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Driving Directions From Colorado Freedom Memorial to Royal Supply South

Driving Directions From Museum of Outdoor Arts to Royal Supply South

Driving Directions From Denver Zoo to Royal Supply South

Driving Directions From Aurora Reservoir to Royal Supply South

Driving Directions From Colorado Freedom Memorial to Royal Supply South

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Reviews for Royal Supply South

Verifying Electrical Capacity for New Units**View GBP**

Frequently Asked Questions

What is the recommended electrical capacity needed for a new HVAC unit in a mobile home?

The recommended electrical capacity depends on the specific HVAC units requirements, often specified by the manufacturer. Typically, central air conditioning units require 20-30 amps at 240 volts, while heat pumps may need more depending on size and efficiency.

How can I determine if my current electrical system can support a new HVAC unit?

To determine if your system can support a new unit, check your main panel’s service amperage (usually listed inside the panel door), compare it with the HVAC unit’s specifications, and ensure you have enough spare circuit breaker slots or capacity.

What steps should I take if my mobile homes electrical system cant handle the new HVAC load?

If your existing system lacks capacity, consider upgrading your service panel or adding subpanels. This requires hiring a licensed electrician to assess and perform necessary upgrades safely and comply with local codes.

Are there any regulations or codes specifically impacting mobile home HVAC installations?

Yes, mobile homes must adhere to HUD standards and local building codes. These regulations can affect installation practices, equipment choice, and safety considerations. Always consult these guidelines before proceeding with an installation.

Royal Supply Inc

Phone : +16362969959

City : Wichita

State : KS

Zip : 67216

Address : Unknown Address

Google Business Profile

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