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Homes

How SEER Ratings Impact Energy Efficiency in Mobile Homes

Mobile homes, with their compact and efficient design, offer a unique living solution for many individuals and families. However, one of the critical aspects of maintaining comfort within these homes is managing their heating, ventilation, and air conditioning (HVAC) systems. The challenges associated with mobile home HVAC systems are distinct from those found in traditional houses due to their size and construction materials. Ductwork in mobile homes is often smaller and requires precise installation **mobile home hvac units** crawl space. A crucial factor in addressing these challenges is understanding the Seasonal Energy Efficiency Ratio (SEER) values and how they can help lower energy costs.

The SEER value is a measure of an air conditioner's cooling efficiency over a typical cooling season. It represents the ratio of the total cooling output in British thermal units (BTUs) during the normal cooling season divided by the total electric energy input in watt-hours during the same period. In simpler terms, a higher SEER rating indicates better energy efficiency. This measure becomes particularly significant when considering mobile homes because they often have less insulation and more exposure to external temperature fluctuations compared to traditional buildings.

Mobile homes face several unique HVAC challenges primarily due to their construction and limited space. They are typically built with lighter materials that do not retain heat or coolness as efficiently as those used in site-built homes. This inefficiency can lead to higher energy consumption as HVAC systems work harder to maintain desired interior temperatures. Additionally, the smaller space within mobile homes means that any inefficiencies or problems with an HVAC system can quickly become apparent through increased utility bills or uncomfortable indoor climates.

When comparing SEER values for potential HVAC systems, homeowners should aim for models that offer both high efficiency and suitability for smaller spaces like mobile homes. Higher SEER-rated units generally consume less power while delivering adequate cooling performance, which translates into lower monthly utility bills-an appealing prospect for mobile home residents looking to manage expenses effectively.

Moreover, selecting an appropriate system involves balancing upfront costs with long-term savings. While units with higher SEER ratings might come at a premium price initially, they tend to provide significant savings on electricity bills over time due to reduced energy consumption. This cost-benefit analysis is essential for anyone making decisions about installing or upgrading an HVAC system in a mobile home environment.

In addition to selecting high-SEER systems, there are other strategies homeowners can employ to enhance their home's energy efficiency further. Proper maintenance of existing systems-such as regularly changing filters and ensuring ductwork is sealed properly-can improve performance without necessitating immediate replacement of entire units.

Ultimately, understanding SEER values provides a valuable tool for mobile home owners seeking to optimize their HVAC systems' performance while keeping energy costs manageable. By focusing on efficient models suited specifically for smaller dwellings like mobile homes and adopting conscientious maintenance practices, homeowners can enjoy comfortable indoor environments throughout all seasons without incurring excessive expenses.

As awareness around sustainable living grows alongside technological advancements in HVAC solutions, exploring options like improved insulation materials or integrated smart thermostats may also present additional ways to enhance both comfort levels inside mobile homes and overall operational efficiencies-a win-win scenario for eco-conscious consumers aiming towards greener lifestyles coupled seamlessly together by effective resource management techniques tailored precisely according individualized needs within ever-evolving residential landscapes today!

In the quest for energy efficiency, mobile homeowners often grapple with finding ways to reduce energy consumption without compromising comfort. One critical factor in this endeavor is understanding SEER ratings-Seasonal Energy Efficiency Ratio-and how they impact energy use and costs. The SEER rating of an air conditioning unit essentially measures its cooling efficiency over a typical cooling season; the higher the SEER rating, the more energy-efficient the unit is.

Mobile homes, like traditional homes, require effective climate control systems to ensure a comfortable living environment. However, their unique construction can sometimes lead to different energy demands. This makes selecting an efficient air conditioning system particularly important for mobile home residents looking to manage utility expenses.

A higher SEER rating indicates that an air conditioner consumes less electricity to provide the same amount of cooling compared to a unit with a lower SEER rating. For example, upgrading from a system with a SEER rating of 10 to one rated at 16 can dramatically cut electricity usage. While such upgrades might involve upfront costs, they often prove financially beneficial in the long run due to reduced utility bills.

Moreover, investing in units with higher SEER ratings aligns well with environmental sustainability efforts. By consuming less power and reducing greenhouse gas emissions associated with power generation, these high-efficiency systems contribute positively towards lowering one's carbon footprint.

When comparing SEER values for potential installations or replacements in mobile homes, it's essential to consider both immediate and long-term cost implications. While initial investments might be higher for units boasting superior SEER ratings, the savings accrued over time through reduced energy consumption typically justify this expenditure.

In conclusion, understanding and utilizing SEER ratings effectively can play a pivotal role in managing energy consumption and lowering costs within mobile homes. By opting for air conditioning systems that offer high efficiency as indicated by their SEER values, homeowners not only enjoy economic benefits but also contribute positively towards broader ecological goals.

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Choosing the Right SEER Rating for Your Mobile Home HVAC System

When it comes to mobile homes, maximizing energy efficiency is not just a matter of environmental consciousness; it's also a practical strategy for reducing monthly utility bills. One of the key metrics in evaluating the energy efficiency of heating and cooling systems is the Seasonal Energy Efficiency Ratio, or SEER. Understanding the differences between low, medium, and high SEER levels can empower homeowners to make informed decisions that align with both their comfort needs and financial goals.

To begin with, SEER is a measure used primarily to denote the efficiency of air conditioning units over an entire cooling season. The higher the SEER rating, the more energy-efficient the unit is considered to be. This means that higher SEER units consume less electricity to achieve the same level of cooling, which translates into lower energy costs over time. For mobile home owners specifically, where space can be limited and insulation may not always be optimal, selecting an appropriate SEER-rated system can have significant implications.

Low-efficiency options typically feature SEER ratings from 13 to 15. While these systems are generally less expensive upfront, they tend to use more electricity than their higher-rated counterparts. For mobile homes located in regions with mild climates or where air conditioning usage is minimal, investing in a low-SEER unit might be cost-effective initially but could lead to higher utility costs during peak usage months.

Medium-efficiency air conditioners boast SEER ratings between 16 and 18. They strike a balance between initial cost and long-term savings by offering improved energy use without breaking the bank at purchase time. For many mobile home owners who experience moderate climatic conditions-where neither extreme heat nor cold dominates-medium-efficiency systems provide an ideal middle ground.

High-efficiency models exceed SEER ratings of 19 and often incorporate advanced technology like variable-speed compressors or smart thermostats for optimized performance. Though these units come with a heftier price tag upfront, they offer substantial savings on monthly utility bills due to their superior energy conservation capabilities. In mobile homes situated in areas with prolonged hot seasons or those aiming for sustainable living solutions, high-SEER systems prove advantageous both financially and environmentally.

It's essential for mobile homeowners to consider factors beyond just initial cost when choosing an air conditioning system based on its SEER rating. Climate conditions, frequency of use, and specific household needs all play critical roles in determining which efficiency level will yield the greatest benefits over time.

Moreover, investing in proper maintenance can further enhance any system's performance regardless of its SEER level. Regular cleaning of filters and coils as well as professional inspections ensure that even lower-rated units operate efficiently throughout their lifespan.

In conclusion, comparing different SEER levels offers valuable insights into how each option impacts energy consumption and costs within mobile homes. By weighing immediate expenses against potential savings-and taking into account personal circumstances such as location and usage patterns-homeowners can select HVAC solutions that effectively reduce their environmental footprint while also lowering monthly expenditures.

Factors Influencing SEER Rating Effectiveness in Mobile Homes

Investing in higher Seasonal Energy Efficiency Ratio (SEER) rated HVAC systems for mobile homes presents a quintessential opportunity to explore cost-benefit analysis, particularly in the context of reducing energy costs. As energy prices continue to fluctuate and environmental concerns become more pressing, homeowners are increasingly seeking efficient solutions to manage their utility expenses while minimizing their carbon footprint. Here, we delve into the merits of opting for higher SEER rated systems and how they compare to lower-rated counterparts concerning energy cost reduction.

Firstly, understanding SEER is crucial. The SEER rating measures an air conditioner's or heat pump's cooling efficiency over a typical cooling season, with a higher number indicating greater efficiency. This metric allows consumers to make informed decisions when purchasing HVAC systems by providing a standardized measure of performance. In mobile homes, where space is often limited and insulation may not be as robust as in traditional houses, the efficiency of an HVAC system can significantly impact overall energy consumption.

The initial investment in a high SEER rated HVAC system can be substantial compared to units with lower ratings. However, this upfront cost must be weighed against long-term savings on energy bills. High SEER systems operate more efficiently, consuming less electricity while providing optimal climate control. Over time, this reduced energy usage translates into considerable savings for homeowners.

For example, consider two air conditioning units: one with a SEER rating of 13 (the minimum standard) and another with a rating of 21 (a high-efficiency model). While the latter may come with a higher price tag initially, it could save hundreds or even thousands of dollars over its lifespan through reduced electricity bills. For mobile home owners who face unique challenges such as limited space for ductwork or insulation issues that exacerbate heating and cooling demands, these savings are particularly impactful.

Moreover, investing in high SEER equipment aligns with broader environmental goals by reducing energy consumption and greenhouse gas emissions. This environmentally friendly choice not only benefits individual households but also contributes positively to community efforts towards sustainability.

However, it's essential for mobile home owners to conduct thorough research before making such investments. Factors like local climate conditions play a significant role; regions with extreme temperatures might benefit more from high-efficiency systems than milder areas where heating and cooling needs are less intense. Additionally, considering potential incentives or rebates offered by government programs or utility companies can further enhance the financial viability of choosing higher-efficiency models.

In conclusion, while the initial costs associated with high-SEER-rated HVAC systems can be daunting for mobile home owners on tight budgets, the long-term benefits often outweigh these expenses through significant reductions in monthly energy bills and enhanced comfort levels within homes. Coupled with favorable environmental impacts and potential financial incentives available at federal or state levels, investing in such efficient technology becomes not just an economic decision but also an ethical one aimed at fostering sustainable living practices across communities nationwide.

Comparing SEER Ratings Across Different Mobile Home Cooling Systems

When it comes to making mobile homes more energy-efficient, one of the most critical considerations is the Seasonal Energy Efficiency Ratio, or SEER, of the air conditioning unit. SEER ratings provide a standardized measure of an air conditioner's cooling efficiency over an entire season. Essentially, the higher the SEER rating, the more efficient the system is at converting electricity into cooling power. For mobile home owners seeking ways to lower their energy costs, understanding and comparing SEER values can lead to significant savings.

Case studies and examples from various regions illustrate how different SEER ratings impact energy consumption and cost savings in mobile homes. Take, for instance, a mobile home community in Florida that decided to upgrade its HVAC systems. Initially equipped with units rated at 10 SEER-a common standard for older systems-the community found their energy bills soaring during the sweltering summer months. By upgrading to units with a 16 SEER rating, residents reported up to 30% reductions in their monthly utility bills. This dramatic decrease was attributed not only to improved efficiency but also to better climate control within their homes.

Another example comes from a mobile home park in Arizona where units with 13 SEER ratings were replaced by those boasting 18 SEER ratings. The desert climate posed unique challenges, with extreme heat leading to high demand for air conditioning. Residents who made this switch noticed immediate improvements: not only did they save money-sometimes as much as $400 annually-but they also experienced increased comfort due to more consistent indoor temperatures.

In both cases, these upgrades required initial investment; however, rebates and incentives often available through local utility companies or state programs helped offset these costs. Additionally, homeowners saw returns on their investments relatively quickly through reduced monthly expenses.

It's important to note that while higher SEER ratings generally contribute to lower energy costs, they are just one piece of the puzzle when it comes to overall efficiency in mobile homes. Proper insulation, sealing leaks around windows and doors, and regular maintenance of HVAC systems are equally crucial components that work alongside high-SEER-rated units.

Thus, when considering options for reducing energy costs in mobile homes through improved air conditioning systems, evaluating different SEER ratings provides valuable insights into potential savings. As demonstrated by these case studies from Florida and Arizona, investing in higher-SEER-rated units can lead not only to significant financial savings but also enhance living conditions-a win-win scenario for any mobile homeowner looking toward sustainable living solutions.

Tips for Maintaining Optimal Performance of High-SEER Rated Systems

When it comes to maintaining comfort in your mobile home while keeping energy costs in check, selecting the right Seasonal Energy Efficiency Ratio (SEER) rating for your HVAC system is crucial. SEER ratings are a measure of an air conditioning unit's efficiency; the higher the SEER rating, the more efficient the unit. This metric can help homeowners compare different units and make informed decisions that balance upfront costs with long-term savings.

First, it's important to understand what SEER ratings mean. They represent the ratio of cooling output during a typical cooling season divided by the total electric energy input during the same period. For mobile home owners looking to minimize energy expenses, choosing an HVAC system with a higher SEER rating often translates into lower utility bills over time.

However, selecting the ideal SEER rating involves more than just opting for the highest number available. Considerations such as climate, initial cost, future savings, and specific needs of your mobile home should guide your decision-making process.

For those living in regions with long, hot summers, investing in a system with a higher SEER rating might be beneficial due to frequent use of air conditioning. The energy savings from increased efficiency can offset any additional upfront cost relatively quickly. On the other hand, if you reside in a milder climate where air conditioning is not used extensively, a moderately rated SEER unit could be more economically feasible without sacrificing comfort.

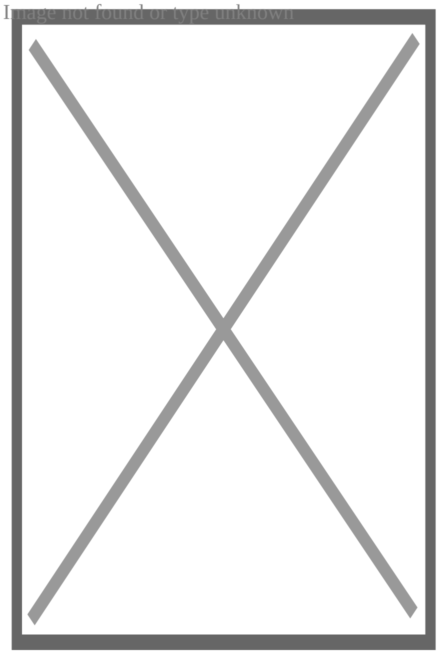
Moreover, budget constraints often play a significant role. While units with higher SEER ratings tend to be more expensive initially, they offer greater energy efficiency that leads to reduced electricity bills over time. It's essential to calculate potential savings against initial expenses; sometimes spending more upfront results in substantial financial benefits down the line.

Additionally, consider how long you plan on staying in your mobile home. If it's a short-term arrangement or you anticipate relocating soon, investing heavily in an ultra-efficient HVAC system may not be necessary or practical.

In summary, when comparing SEER values for lowering energy costs in mobile homes, it's all about striking the right balance between efficiency and cost-effectiveness tailored to individual circumstances and usage patterns. By carefully evaluating factors such as regional climate conditions and personal financial situations alongside desired comfort levels within your living space-you can select an appropriate SEER rating that ensures both economical operation and enhanced environmental responsibility within your mobile home's unique context.

About Refrigerant

This article's lead section **may be too short to adequately summarize the key points**. Please consider expanding the lead to provide an accessible overview of all important aspects of the article. *(March 2021)*



A DuPont R-134a refrigerant

A **refrigerant** is a working fluid used in cooling, heating or reverse cooling and heating of air conditioning systems and heat pumps where they undergo a repeated phase transition from a liquid to a gas and back again. Refrigerants are heavily regulated because of their toxicity and flammability[1] and the contribution of CFC and HCFC refrigerants to ozone depletion[2] and that of HFC refrigerants to climate change.[3]

Refrigerants are used in a direct expansion (DX- Direct Expansion) system (circulating system)to transfer energy from one environment to another, typically from inside a building to outside (or vice versa) commonly known as an air conditioner cooling only or cooling & heating reverse DX system or heat pump a heating only DX cycle. Refrigerants can carry 10 times more energy per kg than water, and 50 times more than air.

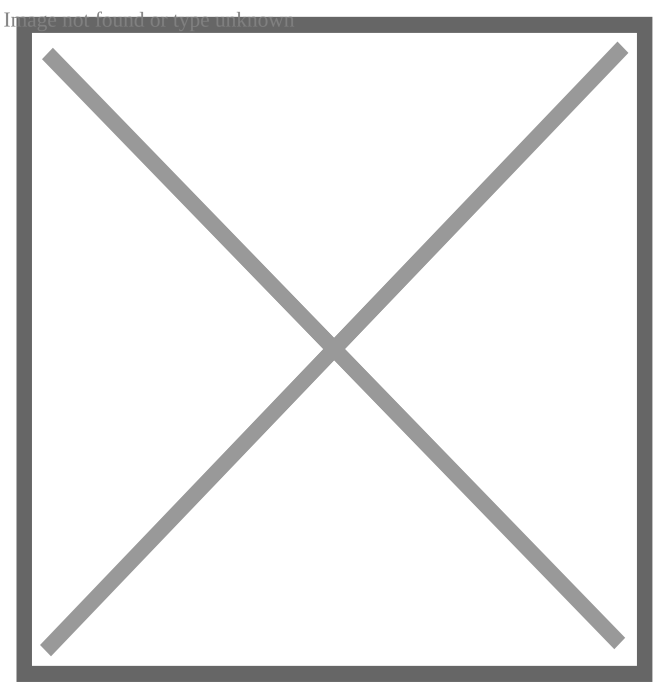
Refrigerants are controlled substances and classified by International safety regulations ISO 817/5149, AHRAE 34/15 & BS EN 378 due to high pressures (700–1,000 kPa (100–150 psi)), extreme temperatures (?50 °C [?58 °F] to over 100 °C [212 °F]), flammability (A1 class non-flammable, A2/A2L class flammable and A3 class extremely flammable/explosive) and toxicity (B1-low, B2-medium & B3-high). The regulations relate to situations when these refrigerants are released into the atmosphere in the event of an accidental leak not while circulated.

Refrigerants (controlled substances) must only be handled by qualified/certified engineers for the relevant classes (in the UK, C&G 2079 for A1-class and C&G 6187-2 for A2/A2L & A3-class refrigerants).

Refrigerants (A1 class only) Due to their non-flammability, A1 class non-flammability, non-explosivity, and non-toxicity, non-explosivity they have been used in open systems (consumed when used) like fire extinguishers, inhalers, computer rooms fire extinguishing and insulation, etc.) since 1928.

History

[edit]



The observed stabilization of HCFC concentrations (left graphs) and the growth of HFCs (right graphs) in earth's atmosphere.

The first air conditioners and refrigerators employed toxic or flammable gases, such as ammonia, sulfur dioxide, methyl chloride, or propane, that could result in fatal accidents when they leaked.[4]

In 1928 Thomas Midgley Jr. created the first non-flammable, non-toxic chlorofluorocarbon gas, *Freon* (R-12). The name is a trademark name owned by DuPont (now Chemours) for any chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), or hydrofluorocarbon (HFC) refrigerant. Following the discovery of better synthesis methods, CFCs such as R-11,[5] R-12,[6] R-123[5] and R-502[7] dominated the market.

Phasing out of CFCs

[edit]
See also: Montreal Protocol

In the mid-1970s, scientists discovered that CFCs were causing major damage to the ozone layer that protects the earth from ultraviolet radiation, and to the ozone holes over polar regions.[8][9] This led to the signing of the Montreal Protocol in 1987 which aimed to phase out CFCs and HCFC[10] but did not address the contributions that HFCs made to climate change. The adoption of HCFCs such as R-22,[11][12][13] and R-123[5] was accelerated and so were used in most U.S. homes in air conditioners and in chillers[14] from the 1980s as they have a dramatically lower Ozone Depletion Potential (ODP) than CFCs, but their ODP was still not zero which led to their eventual phase-out.

Hydrofluorocarbons (HFCs) such as R-134a,[15][16] R-407A,[17] R-407C,[18] R-404A,[7] R-410A[19] (a 50/50 blend of R-125/R-32) and R-507[20][21] were promoted as replacements for CFCs and HCFCs in the 1990s and 2000s. HFCs were not ozone-depleting but did have global warming potentials (GWPs) thousands of times greater than CO_2 with atmospheric lifetimes that can extend for decades. This in turn, starting from the 2010s, led to the adoption in new equipment of Hydrocarbon and HFO (hydrofluoroolefin) refrigerants R-32,[22] R-290,[23] R-600a,[23] R-454B,[24] R-1234yf,[25][26] R-514A,[27] R-744 (CO_2),[28] R-1234ze(E)[29] and R-1233zd(E),[30] which have both an ODP of zero and a lower GWP. Hydrocarbons and CO_2 are sometimes called natural refrigerants because they can be found in nature.

The environmental organization Greenpeace provided funding to a former East German refrigerator company to research alternative ozone- and climate-safe refrigerants in 1992. The company developed a hydrocarbon mixture of propane and isobutane, or pure isobutane,[31] called "Greenfreeze", but as a condition of the contract with Greenpeace could not patent the technology, which led to widespread adoption by other firms.[32][33][34] Policy and political influence by corporate executives resisted change however,[35][36] citing the flammability and explosive properties of the refrigerants,[37] and DuPont together with other companies blocked them in the U.S. with the U.S. EPA.[38][39]

Beginning on 14 November 1994, the U.S. Environmental Protection Agency restricted the sale, possession and use of refrigerants to only licensed technicians, per rules under sections 608 and 609 of the Clean Air Act.[40] In 1995, Germany made CFC refrigerators illegal.[41]

In 1996 Eurammon, a European non-profit initiative for natural refrigerants, was established and comprises European companies, institutions, and industry experts.[42][43][44]

In 1997, FCs and HFCs were included in the Kyoto Protocol to the Framework Convention on Climate Change.

In 2000 in the UK, the Ozone Regulations[45] came into force which banned the use of ozone-depleting HCFC refrigerants such as R22 in new systems. The Regulation banned the use of R22 as a "top-up" fluid for maintenance from 2010 for virgin fluid and from 2015 for recycled fluid.[*citation needed*]

Addressing greenhouse gases

[edit]

With growing interest in natural refrigerants as alternatives to synthetic refrigerants such as CFCs, HCFCs and HFCs, in 2004, Greenpeace worked with multinational corporations like Coca-Cola and Unilever, and later Pepsico and others, to create a corporate coalition called Refrigerants Naturally!.[41][46] Four years later, Ben & Jerry's of Unilever and General Electric began to take steps to support production and use in the U.S.[47] It is estimated that almost 75 percent of the refrigeration and air conditioning sector has the potential to be converted to natural refrigerants.[48]

In 2006, the EU adopted a Regulation on fluorinated greenhouse gases (FCs and HFCs) to encourage to transition to natural refrigerants (such as hydrocarbons). It was reported in 2010 that some refrigerants are being used as recreational drugs, leading to an extremely dangerous phenomenon known as inhalant abuse.[49]

From 2011 the European Union started to phase out refrigerants with a global warming potential (GWP) of more than 150 in automotive air conditioning (GWP = 100-year warming potential of one kilogram of a gas relative to one kilogram of CO_2) such as the refrigerant HFC-134a (known as R-134a in North America) which has a GWP of 1526.[50] In the same year the EPA decided in favour of the ozone- and climate-safe refrigerant for U.S. manufacture.[32][51][52]

A 2018 study by the nonprofit organization "Drawdown" put proper refrigerant management and disposal at the very top of the list of climate impact solutions, with an impact equivalent to eliminating over 17 years of US carbon dioxide emissions.[53]

In 2019 it was estimated that CFCs, HCFCs, and HFCs were responsible for about 10% of direct radiative forcing from all long-lived anthropogenic greenhouse gases.[54] and in the same year the UNEP published new voluntary guidelines,[55] however many countries have not yet ratified the Kigali Amendment.

From early 2020 HFCs (including R-404A, R-134a and R-410A) are being superseded: Residential air-conditioning systems and heat pumps are increasingly using R-32. This still has a GWP of more than 600. Progressive devices use refrigerants with almost no climate impact, namely R-290 (propane), R-600a (isobutane) or R-1234yf (less flammable, in cars). In commercial refrigeration also CO_2 (R-744) can be used.

Requirements and desirable properties

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A refrigerant needs to have: a boiling point that is somewhat below the target temperature (although boiling point can be adjusted by adjusting the pressure appropriately), a high heat of vaporization, a moderate density in liquid form, a relatively high density in gaseous form (which can also be adjusted by setting pressure appropriately), and a high critical temperature. Working pressures should ideally be containable by copper tubing, a commonly available material. Extremely high pressures should be avoided.[*citation needed*]

The ideal refrigerant would be: non-corrosive, non-toxic, non-flammable, with no ozone depletion and global warming potential. It should preferably be natural with well-studied and low environmental impact. Newer refrigerants address the issue of the damage that CFCs caused to the ozone layer and the contribution that HCFCs make to climate change, but some do raise issues relating to toxicity and/or flammability.[56]

Common refrigerants

[edit]

Refrigerants with very low climate impact

[edit]

With increasing regulations, refrigerants with a very low global warming potential are expected to play a dominant role in the 21st century,[57] in particular, R-290 and R-1234yf. Starting from almost no market share in 2018,[58] low GWPO devices are gaining market share in 2022.

Code	Chemical	Name	GWP 20yr[59]	GWP 100yr[59]	Status	Commentary

R-290	C_3H_8	Propane		3.3[60]	Increasing use	Low cost, widely available and efficient. They also have zero ozone depletion potential. Despite their flammability, they are increasingly used in domestic refrigerators and heat pumps. In 2010, about one-third of all household refrigerators and freezers manufactured globally used isobutane or an isobutane/propane blend, and this was expected to increase to 75% by 2020.[61]
R-600a	$HC(CH_3)_3$	Isobutane		3.3	Widely used	See R-290.
R-717	NH_3	Ammonia	0	0[62]	Widely used	Commonly used before the popularisation of CFCs, it is again being considered but does suffer from the disadvantage of toxicity, and it requires corrosion-resistant components, which restricts its domestic and small-scale use. Anhydrous ammonia is widely used in industrial refrigeration applications and hockey rinks because of its high energy efficiency and low cost.
R-1234yf HFO-1234yf	$C_3H_2F_4$	2,3,3,3-Tetrafluoropropene		<1		Less performance but also less flammable than R-290.[57] GM announced that it would start using "hydro-fluoro olefin", HFO-1234yf, in all of its brands by 2013.[63]

R-744	CO_2	Carbon dioxide	1	1	In use	Was used as a refrigerant prior to the discovery of CFCs (this was also the case for propane)[4] and now having a renaissance due to it being non-ozone depleting, non-toxic and non-flammable. It may become the working fluid of choice to replace current HFCs in cars, supermarkets, and heat pumps. Coca-Cola has fielded CO_2-based beverage coolers and the U.S. Army is considering CO_2 refrigeration.[64][65] Due to the need to operate at pressures of up to 130 bars (1,900 psi; 13,000 kPa), CO_2 systems require highly resistant components, however these have already been developed for mass production in many sectors.

Most used

[edit]

Code	Chemical	Name	Global warming potential 20yr[59]	GWP 100yr [59]	Status	Commentary

R-32 HFC-32	CH_2F_2	Difluoromethane	2430	677	Widely used	Promoted as climate-friendly substitute for R-134a and R-410A, but still with high climate impact. Has excellent heat transfer and pressure drop performance, both in condensation and vaporisation.[66] It has an atmospheric lifetime of nearly 5 years.[67] Currently used in residential and commercial air-conditioners and heat pumps.
R-134a HFC-134a	CH_2FCF_3	1,1,1,2-Tetrafluoroethane	3790	1550	Widely used	Most used in 2020 for hydronic heat pumps in Europe and the United States in spite of high GWP.[58] Commonly used in automotive air conditioners prior to phase out which began in 2012.
R-410A		50% R-32 / 50% R-125 (pentafluoroethane)	Between 2430 (R-32) and 6350 (R-125)	> 677	Widely Used	Most used in split heat pumps / AC by 2018. Almost 100% share in the USA.[58] Being phased out in the US starting in 2022.[68][69]

Banned / Phased out

[edit]

Code	Chemical	Name	Global warming potential 20yr[59]	GWP 100yr [59]	Status	Commentary

R-11 CFC-11	CCl_3F	Trichlorofluoromethane	6900	4660	Banned	Production was banned in developed countries by Montreal Protocol in 1996
R-12 CFC-12	CCl_2F_2	Dichlorodifluoromethane	10800	10200	Banned	Also known as Freon, a widely used chlorofluorocarbon halomethane (CFC). Production was banned in developed countries by Montreal Protocol in 1996, and in developing countries (article 5 countries) in 2010.[70]
R-22 HCFC-22	$CHClF_2$	Chlorodifluoromethane	5280	1760	Being phased out	A widely used hydrochlorofluorocarbon (HCFC) and powerful greenhouse gas with a GWP equal to 1810. Worldwide production of R-22 in 2008 was about 800 Gg per year, up from about 450 Gg per year in 1998. R-438A (MO-99) is a R-22 replacement.[71]
R-123 HCFC-123	$CHCl_2CF_3$	2,2-Dichloro-1,1,1-trifluoroethane	292	79	US phase-out	Used in large tonnage centrifugal chiller applications. All U.S. production and import of virgin HCFCs will be phased out by 2030, with limited exceptions.[72] R-123 refrigerant was used to retrofit some chiller that used R-11 refrigerant Trichlorofluoromethane. The production of R-11 was banned in developed countries by Montreal Protocol in 1996.[73]

Other

[edit]

Code	Chemical	Name	Global warming potential 20yr[59]	GWP 100yr [59]	Commentary
R-152a HFC-152a	CH_3CHF_2	1,1-Difluoroethane	506	138	As a compressed air duster
R-407C		Mixture of difluoromethane and pentafluoroethane and 1,1,1,2-tetrafluoroethane			A mixture of R-32, R-125, and R-134a
R-454B		Difluoromethane and 2,3,3,3-Tetrafluoropropene			HFOs blend of refrigerants Difluoromethane (R-32) and 2,3,3,3-Tetrafluoropropene (R-1234yf).[74][75][76][77]
R-513A		An HFO/HFC blend (56% R-1234yf/44%R-134a)			May replace R-134a as an interim alternative[78]
R-514A		HFO-1336mzz-Z/trans-1,2- dichloroethylene (t-DCE)			An hydrofluoroolefin (HFO)-based refrigerant to replace R-123 in low pressure centrifugal chillers for commercial and industrial applications.[79][80]

Refrigerant reclamation and disposal

[edit]
Main article: Refrigerant reclamation

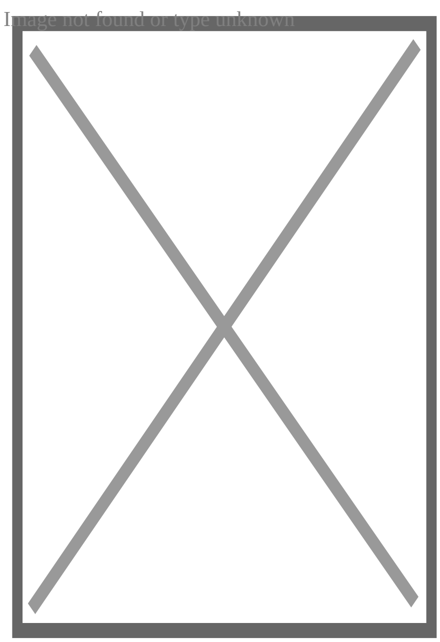
Coolant and refrigerants are found throughout the industrialized world, in homes, offices, and factories, in devices such as refrigerators, air conditioners, central air conditioning systems (HVAC), freezers, and dehumidifiers. When these units are serviced, there is a risk that refrigerant gas will be vented into the atmosphere either accidentally or intentionally, hence the creation of technician training and certification programs in order to ensure that the material is conserved and managed safely. Mistreatment of these gases has been shown to deplete the ozone layer and is suspected to contribute to global warming.[81]

With the exception of isobutane and propane (R600a, R441A and R290), ammonia and CO_2 under Section 608 of the United States' Clean Air Act it is illegal to knowingly release any refrigerants into the atmosphere.[82][83]

Refrigerant reclamation is the act of processing used refrigerant gas which has previously been used in some type of refrigeration loop such that it meets specifications for new refrigerant gas. In the United States, the Clean Air Act of 1990 requires that used refrigerant be processed by a certified reclaimer, which must be licensed by the United States Environmental Protection Agency (EPA), and the material must be recovered and delivered to the reclaimer by EPA-certified technicians.[84]

Classification of refrigerants

[edit]



R407C pressure-enthalpy diagram, isotherms between the two saturation lines

Main article: List of refrigerants

Refrigerants may be divided into three classes according to their manner of absorption or extraction of heat from the substances to be refrigerated:[*citation needed*]

- Class 1: This class includes refrigerants that cool by phase change (typically boiling), using the refrigerant's latent heat.
- Class 2: These refrigerants cool by temperature change or 'sensible heat', the quantity of heat being the specific heat capacity x the temperature change. They are air, calcium chloride brine, sodium chloride brine, alcohol, and similar nonfreezing

solutions. The purpose of Class 2 refrigerants is to receive a reduction of temperature from Class 1 refrigerants and convey this lower temperature to the area to be cooled.
- Class 3: This group consists of solutions that contain absorbed vapors of liquefiable agents or refrigerating media. These solutions function by nature of their ability to carry liquefiable vapors, which produce a cooling effect by the absorption of their heat of solution. They can also be classified into many categories.

R numbering system

[edit]

The R- numbering system was developed by DuPont (which owned the Freon trademark), and systematically identifies the molecular structure of refrigerants made with a single halogenated hydrocarbon. ASHRAE has since set guidelines for the numbering system as follows:[85]

R-$X_1X_2X_3X_4$

- **X_1** = Number of unsaturated carbon-carbon bonds (omit if zero)
- **X_2** = Number of carbon atoms minus 1 (omit if zero)
- **X_3** = Number of hydrogen atoms plus 1
- **X_4** = Number of fluorine atoms

Series

[edit]
- **R-xx** Methane Series
- **R-1xx** Ethane Series
- **R-2xx** Propane Series
- **R-4xx** Zeotropic blend
- **R-5xx** Azeotropic blend
- **R-6xx** Saturated hydrocarbons (except for propane which is R-290)
- **R-7xx** Inorganic Compounds with a molar mass < 100
- **R-7xxx** Inorganic Compounds with a molar mass ? 100

Ethane Derived Chains

[edit]
- **Number Only** Most symmetrical isomer
- **Lower Case Suffix (a, b, c, etc.)** indicates increasingly unsymmetrical isomers

Propane Derived Chains

[edit]

- **Number Only** If only one isomer exists; otherwise:
- **First lower case suffix (a-f):**
  - **a Suffix** Cl_2 central carbon substitution
  - **b Suffix** Cl, F central carbon substitution
  - **c Suffix** F_2 central carbon substitution
  - **d Suffix** Cl, H central carbon substitution
  - **e Suffix** F, H central carbon substitution
  - **f Suffix** H_2 central carbon substitution
- **2nd Lower Case Suffix (a, b, c, etc.)** Indicates increasingly unsymmetrical isomers

Propene derivatives

[edit]

- **First lower case suffix (x, y, z)**:
  - **x Suffix** Cl substitution on central atom
  - **y Suffix** F substitution on central atom
  - **z Suffix** H substitution on central atom
- **Second lower case suffix (a-f)**:
  - **a Suffix** $=CCl_2$ methylene substitution
  - **b Suffix** =CClF methylene substitution
  - **c Suffix** $=CF_2$ methylene substitution
  - **d Suffix** =CHCl methylene substitution
  - **e Suffix** =CHF methylene substitution
  - **f Suffix** $=CH_2$ methylene substitution

Blends

[edit]

- **Upper Case Suffix (A, B, C, etc.)** Same blend with different compositions of refrigerants

Miscellaneous

[edit]

- **R-Cxxx** Cyclic compound
- **R-Exxx** Ether group is present
- **R-CExxx** Cyclic compound with an ether group
- **R-4xx/5xx + Upper Case Suffix (A, B, C, etc.)** Same blend with different composition of refrigerants

- **R-6xx + Lower Case Letter** Indicates increasingly unsymmetrical isomers
- **7xx/7xxx + Upper Case Letter** Same molar mass, different compound
- **R-xxxxB#** Bromine is present with the number after B indicating how many bromine atoms
- **R-xxxxI#** Iodine is present with the number after I indicating how many iodine atoms
- **R-xxx(E)** Trans Molecule
- **R-xxx(Z)** Cis Molecule

For example, R-134a has 2 carbon atoms, 2 hydrogen atoms, and 4 fluorine atoms, an empirical formula of tetrafluoroethane. The "a" suffix indicates that the isomer is unbalanced by one atom, giving 1,1,1,2-Tetrafluoroethane. R-134 (without the "a" suffix) would have a molecular structure of 1,1,2,2-Tetrafluoroethane.

The same numbers are used with an R- prefix for generic refrigerants, with a "Propellant" prefix (e.g., "Propellant 12") for the same chemical used as a propellant for an aerosol spray, and with trade names for the compounds, such as "**Freon** 12". Recently, a practice of using abbreviations HFC- for hydrofluorocarbons, CFC- for chlorofluorocarbons, and HCFC- for hydrochlorofluorocarbons has arisen, because of the regulatory differences among these groups.[*citation needed*]

Refrigerant safety

[edit]

ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants*, assigns safety classifications to refrigerants based upon toxicity and flammability.

Using safety information provided by producers, ASHRAE assigns a capital letter to indicate toxicity and a number to indicate flammability. The letter "A" is the least toxic and the number 1 is the least flammable.[86]

See also

[edit]
- Brine (Refrigerant)
- Section 608
- List of Refrigerants

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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

Components

- Grille
- Ground-coupled heat exchanger

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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About Durham Supply Inc

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Things To Do in Oklahoma County

Photo

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Lighthouse

4.7 (993)

Photo

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Oklahoma Railway Museum

4.6 (990)

Photo

Centennial Land Run Monument

4.8 (811)

Photo

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Oklahoma City Zoo

4.5 (14305)

Photo

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National Cowboy & Western Heritage Museum

4.8 (5474)

Photo

Crystal Bridge Tropical Conservatory

4.7 (464)

Driving Directions in Oklahoma County

Driving Directions From Oklahoma City to Durham Supply Inc

Driving Directions From Santa Fe South High School to Durham Supply Inc

Driving Directions From Diamond Ballroom to Durham Supply Inc

Driving Directions From Oakwood Homes to Durham Supply Inc

Driving Directions From The Home Depot to Durham Supply Inc

Driving Directions From Love's Travel Stop to Durham Supply Inc

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https://www.google.com/maps/dir/Diamond+Ballroom/Durham+Supply+Inc/@35.386267
97.4784568,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sChIJU064a8wVsocRVF13sIhXuh

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Driving Directions From Oklahoma City Museum of Art to Durham Supply Inc

Driving Directions From Sanctuary Asia to Durham Supply Inc

Driving Directions From National Cowboy & Western Heritage Museum to Durham Supply Inc

Driving Directions From Sanctuary Asia to Durham Supply Inc

Driving Directions From Lighthouse to Durham Supply Inc

Driving Directions From Crystal Bridge Tropical Conservatory to Durham Supply Inc

https://www.google.com/maps/dir/Model+T+Graveyard/Durham+Supply+Inc/@35.42091
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Reviews for Durham Supply Inc

Durham Supply Inc

Image not found or type unknown

Crystal Dawn

(1)

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

Durham Supply Inc

Image not found or type unknown

Salest

(5)

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

Durham Supply Inc

Image not found or type unknown

Jennifer Williamson

(5)

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

Durham Supply Inc

Image not found or type unknown

K Moore

(1)

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

Durham Supply Inc

Image not found or type unknown

Noel Vandy

(5)

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

Comparing SEER Values to Lower Energy Costs in Mobile Homes**View GBP**

Frequently Asked Questions

What is SEER, and why is it important for mobile home HVAC systems?

SEER stands for Seasonal Energy Efficiency Ratio, which measures the cooling efficiency of an air conditioning system. A higher SEER value indicates greater energy efficiency, potentially lowering energy costs in mobile homes by using less electricity to achieve desired temperatures.

How does a higher SEER rating directly impact energy savings for mobile home owners?

A higher SEER rating means that the HVAC system uses less electricity to cool the mobile home, leading to reduced utility bills. Over time, this can result in significant cost savings as more efficient units consume less power while maintaining comfort levels.

What is considered a good SEER rating for new HVAC systems installed in mobile homes?

For new installations, a SEER rating of 14 or higher is generally recommended. Newer models with ratings of 16 or above offer even greater efficiency and potential cost savings.

Are there any initial costs associated with choosing an HVAC system with a higher SEER rating for a mobile home?

Yes, units with higher SEER ratings typically have a higher upfront cost due to advanced technology and improved components. However, these initial expenses are often offset by long-term energy savings.

Can upgrading to an HVAC system with a better SEER value increase the resale value of my mobile home?

Upgrading to an efficient HVAC system can enhance the appeal of your mobile home by offering lower operational costs and improved comfort. This can potentially increase its marketability and resale value by attracting buyers interested in energy-efficient features.

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Google Business Profile

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

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