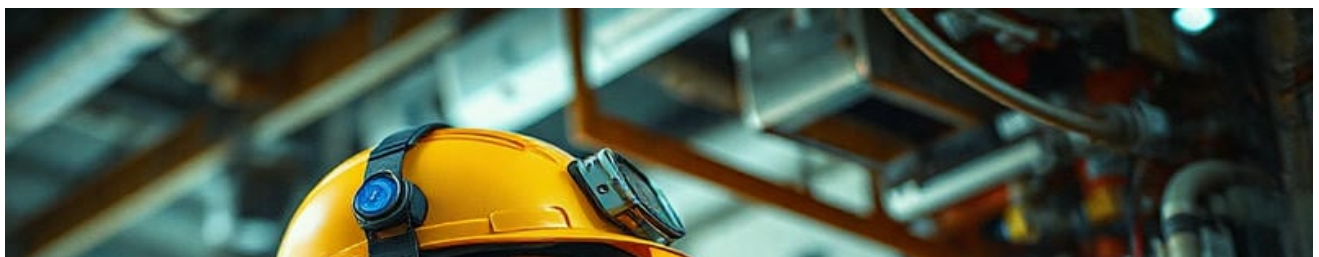


Air Quality



- **Mapping Duct Layouts for Cleaner Airflow in Mobile Homes**
Mapping Duct Layouts for Cleaner Airflow in Mobile Homes **Inspecting Vent Connections for Improved Air Quality** **Minimizing Drafts Through Sealed Mobile Home Duct Systems** **Scheduling Regular Cleanings for Mobile Home Ventilation** **Evaluating Filter Efficiency for Enhanced Mobile Home Air Quality** **Addressing Mold Risks in Mobile Home Ductwork** **Installing Air Purification Systems in Mobile Homes** **Checking Air Pressure to Reduce Allergens in Mobile Home Interiors** **Identifying Common Leaks in Flexible Mobile Home Ducts** **Balancing Humidity Levels for Healthier Mobile Home Air** **Considering UV Technology for Mobile Home Air Treatment** **Using Diagnostic Tools to Assess Air Quality in Mobile Homes**
- **Preparing Mobile Home HVAC Units for Intense Summer Heat**
Preparing Mobile Home HVAC Units for Intense Summer Heat **Protecting Mobile Home Furnaces During Low Temperature Periods** **Coping with Storm Related Damage to Mobile Home Air Conditioners** **Adjusting Climate Control in Mobile Homes for Coastal Humidity** **Handling Power Outages in Mobile Home Heating Systems** **Planning Winterization Steps for Mobile Home HVAC Equipment** **Adapting Mobile Homes to Rapid Seasonal Swings in Temperature** **Evaluating Wind Exposure Factors for Mobile Home AC Placement** **Addressing Extended Rainy Periods in Mobile Home Ventilation** **Considering Local Building Codes for Mobile Home Climate Adaptations** **Balancing Heat Needs in Mobile Homes Across Different Regions** **Checking Insurance Coverage for Storm Damaged Mobile Home AC Units**
- **About Us**



Scheduling Regular Cleanings for Mobile Home Ventilation

Importance of Efficient Duct Layouts for Airflow

Mobile homes, often seen as a practical and flexible living solution, require unique considerations when it comes to heating, ventilation, and air conditioning (HVAC) systems. These systems are crucial for maintaining a comfortable and healthy indoor environment, especially given the compact nature of mobile homes which can lead to quicker temperature fluctuations and potential air quality issues. Scheduling regular cleanings for mobile home ventilation is a key aspect of ensuring these systems function efficiently over time.

Mobile homes need specialized HVAC systems for efficient heating and cooling **best hvac system for mobile home** allergen.

To begin with, it's important to understand the basics of mobile home HVAC systems. Unlike traditional residential units, mobile homes typically use compact and more integrated HVAC solutions due to space constraints. These systems often combine heating and cooling functions in a single unit that is designed specifically for limited spaces. Ventilation in mobile homes is particularly critical because it not only helps regulate temperature but also ensures that fresh air circulates throughout the interior, reducing moisture buildup and preventing mold growth.

Regular maintenance of these ventilation systems is essential for several reasons. Firstly, it promotes energy efficiency. Over time, dust and debris can accumulate in vents and ducts, forcing the system to work harder to maintain desired temperatures. This

increased workload can lead to higher energy consumption and utility bills. By scheduling regular cleanings, homeowners can ensure their systems operate smoothly without unnecessary strain.

Secondly, regular cleaning enhances indoor air quality—an important health consideration for anyone living in a confined space like a mobile home. Pollutants such as dust mites, pet dander, pollen, and even chemical residues from cleaning products can build up within an HVAC system if not regularly addressed. A clean system helps reduce these pollutants' circulation indoors, significantly benefiting individuals with allergies or respiratory conditions.

Furthermore, scheduled cleanings contribute to the longevity of the HVAC system itself. Just like any machine with moving parts that are subject to wear and tear over time, HVAC units benefit from routine care that includes cleaning filters and checking components for signs of damage or inefficiency. Regular maintenance can help identify potential issues before they escalate into costly repairs or replacements.

Scheduling these cleanings should be done methodically—ideally every six months—to correspond with seasonal changes when usage patterns typically shift between heating in winter months to cooling during summer spells. Engaging professional services ensures thoroughness as they have specialized tools for deep cleaning hard-to-reach areas within ductwork or internal components.

In conclusion, while living in a mobile home offers unique benefits such as mobility and affordability compared to traditional housing options, it does come with its own set of challenges regarding climate control through effective HVAC solutions. Regularly scheduled cleanings play an indispensable role in maintaining both comfort levels inside the home as well as protecting residents' health by preserving excellent air quality standards—all while optimizing operational efficiency over years of use without frequent

breakdowns or escalated energy costs.

By prioritizing this preventive measure within your routine household management tasks alongside other essential upkeep activities like plumbing checks or exterior maintenance assessments—you ensure your mobile home remains a cozy sanctuary regardless of what Mother Nature might throw your way outside those walls!

Common Challenges in Mobile Home Ventilation —

- [Importance of Efficient Duct Layouts for Airflow](#)
- [Common Challenges in Mobile Home Ventilation](#)
- [Techniques for Mapping Duct Layouts](#)
- [Tools and Technologies for Accurate Duct Mapping](#)
- [Best Practices for Cleaner Airflow](#)
- [Case Studies of Improved Air Quality in Mobile Homes](#)

Maintaining proper ventilation in a mobile home is crucial for ensuring a healthy and comfortable living environment. However, owners often face several common challenges when it comes to scheduling regular cleanings for mobile home ventilation systems. Understanding these challenges can help create more effective maintenance strategies.

One of the primary challenges is the lack of awareness about the importance of regular ventilation cleaning. Many mobile homeowners underestimate how quickly dust, debris, and other pollutants can accumulate in their ventilation systems. This buildup not only reduces the efficiency of the system but also poses health risks by circulating allergens

and potentially harmful particles throughout the home. Educating homeowners about these risks is essential to encourage proactive maintenance.

Another significant challenge is accessibility. Mobile homes are designed with compact spaces, which can make accessing ventilation ducts and components difficult. Unlike traditional homes, where attics or basements provide easy access points for HVAC systems, mobile homes often require special tools or expertise to reach certain areas safely. This difficulty can deter homeowners from attempting regular cleanings themselves or even from contacting professionals due to perceived inconvenience or cost.

Speaking of cost, financial constraints are another barrier that many mobile homeowners encounter. Regular professional cleaning services can be expensive, especially if additional repairs are needed due to neglect over time. Without budget-friendly options or payment plans available, some owners may put off necessary maintenance until problems become severe, which ironically leads to even higher costs down the line.

Time management also plays a role in this issue. With modern life's demands—work schedules, family responsibilities—it can be challenging for individuals to find time to schedule maintenance appointments or perform DIY cleanings on their own systems regularly.

To overcome these challenges, it's crucial for both manufacturers and service providers to increase awareness about the importance of maintaining clean ventilation systems in mobile homes. Offering workshops or informational sessions highlighting the benefits of regular upkeep could empower owners with knowledge while fostering a sense of responsibility towards their living environment.

Furthermore, creating partnerships between manufacturers and local service providers could offer bundled packages at discounted rates specifically tailored for mobile home owners. These partnerships could also facilitate easier access by developing specialized tools or techniques designed expressly for dealing with tight spaces unique to mobile homes.

Lastly, embracing technology could streamline scheduling processes significantly; apps that remind users when it's time for a cleaning based on previous service dates could ensure more consistent upkeep without adding stress onto already busy lives.

In conclusion, while there are indeed common challenges associated with maintaining proper ventilation in mobile homes through regular cleanings—such as lack of awareness, accessibility issues within compact spaces financial concerns related costs involved services needed—these obstacles aren't insurmountable! By increasing educational efforts alongside creating strategic solutions like affordable service options tailored specifically toward needs unique being faced today within this community – better air quality healthier happier living conditions await those who take action now rather than later!

More About Us

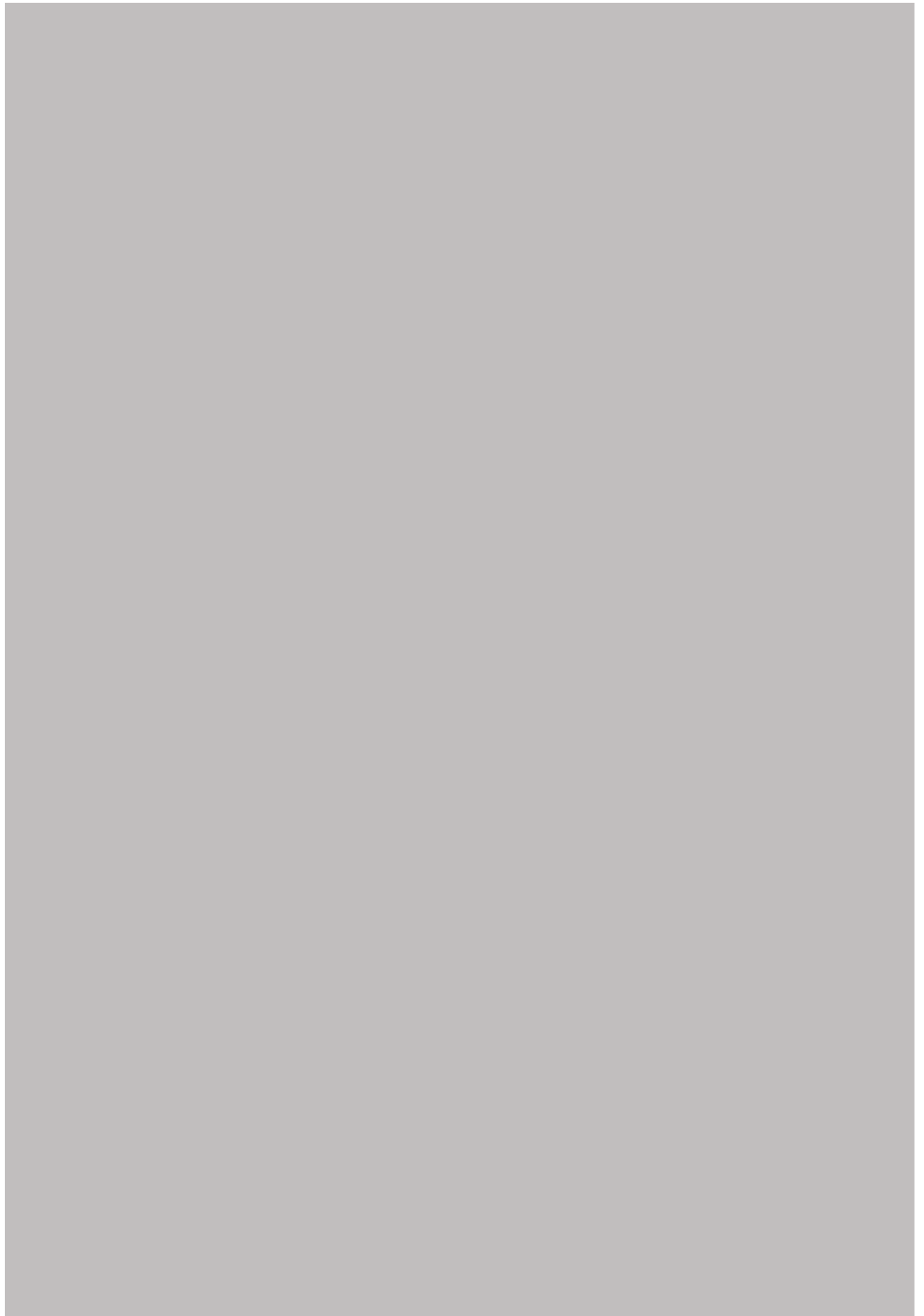
Mobile Home Air Conditioning Installation Services

What Yelp Says About Us

Mobile Home Hvac Service

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Mobile Home Hvac Repair



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Techniques for Mapping Duct Layouts

Maintaining a comfortable and healthy living environment in a mobile home can often present unique challenges, particularly when it comes to ventilation. One of the most effective ways to ensure both comfort and efficiency is through regular cleaning of the HVAC system. The benefits of maintaining this routine go beyond mere cleanliness; they play a crucial role in enhancing system efficiency, promoting indoor air quality, and extending the lifespan of your equipment.

Regular cleaning of an HVAC system is essential for optimizing its performance. Over time, dust, dirt, and other debris can accumulate within the system's components, such as filters, coils, and ducts. This buildup not only obstructs airflow but also forces the system to work harder to maintain desired temperatures. By scheduling regular cleanings, homeowners can ensure that their HVAC systems operate at peak efficiency. Clean systems require less energy to function effectively, resulting in lower utility bills – an attractive advantage for any homeowner.

Moreover, consistent maintenance significantly improves indoor air quality—a critical factor for overall health and well-being. Mobile homes can be particularly susceptible to poor air circulation due to their compact nature. When HVAC systems are neglected, accumulated dust and allergens are continuously cycled through the air supply. Regular cleaning helps mitigate these concerns by removing potential irritants from the system before they circulate throughout the home. For families with allergies or respiratory issues, this benefit alone makes routine maintenance indispensable.

In addition to efficiency and air quality improvements, regular HVAC cleaning extends the lifespan of your equipment. Just like any mechanical device, heating and cooling systems endure wear and tear over time. However, without proper care, this wear accelerates significantly due to increased strain on clogged components. By keeping parts clean and unencumbered by debris buildup, homeowners reduce unnecessary stress on vital components such as motors and fans—ultimately prolonging their service life.

Scheduling regular cleanings for your mobile home's ventilation might seem like a small task amidst daily responsibilities; however, its impact is far-reaching. Not only does it ensure optimal performance from your HVAC system but it also safeguards against unexpected breakdowns that could lead to costly repairs or replacements down the line.

In conclusion, investing time in routine maintenance through scheduled cleanings pays dividends in enhanced efficiency—lowering energy costs while boosting indoor air quality—and longevity of equipment—all contributing factors toward creating a more comfortable living environment in mobile homes year-round. Embracing this proactive approach not only protects one's investment but also fosters healthier living conditions—a win-win scenario every homeowner should strive towards achieving with diligence and foresight.





Tools and Technologies for Accurate Duct Mapping

Scheduling regular cleanings for mobile home ventilation systems is an essential maintenance task that often goes overlooked. However, the importance of keeping these systems in optimal condition cannot be overstated, as they play a crucial role in maintaining indoor air quality and ensuring the health and comfort of the home's occupants. To achieve this, it's important to adhere to a set of guidelines that can help streamline the scheduling process and ensure that your mobile home's ventilation system remains efficient and effective.

Firstly, understanding the unique nature of mobile home ventilation systems is key. Unlike traditional homes, mobile homes often have more compact and specialized ventilation setups. These systems are designed to accommodate limited space while still providing adequate airflow throughout the home. This means that even minor obstructions or inefficiencies can quickly lead to larger issues such as poor air quality or increased energy consumption.

Regular cleaning schedules should be tailored to the specific needs of your mobile home. A general guideline is to inspect and clean ventilation components at least twice a year—typically during spring and fall when seasonal changes occur. This timing helps prepare your system for temperature fluctuations and ensures it operates efficiently during peak usage periods like summer and winter.

When scheduling these cleanings, consider creating reminders that align with other routine maintenance tasks around your home. For example, pairing your ventilation cleaning with changing smoke detector batteries or checking fire extinguishers can help create a comprehensive maintenance routine that's easy to remember.

Furthermore, it's advisable to hire professionals for thorough inspections at least once a year. While basic cleaning tasks such as dusting vents or replacing filters can be done by homeowners, professional technicians have the expertise to identify potential issues

before they escalate into costly repairs. They can also provide valuable advice on maintaining optimal airflow efficiency specific to your system's design.

Being proactive about cleaning schedules not only extends the lifespan of your ventilation system but also contributes significantly to better indoor air quality—a benefit that directly impacts health by reducing allergens, mold spores, and other airborne contaminants.

In conclusion, establishing guidelines for scheduling regular cleanings of mobile home ventilation systems is an investment in both safety and comfort. By adhering to a structured schedule tailored specifically for these unique environments—and seeking professional assistance when necessary—you can ensure that your home's air remains fresh while optimizing overall system performance.

Best Practices for Cleaner Airflow

Maintaining a comfortable and healthy living environment in a mobile home necessitates paying close attention to its ventilation system. The HVAC systems in these homes, while compact and efficient, require regular cleaning and maintenance to ensure optimal performance. Scheduling routine cleanings is vital not only for the longevity of the system but also for the health of its occupants.

The first step toward effective HVAC cleaning is developing a schedule that fits both your lifestyle and the needs of your system. Mobile homes, with their unique structural characteristics, can be more susceptible to dust accumulation in vents due to their size and proximity to outdoor elements. Establishing a seasonal cleaning routine—ideally at the beginning of each major season—can help keep your system running smoothly.

Regular cleanings primarily focus on clearing out accumulated dust, mold spores, or any debris that may clog the ducts. This process involves several tools and techniques essential for maintaining an efficient system. A good vacuum cleaner with a hose attachment can effectively remove loose particles from easily accessible parts of the ductwork. For deeper cleaning, investing in specialized HVAC brushes can help scrub away stubborn dirt without damaging sensitive components.

In addition to physical cleaning tools, it's important to consider chemical cleaners that are specifically designed for HVAC systems. These cleaners can sanitize and deodorize ducts, ensuring that no harmful bacteria or unpleasant odors circulate through your home. However, caution must be exercised when using chemical products; always follow manufacturer instructions closely to avoid potential damage or safety hazards.

Another crucial technique involves inspecting and replacing air filters regularly. Filters trap dust and airborne contaminants before they reach sensitive areas of the HVAC system, thus preventing clogs and reducing overall wear. Depending on usage patterns and environmental factors such as pets or local air quality, filters may need changing every one to three months.

Scheduling professional inspections once a year complements regular self-maintenance efforts by identifying issues that may not be visible during routine cleanings. Professionals have access to advanced diagnostic tools that can detect problems early on—saving you from costly repairs down the line.

By adhering to a well-structured maintenance schedule using appropriate tools and techniques, mobile home residents can ensure their ventilation systems remain effective year-round. This proactive approach not only enhances indoor air quality but also contributes significantly towards energy efficiency—a crucial aspect given rising utility costs.

Ultimately, creating a conducive environment within your mobile home hinges on consistent care of its ventilation system through scheduled cleanings—a commitment that pays dividends in comfort, health benefits, and financial savings over time.

Case Studies of Improved Air Quality in Mobile Homes

In the realm of maintaining a healthy living environment within your mobile home, scheduling regular cleanings for your ventilation system plays a crucial role. The importance of this task cannot be overstated, as the quality of air you breathe directly impacts your health and well-being. However, there are certain signs that should prompt immediate attention to your ventilation system beyond the routine maintenance schedule.

One of the most noticeable indicators that your mobile home's ventilation system requires immediate cleaning is the presence of unusual or unpleasant odors. If you start to notice persistent musty or stale smells circulating through your home, it could be a sign that

mold or mildew has taken root in your ducts. This not only compromises air quality but also poses significant health risks to inhabitants, particularly those with respiratory issues or allergies.

Another telltale sign is an increase in dust accumulation around vents and throughout your mobile home. While some dust is normal, excessive amounts suggest that the ventilation system may be clogged or malfunctioning, preventing efficient air circulation. This can lead to poor indoor air quality and exacerbate allergy symptoms, making it essential to address promptly.

A further indication that immediate cleaning is necessary is uneven airflow from room to room. If you find certain areas of your mobile home are not receiving adequate ventilation while others are overly drafty, it could mean there are blockages within the ductwork. This imbalance not only affects comfort levels but can also cause strain on heating and cooling systems, potentially leading to costly repairs if left unchecked.

Additionally, if you notice an abrupt spike in energy bills without a corresponding change in usage habits, this could point towards an inefficient ventilation system struggling due to dirt buildup or obstructions. Cleaning the ducts can help restore efficiency and reduce energy consumption by allowing HVAC systems to operate smoothly.

Lastly, visible signs such as mold growth around vents or unusual noises emanating from the ductwork should never be ignored. These symptoms indicate underlying issues that require professional intervention to prevent further damage and ensure safe living conditions within your mobile home.

In conclusion, while regularly scheduled cleanings are vital for maintaining optimal performance of your mobile home's ventilation system, being vigilant for these warning signs will help identify when immediate action is necessary. By addressing issues promptly

as they arise whether it's strange odors, dust buildup, inconsistent airflow, unexpected utility costs, or visible mold you safeguard both the integrity of your ventilation system and the health of those residing within its walls. Prioritizing timely interventions ensures a fresh and healthy atmosphere conducive to comfort and wellness year-round.

About Oklahoma City

For other uses, see Oklahoma City (disambiguation).

Oklahoma City is located in the United States

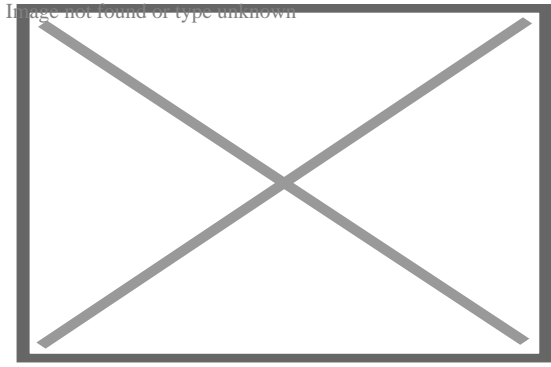
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Oklahoma City

City

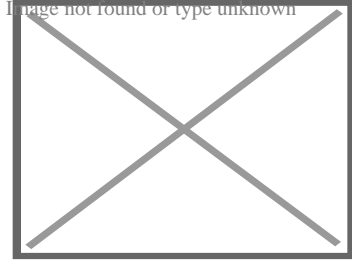
Location within the United
States

Oklahoma City

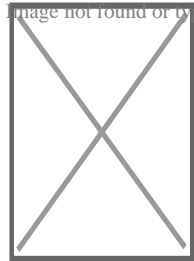
State capital city



Downtown Oklahoma City

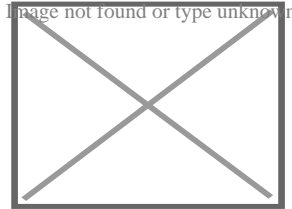


Oklahoma City Hall



Skydance

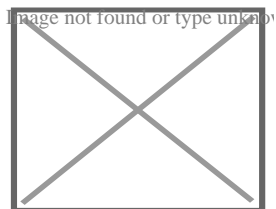
Bridge



Oklahoma City

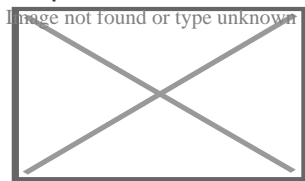
National

Memorial



Oklahoma State

Capitol



Flag of Oklahoma City

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Flag

Official seal of Oklahoma City

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Seal

Nickname(s):

"OKC", "The 405", "Oklas", "Boomtown", "The Big Friendly",^[1] "The City",^[2]

Map

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Interactive map of Oklahoma City

Oklahoma City is located in Oklahoma

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Oklahoma City

City

Location within the state of

Oklahoma

Oklahoma City's city limits extend somewhat into Canadian, Cleveland, and Pottawatomie counties. However, much of those areas outside the core Oklahoma County area are suburban tracts or protected rural zones (watershed). The city is the eighth-largest in the United States by area including consolidated city-counties; it is the second-largest, after Houston, not including consolidated cities. The city is also the second-largest by area among state capital cities in the United States, after Juneau, Alaska.

Oklahoma City has one of the world's largest livestock markets.^[12] Oil, natural gas, petroleum products, and related industries are its economy's largest sector. The city is in the middle of an active oil field, and oil derricks dot the capitol grounds. The federal government employs a large number of workers at Tinker Air Force Base and the United States Department of Transportation's Mike Monroney Aeronautical Center (which house offices of the Federal Aviation Administration and the Transportation Department's Enterprise Service Center, respectively).

Oklahoma City is on the I-35 and I-40 corridors, one of the primary travel corridors south into neighboring Texas and New Mexico, north towards Wichita and Kansas City, west to Albuquerque, and east towards Little Rock and Memphis. Located in the state's Frontier Country region, the city's northeast section lies in an ecological region known as the Cross Timbers. The city was founded during the Land Run of 1889 and grew to a population of over 10,000 within hours of its founding. It was the site of the April 19, 1995, bombing of the Alfred P. Murrah Federal Building, in which 167 people died,^[13] the deadliest terror attack in U.S. history until the attacks of September 11, 2001, and the deadliest act of domestic terrorism in U.S. history.

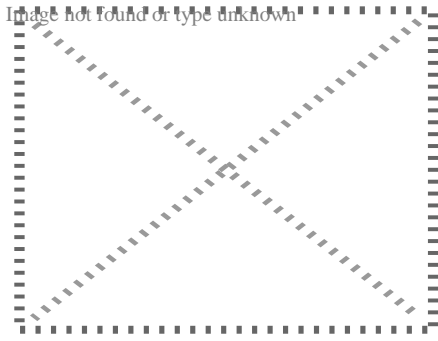
Since weather records have been kept beginning in 1890, Oklahoma City has been struck by 14 violent tornadoes, 11 of which were rated F4 or EF4 on the Fujita and Enhanced Fujita scales, and two rated F5 and EF5.^[14]

History

[edit]

Main article: History of Oklahoma City

For a chronological guide, see Timeline of Oklahoma City.



Map of Indian Territory (Oklahoma) 1889, showing Oklahoma as a train stop on a railroad line. Britannica 9th ed.

Native American names for Oklahoma City

Choctaw: *Tãf'ã...ã ãf'ãçã€šã-ã,ã'maha chito*

Cherokee:

*ã€'ã,ã;ã€;ã,ã½ã€ã,ã€ã€'ã,ã;ã€;ã,ã½ã€ã,ã;ã€'ã,ã;ã€;ã,ã½ã€ã
ã€'ã,ã;ã€;ã€ã,ã½ã€ã,ã;ã€'ã,ã;ã€€ã,ã€ã€'ã,ã;ã€'ã,ã;ã€'ã,ã;ã€'ã,ã;ã€'ã*

Romanized: ogalahoma gaduhvi

Cheyenne: *Ma'xepóno'e*

Comanche: *Pia Sookaãf'ã...ã€™ãfã€šã,*

Delaware: *Oklahoma-utènaii*

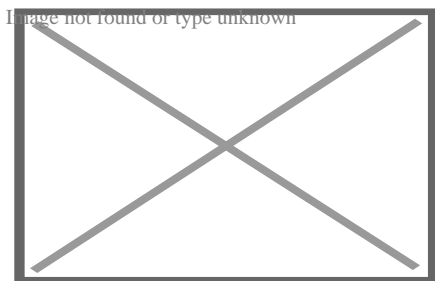
Iowa-Oto: *Chína Chége Itúãf'ã,ãçãfã€šã,ã•ãf*

Navajo: *Halgai Hóteeldi Kin Haalãf'ã...ã ãfã€*

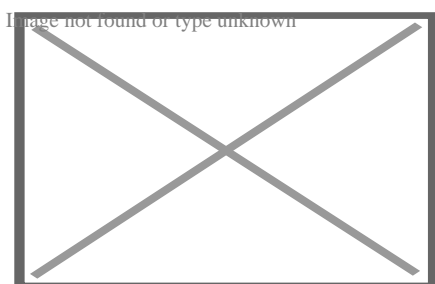
Meskwaki: *Okonohômîheki*^[16]

Oklahoma City was settled on April 22, 1889,^[17] when the area known as the "Unassigned Lands" was opened for settlement in an event known as "The Land Run".^[18] On April 26 of that year, its first mayor was elected, William Couch. Some 10,000 homesteaders settled in the area that would become the capital of Oklahoma. The town grew quickly; the population doubled between 1890 and 1900.

[¹⁹] Early leaders of the development of the city included Anton H. Classen, John Wilford Shartel, Henry Overholser, Oscar Ameringer, Jack C. Walton, Angelo C. Scott, and James W. Maney.



Lithograph of Oklahoma City from 1890.



Looking north on Broadway from present-day Sheridan Ave, 1910.

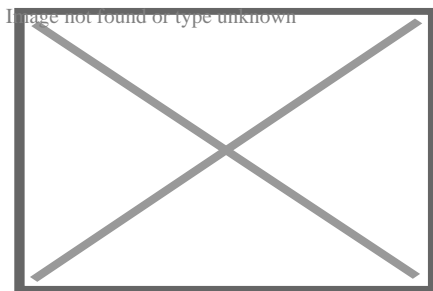
By the time Oklahoma was admitted to the Union in 1907, Oklahoma City had surpassed Guthrie, the territorial capital, as the new state's population center and commercial hub. Soon after, the capital was moved from Guthrie to Oklahoma City.[²⁰] Oklahoma City was a significant stop on Route 66 during the early part of the 20th century; it was prominently mentioned in Bobby Troup's 1946 jazz song "(Get Your Kicks on) Route 66" made famous by artist Nat King Cole.

Before World War II, Oklahoma City developed significant stockyards, attracting jobs and revenue formerly in Chicago and Omaha, Nebraska. With the 1928 discovery of oil within the city limits (including under the State Capitol), Oklahoma City became a major center of oil production.[²¹] Post-war growth accompanied the construction of the Interstate Highway System, which made Oklahoma City a major interchange as the convergence of I-35, I-40, and I-44. It was also aided by the federal development of Tinker Air Force Base after successful lobbying efforts by the director of the Chamber of Commerce Stanley Draper.

In 1950, the Census Bureau reported the city's population as 8.6% black and 90.7% white.^[22]

In 1959, the city government launched a "Great Annexation Drive" that expanded the city's area from 80 to 475.55 square miles (207.2 to 1,231.7 square kilometers) by the end of 1961, making it the largest U.S. city by land mass at the time.^[23]

Patience Latting was elected Mayor of Oklahoma City in 1971, becoming the city's first female mayor.^[24] Latting was also the first woman to serve as mayor of a U.S. city with over 350,000 residents.^[24]



Oklahoma City National Memorial at Christmas.

Like many other American cities, the center city population declined in the 1970s and 1980s as families followed newly constructed highways to move to newer housing in nearby suburbs. Urban renewal projects in the 1970s, including the Pei Plan, removed older structures but failed to spark much new development, leaving the city dotted with vacant lots used for parking. A notable exception was the city's construction of the Myriad Gardens and Crystal Bridge, a botanical garden and modernistic conservatory in the heart of downtown. Architecturally significant historic buildings lost to clearances were the Criterion Theater,^[25]^[26] the Baum Building,^[27] the Hales Building,^[28]^[29] and the Biltmore Hotel.^[30]

In 1993, the city passed a massive redevelopment package known as the Metropolitan Area Projects (MAPS), intended to rebuild the city's core with civic projects to establish more activities and life in downtown. The city added a new baseball park; a central library; renovations to the civic center, convention center, and fairgrounds; and a water canal in the Bricktown entertainment district. Water

taxis transport passengers within the district, adding color and activity along the canal. MAPS has become one of the most successful public-private partnerships undertaken in the U.S., exceeding \$3 billion in private investment as of 2010.^[31] As a result of MAPS, the population in downtown housing has exponentially increased, with the demand for additional residential and retail amenities, such as groceries, services, and shops.

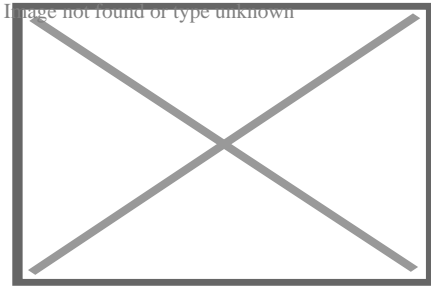
Since the completion of the MAPS projects, the downtown area has seen continued development. Several downtown buildings are undergoing renovation/restoration. Notable among these was the restoration of the Skirvin Hotel in 2007. The famed First National Center is also being renovated.

Residents of Oklahoma City suffered substantial losses on April 19, 1995, when Timothy McVeigh detonated a bomb in front of the Murrah building. The building was destroyed (the remnants of which had to be imploded in a controlled demolition later that year), more than 100 nearby buildings suffered severe damage, and 168 people were killed.^[32] The site has been commemorated as the Oklahoma City National Memorial and Museum.^[33] Since its opening in 2000, over three million people have visited. Every year on April 19, survivors, families, and friends return to the memorial to read the names of each person lost. McVeigh was executed by lethal injection on June 11, 2001.

The "Core-to-Shore" project was created to relocate I-40 one mile (1.6 km) south and replace it with a boulevard to create a landscaped entrance to the city.^[34] This also allows the central portion of the city to expand south and connect with the shore of the Oklahoma River. Several elements of "Core to Shore" were included in the MAPS 3 proposal approved by voters in late 2009.

Geography

[edit]



Mid-May 2006 photograph of Oklahoma City taken from the International Space Station (ISS)

Oklahoma City lies along one of the primary corridors into Texas and Mexico and is a three-hour drive from the Dallas-Fort Worth metroplex. The city is in the Frontier Country region in the state's center, making it ideal for state government.

According to the United States Census Bureau, the city has a total area of 620.34 square miles (1,606.7 km²),^[35] of which 601.11 square miles (1,556.9 km²) is land and 19.23 square miles (49.8 km²) is water.

Oklahoma City lies in the Sandstone Hills region of Oklahoma, known for hills of 250 to 400 feet (80 to 120 m) and two species of oak: blackjack oak (*Quercus marilandica*) and post oak (*Q. stellata*).^[36] The northeastern part of the city and its eastern suburbs fall into an ecological region known as the Cross Timbers.^[37]

The city is roughly bisected by the North Canadian River (recently renamed the Oklahoma River inside city limits). The North Canadian once had sufficient flow to flood every year, wreaking destruction on surrounding areas, including the central business district and the original Oklahoma City Zoo.^[38] In the 1940s, a dam was built on the river to manage the flood control and reduce its level.^[39] In the 1990s, as part of the citywide revitalization project known as MAPS, the city built a series of low-water dams, returning water to the portion of the river flowing near downtown.^[40] The city has three large lakes: Lake Hefner and Lake Overholser, in the northwestern quarter of the city; and the largest, Lake Stanley Draper, in the city's sparsely populated far southeast portion.

The population density typically reported for Oklahoma City using the area of its city limits can be misleading. Its urbanized zone covers roughly 244 square miles (630 km²) resulting in a 2013 estimated density of 2,500 per square mile (970/km²), compared with larger rural watershed areas incorporated by the city, which cover the remaining 377 sq mi (980 km²) of the city limits.^[41]

Oklahoma City is one of the largest cities in the nation in compliance with the Clean Air Act.^[42]

Tallest buildings

[edit]

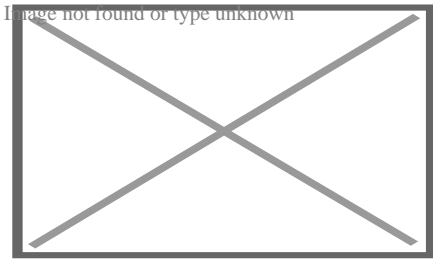
Main article: List of tallest buildings in Oklahoma City

Rank	Building	Height	Floors	Built	Ref.
1	Devon Energy Center	844 feet (257 m)	50	2012	^[43]
2	BancFirst Tower	500 feet (152 m)	36	1971	^[44]
3	First National Center	446 feet (136 m)	33	1931	^[45]
4	BOK Park Plaza	433 feet (132 m)	27	2017	^[46]
5	Oklahoma Tower	410 feet (125 m)	31	1982	^[47]
6	Strata Tower	393 feet (120 m)	30	1973	^[48]
7	City Place	391 feet (119 m)	33	1931	^[49]
8	Valliance Bank Tower	321 feet (98 m)	22	1984	^[50]
9	Leadership Square North	285 feet (87 m)	22	1984	^[51]
10	Arvest Tower	281 feet (86 m)	16	1972	^[52]

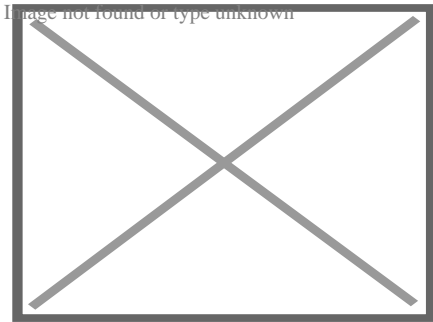
Neighborhoods

[edit]

Main article: Neighborhoods of Oklahoma City



Automobile Alley in Oklahoma City



Looking up in the heart of Oklahoma City's Central Business District

Oklahoma City neighborhoods are highly varied, with affluent historic neighborhoods located next to districts that have not wholly recovered from the economic and social decline of the 1970s and 1980s. ^[citation needed]

The city is bisected geographically and culturally by the North Canadian River, which divides North Oklahoma City and South Oklahoma City. The north side is characterized by diverse and fashionable urban neighborhoods near the city center and sprawling suburbs further north. South Oklahoma City is generally more blue-collar working class and significantly more industrial, having grown up around the Stockyards and meat packing plants at the turn of the century. It is also the center of the city's rapidly growing Latino community.

Downtown Oklahoma City, which has 7,600 residents, is seeing an influx of new private investment and large-scale public works projects, which have helped to revitalize a central business district left almost deserted by the Oil Bust of the early 1980s. The centerpiece of downtown is the newly renovated Crystal Bridge and Myriad Botanical Gardens, one of the few elements of the Pei Plan to be completed. In 2021, a massive new central park will link the gardens near the CBD and the new convention center to be built just south of it to the North Canadian

River as part of a massive works project known as "Core to Shore"; the new park is part of MAPS3, a collection of civic projects funded by a one-cent temporary (seven-year) sales tax increase.^[53]

Climate

[edit]

Main article: Climate of Oklahoma City

Oklahoma City has a temperate humid subtropical climate (Köppen: *Cfa*, Trewartha: *Cfak*), along with significant continental influences. The city features hot, humid summers and cool winters. Prolonged and severe droughts (sometimes leading to wildfires in the vicinity) and hefty rainfall leading to flash flooding and flooding occur regularly. Consistent winds, usually from the south or south-southeast during the summer, help temper the hotter weather. Consistent northerly winds during the winter can intensify cold periods. Severe ice storms and snowstorms happen sporadically during the winter.

The average temperature is 61.4 °F (16.3 °C), with the monthly daily average ranging from 39.2 °F (4.0 °C) in January to 83.0 °F (28.3 °C) in July. Extremes range from −17 °F (−27 °C) on February 12, 1899 to 113 °F (45 °C) on August 11, 1936, and August 3, 2012;^[54] The last sub-zero (Fahrenheit) reading was −14 °F (−26 °C) on February 16, 2021.^[55]^[56] Temperatures reach 100 °F (38 °C) on 10.4 days of the year, 90 °F (32 °C) on nearly 70 days, and fail to rise above freezing on 8.3 days.^[55] The city receives about 35.9 inches (91.2 cm) of precipitation annually, of which 8.6 inches (21.8 cm) is snow.

The report "Regional Climate Trends and Scenarios for the U.S. National Climate Assessment" (NCA) from 2013 by NOAA projects that parts of the Great Plains region can expect up to 30% (high emissions scenario based on CMIP3 and NARCCAP models) increase in extreme precipitation days by mid-century. This definition is based on days receiving more than one inch of rainfall.^[57]

Extreme weather

[edit]

Oklahoma City has an active severe weather season from March through June, especially during April and May. Being in the center of what is colloquially referred to as Tornado Alley, it is prone to widespread and severe tornadoes, as well as severe hailstorms and occasional derechos. Tornadoes occur every month of the year, and a secondary smaller peak also occurs during autumn, especially in October. The Oklahoma City metropolitan area is one of the most tornado-prone major cities in the world, with about 150 tornadoes striking within the city limits since 1890. Since the time weather records have been kept, Oklahoma City has been struck by 13 violent tornadoes, eleven rated F/EF4 and two rated F/EF5.^[14]

On May 3, 1999, parts of Oklahoma City and surrounding communities were impacted by a tornado. It was the last U.S. tornado to be given a rating of F5 on the Fujita scale before the Enhanced Fujita scale replaced it in 2007. While the tornado was in the vicinity of Bridge Creek to the southwest, wind speeds of 318 mph (510 km/h) were estimated by a mobile Doppler radar, the highest wind speeds ever recorded on Earth.^[58] A second top-of-the-scale tornado occurred on May 20, 2013; South Oklahoma City, along with Newcastle and Moore, was hit by an EF5 tornado. The tornado was 0.5 to 1.3 miles (0.80 to 2.09 km) wide and killed 23 people.^[59] On May 31, less than two weeks after the May 20 event, another outbreak affected the Oklahoma City area. Within Oklahoma City, the system spawned an EF1 and an EF0 tornado, and in El Reno to the west, an EF3 tornado occurred. This lattermost tornado, which was heading in the direction of Oklahoma City before it dissipated, had a width of 2.6 miles (4.2 km), making it the widest tornado ever recorded. Additionally, winds over 295 mph (475 km/h) were measured, one of the two highest wind records for a tornado.^[60]

With 19.48 inches (495 mm) of rainfall, May 2015 was Oklahoma City's record-wettest month since record-keeping began in 1890. Across Oklahoma and Texas

generally, there was a record flooding in the latter part of the month.^[61]

**Climate data for Oklahoma City (Will Rogers World Airport), 1991–2020 normals, ^[a]
extremes 1890–present^[b]**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high	83	92	97	100	104	107	110	113	108	97	87	86	100
°F (°C)	(28)	(33)	(36)	(38)	(40)	(42)	(43)	(45)	(42)	(36)	(31)	(30)	(40)
Mean maximum	71.7	77.1	84.2	86.9	92.3	96.4	102.4	101.5	96.2	88.9	79.1	71.2	100
°F (°C)	(22.1)	(25.1)	(29.0)	(30.5)	(33.5)	(35.8)	(39.1)	(38.6)	(35.7)	(31.6)	(26.2)	(21.8)	(33)
Mean daily maximum	49.3	53.8	62.9	71.1	78.9	87.5	93.1	92.2	83.9	72.8	60.7	50.4	71
°F (°C)	(9.6)	(12.1)	(17.2)	(21.7)	(26.1)	(30.8)	(33.9)	(33.4)	(28.8)	(22.7)	(15.9)	(10.2)	(22)
Daily mean	38.2	42.3	51.2	59.3	68.2	76.9	81.7	80.7	72.7	61.1	49.2	40.0	60
°F (°C)	(3.4)	(5.7)	(10.7)	(15.2)	(20.1)	(24.9)	(27.6)	(27.1)	(22.6)	(16.2)	(9.6)	(4.4)	(15)
Mean daily minimum	27.0	30.8	39.5	47.5	57.6	66.2	70.3	69.1	61.5	49.4	37.7	29.5	48
°F (°C)	(-2.8)	(-0.7)	(4.2)	(8.6)	(14.2)	(19.0)	(21.3)	(20.6)	(16.4)	(9.7)	(3.2)	(-1.4)	(9)
Mean minimum	11.7	15.4	21.5	32.3	43.8	56.6	63.6	61.7	48.4	33.8	21.7	14.3	71
°F (°C)	(-11.3)	(-9.2)	(-5.8)	(0.2)	(6.6)	(13.7)	(17.6)	(16.5)	(9.1)	(1.0)	(-5.7)	(-9.8)	(-1)
Record low	-11	-17	1	20	32	46	53	49	35	16	9	-8	-11
°F (°C)	(-24)	(-27)	(-17)	(-7)	(0)	(8)	(12)	(9)	(2)	(-9)	(-13)	(-22)	(-24)
Average precipitation	1.32	1.42	2.55	3.60	5.31	4.49	3.59	3.60	3.72	3.32	1.68	1.79	36
inches (mm)	(34)	(36)	(65)	(91)	(135)	(114)	(91)	(91)	(94)	(84)	(43)	(45)	(91)
Average snowfall	1.8	1.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.8	6
inches (cm)	(4.6)	(4.6)	(2.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(1.3)	(4.6)	(15)

Average precipitation days (0.01 in)	5.0	5.7	6.9	7.9	10.0	8.6	6.0	6.7	7.1	7.5	5.8	5.7	8.0
Average snowy days (0.1 in)	1.3	1.3	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.4	4.0
Average relative humidity (%)	66.6	65.7	61.3	61.1	67.5	67.2	60.9	61.6	67.1	64.4	67.1	67.8	64.0
Average dew point °F (°C)	23.7 (-4.6)	28.0 (-2.2)	35.2 (1.8)	45.1 (7.3)	55.8 (13.2)	63.7 (17.6)	65.3 (18.5)	64.4 (18.0)	59.5 (15.3)	47.7 (8.7)	37.0 (2.8)	27.5 (-2.5)	40.0 (7.0)
Mean monthly sunshine hours	200.8	189.7	244.2	271.3	295.2	326.1	356.6	329.3	263.7	245.1	186.5	180.9	3,000
Mean daily daylight hours	10.1	10.9	12.0	13.1	14.1	14.5	14.3	13.4	12.4	11.3	10.3	9.8	12.0
Percent possible sunshine	64	62	66	69	68	75	80	79	71	70	60	60	60
Average ultraviolet index	3	4	6	8	9	10	10	9	8	5	3	2	6

Source 1: NOAA (relative humidity and sun 1961-1990)^{[62][55][63]}

Source 2: Weather Atlas(Daylight-UV) ^[64]

Demographics

[edit]

Population of Oklahoma City 1890–2022

Census	Pop.	Note	%±
1890	4,151		—
1900	10,037		141.8%
1910	64,205		539.7%
1920	91,295		42.2%
1930	185,389		103.1%
1940	204,424		10.3%
1950	243,504		19.1%
1960	324,253		33.2%
1970	368,164		13.5%
1980	404,014		9.7%
1990	444,719		10.1%
2000	506,132		13.8%
2010	579,999		14.6%
2020	681,054		17.4%
2024 (est.)	709,330	[⁶⁵]	4.2%
U.S. Decennial Census [⁶⁶]			
1790–1960 [⁶⁷] 1900–1990 [⁶⁸]			
1990–2000 [⁶⁹] 2010 [⁷⁰]			

In the 2010 census, there were 579,999 people, 230,233 households, and 144,120 families in the city. The population density was 956.4 inhabitants per square mile (321.9/km²). There were 256,930 housing units at an average density of 375.9 per square mile (145.1/km²). By the 2020 census, its population grew to 681,054. [⁷¹]

Of Oklahoma City's 579,999 people in 2010, 44,541 resided in Canadian County, 63,723 lived in Cleveland County, 471,671 resided in Oklahoma County, and 64 resided in Pottawatomie County. [⁷²]

In 2010, there were 230,233 households, 29.4% of which had children under 18 living with them, 43.4% were married couples living together, 13.9% had a female householder with no husband present, and 37.4% were non-families. One person households account for 30.5% of all households, and 8.7% of all households had someone living alone who was 65 years of age or older. The average household size was 2.47 and the average family size was 3.11.^[73]

According to the American Community Survey 1-year estimates in 2022, the median income for a household in the city was \$63,713, and the median income for a family was \$80,833. Married-couple families \$99,839, and nonfamily households \$40,521.^[74] The per capita income for the city was \$35,902.^[75] 15.5% of the population and 11.2% of families were below the poverty line. Of the total population, 20.1% of those under 18 and 10.6% of those 65 and older lived below the poverty line.^[76]

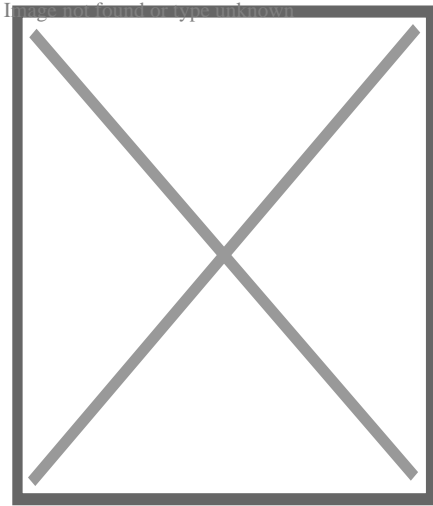
In the 2000 census, Oklahoma City's age composition was 25.5% under the age of 18, 10.7% from 18 to 24, 30.8% from 25 to 44, 21.5% from 45 to 64, and 11.5% who were 65 years of age or older. The median age was 34 years. For every 100 females, there were 95.6 males. For every 100 females age 18 and over, there were 92.7 males.

Oklahoma City has experienced significant population increases since the late 1990s. It is the first city in the state to record a population greater than 600,000 residents and the first city in the Great Plains region to record a population greater than 600,000 residents. It is the largest municipal population of the Great Plains region (Oklahoma, Kansas, Nebraska, South Dakota, North Dakota).^[ambiguous]

In the 2020 census, there were 268,035 households in the city, out of which 81,374 households (30.4%) were individuals, 113,161 (42.2%) were opposite-sex married couples, 17,699 (6.6%) were unmarried opposite-sex partnerships, and 2,930 (1.1%) were same-sex married couples or partnerships.^[77]

Race and ethnicity

[edit]



Map of racial distribution of the Oklahoma City area, 2020 U.S. census.
 Each dot is one person: • White

• Black

• Asian

• Hispanic

• Multiracial

• Native American/Other

Historical racial composition	2020 ^[71]	2010 ^[78]	1990 ^[22]	1970 ^[22]	1940 ^[22]
White (Non-Hispanic)	49.5%	56.7%	72.9%	82.2%	90.4%
Hispanic or Latino	21.3%	17.2%	5.0%	2.0%	n/a
Black or African American	13.8%	14.8%	16.0%	13.7%	9.5%

Mixed	7.6%	4.0%	0.4%	–	–
Asian	4.6%	4.0%	2.4%	0.2%	–
Native American	3.4%	3.1%	4.2%	2.0%	0.1%

According to the 2020 census, the racial composition of Oklahoma City was as follows:[⁷⁹] White or European American 49.5%, Hispanic or Latino 21.3%, Black or African American 13.8%, Asian 4.6%, Native American 2.8%, Native Hawaiian and Other Pacific Islander 0.2%, other race 0.4%, and two or more races (non-Hispanic) 7.6%. Its population has diversified since the 1940s census, where 90.4% was non-Hispanic white.[²²] An analysis in 2017 found Oklahoma City to be the 8th least racially segregated significant city in the United States.[⁸⁰] Of the 20 largest US cities, Oklahoma City has the second-highest percentage of the population reporting two or more races on the Census, 7.6%, second to 8.9% in New York City.

2020

[edit]

Oklahoma City – Racial and ethnic composition

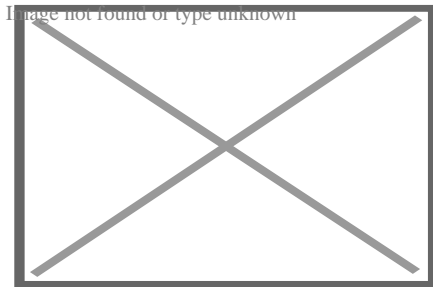
Note: the US Census treats Hispanic/Latino as an ethnic category. This table excludes Latinos from the racial categories and assigns them to a separate category. Hispanics/Latinos may be of any race.

Race / Ethnicity (NH = <i>Non-Hispanic</i>)	Pop 2000 [⁸¹]	Pop 2010 [⁸²]	Pop 2020 [⁸³]	% 2000	% 2010	% 2020
White alone (NH)	327,225	328,582	337,063	64.65%	56.65%	49.49%
Black or African American alone (NH)	76,994	85,744	93,767	15.21%	14.78%	13.77%
Native American or Alaska Native alone (NH)	16,406	18,208	18,757	3.24%	3.14%	2.75%
Asian alone (NH)	17,410	23,051	31,163	3.44%	3.97%	4.58%
Pacific Islander alone (NH)	278	464	971	0.05%	0.08%	0.14%

Some Other Race alone (NH)	452	700	2,700	0.09%	0.12%	0.40%
Mixed Race or Multi-Racial (NH)	15,999	23,212	51,872	3.16%	4.00%	7.62%
Hispanic or Latino (any race)	51,368	100,038	144,761	10.15%	17.25%	21.26%
Total	506,132	579,999	681,054	100.00%	100.00%	100.00%

Metropolitan statistical area

[edit]



Old Interstate 40 Crosstown, Oklahoma City

Oklahoma City is the principal city of the eight-county Oklahoma City metropolitan statistical Area in Central Oklahoma and is the state's largest urbanized area. As of 2015, the metro area was the 41st largest in the nation based on population.^[84]

Religion

[edit]

The Association of Religion Data Archives in 2020 reported that the Southern Baptist Convention was the city and metropolitan area's most prominent Christian tradition with 213,008 members, Christianity being the area's predominant religion. Non/interdenominational Protestants were the second largest tradition with 195,158 members. The Roman Catholic Church claimed 142,491 adherents

throughout the metropolitan region and Pentecostals within the Assemblies of God USA numbered 48,470.^[85] The remainder of Christians in the area held to predominantly Evangelical Christian beliefs in numerous evangelical Protestant denominations. Outside of Christendom, there were 4,230 practitioners of Hinduism and 2,078 Mahayana Buddhists. An estimated 8,904 residents practiced Islam during this study.^[85]

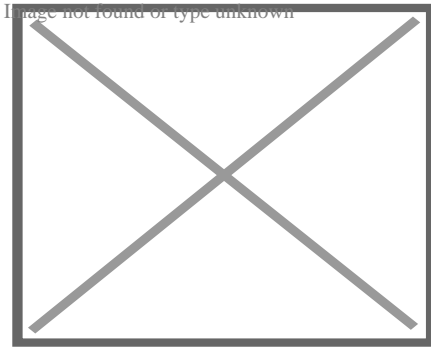
Crime

[edit]

Law enforcement claims Oklahoma City has traditionally been the territory of the notorious Juárez Cartel, but the Sinaloa Cartel has been reported as trying to establish a foothold in Oklahoma City. There are many rival gangs in Oklahoma City, one whose headquarters has been established in the city, the Southside Locos, traditionally known as Sureños.^[86]

Oklahoma City also has its share of violent crimes, particularly in the 1970s. The worst occurred in 1978 when six employees of a Sirloin Stockade restaurant on the city's south side were murdered execution-style in the restaurant's freezer. An intensive investigation followed, and the three individuals involved, who also killed three others in Purcell, Oklahoma, were identified. One, Harold Stafford, died in a motorcycle accident in Tulsa not long after the restaurant murders. Another, Verna Stafford, was sentenced to life without parole after being granted a new trial after she had been sentenced to death. Roger Dale Stafford, considered the mastermind of the murder spree, was executed by lethal injection at the Oklahoma State Penitentiary in 1995.^[87]

The Oklahoma City Police Department has a uniformed force of 1,169 officers and 300+ civilian employees. The department has a central police station and five substations covering 2,500 police reporting districts that average 1/4 square mile in size.



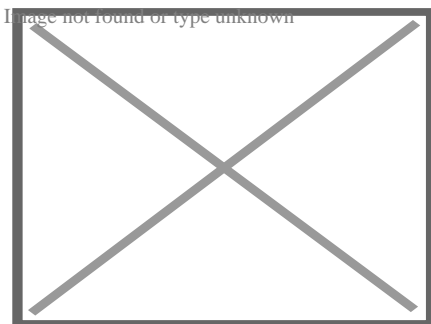
The Murrah Federal Building after the attack

On April 19, 1995, the Alfred P. Murrah Federal Building was destroyed by a fertilizer bomb manufactured and detonated by Timothy McVeigh. The blast and catastrophic collapse killed 168 people and injured over 680. The blast shock-wave destroyed or damaged 324 buildings within a 340-meter radius, destroyed or burned 86 cars, and shattered glass in 258 nearby buildings, causing at least an estimated \$652 million. McVeigh was convicted and subsequently executed by lethal injection on June 11, 2001.

Economy

[edit]

See also: List of companies based in Oklahoma City



The Sonic Drive-In restaurant chain is headquartered in Oklahoma City.

The economy of Oklahoma City, once just a regional power center of government and energy exploration, has since diversified to include the sectors of information technology, services, health services, and administration. The city is headquarters to two Fortune 500 companies: Expand Energy and Devon Energy,^[88] as well as

being home to Love's Travel Stops & Country Stores, which is ranked thirteenth on Forbes' list of private companies.^[89]

As of March 2024, the top 20 employers in the city were:^[90]

#	Employer	# of employees
1	State of Oklahoma (State Capital)	37,600
2	Tinker Air Force Base	26,000
3	Oklahoma State University–Stillwater	13,940
4	University of Oklahoma–Norman	11,530
5	Integrus Health	11,000
6	Amazon	8,000
7	Hobby Lobby Stores (HQ)	6,500
8	Mercy Health Center (HQ)	6,500
9	SSM Health Care (Regional HQ)	5,600
10	FAA Mike Monroney Aeronautical Center	5,150
11	University of Oklahoma Health Sciences Center	5000
12	City of Oklahoma City	4,500
13	OU Medical Center	4,360
14	Paycom (HQ)	4,200
15	The Boeing Company	3,740
16	Midfirst Bank (HQ)	3,100
17	Norman Regional Hospital	2,740
18	AT&T	2,700
19	OGE Energy Corp (HQ)	2,240
20	Dell	2,100

Other major corporations with a significant presence (over 1,000 employees) in the city of Oklahoma City include the United Parcel Service, Farmers Insurance Group, Great Plains Coca-Cola Bottling Company, Deaconess Hospital, Johnson Controls,

MidFirst Bank, Rose State College, and Continental Resources.^{[91][92]}

While not in the city limits, other large employers within the Oklahoma City MSA include United States Air Force – Tinker AFB (27,000); University of Oklahoma (11,900); University of Central Oklahoma (2,900); and Norman Regional Hospital (2,800).^[91]

According to the Oklahoma City Chamber of Commerce, the metropolitan area's economic output grew by 33% between 2001 and 2005 due chiefly to economic diversification. Its gross metropolitan product (GMP) was \$43.1 billion in 2005^[93] and grew to \$61.1 billion in 2009.^[94] By 2016 the GMP had grown to \$73.8 billion.^[95]

In 2008, *Forbes* magazine reported that the city had falling unemployment, one of the strongest housing markets in the country and solid growth in energy, agriculture, and manufacturing.^[96] However, during the early 1980s, Oklahoma City had one of the worst job and housing markets due to the bankruptcy of Penn Square Bank in 1982 and then the post-1985 crash in oil prices (oil bust).^[citation needed]

Tourism

[edit]

Approximately 23.2 million visitors contributed \$4.3 billion to Oklahoma City's economy. These visitors directly spent \$2.6 billion, sustained nearly 34,000 jobs, and generated \$343 million in state and local taxes.^[97]

Business districts

[edit]

See also: Neighborhoods of Oklahoma City

Business and entertainment districts (and, to a lesser extent, local neighborhoods) tend to maintain their boundaries and character by applying zoning regulations

and business improvement districts (districts where property owners agree to a property tax surcharge to support additional services for the community).^[98] Through zoning regulations, historic districts, and other special zoning districts, including overlay districts, are well established.^[99] Oklahoma City has three business improvement districts, including one encompassing the central business district.

Culture

[edit]

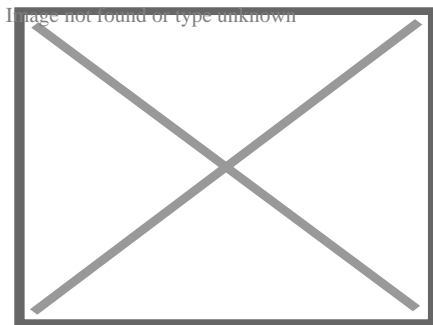
Museums and theaters

[edit]

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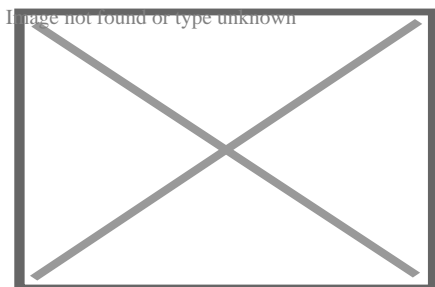
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Water taxis in Oklahoma City's downtown Bricktown neighborhood

The Donald W. Reynolds Visual Arts Center is the new downtown home for the Oklahoma City Museum of Art. The museum features visiting exhibits, original selections from its collection, a theater showing various foreign, independent, and classic films each week, and a restaurant. OKCMOA is also home to the most comprehensive collection of Chihuly glass in the world, including the 55-foot Eleanor Blake Kirkpatrick Memorial Tower in the Museum's atrium.^[100] The art

deco Civic Center Music Hall, which was renovated in 2001, has performances from the Oklahoma City Ballet, the Oklahoma City Opera, the Oklahoma City Philharmonic, and also various concerts and traveling Broadway shows.



The Survivor Tree on the grounds of the Oklahoma City National Memorial

Other theaters include the Lyric Theatre, Jewel Box Theatre, Kirkpatrick Auditorium, the Poteet Theatre, the Oklahoma City Community College Bruce Owen Theater, and the 488-seat Petree Recital Hall at the Oklahoma City University campus. The university opened the Wanda L Bass School of Music and Auditorium in April 2006.

The Oklahoma Contemporary Arts Center (formerly City Arts Center) moved downtown in 2020, near Campbell Art Park at 11th and Broadway, after being at the Oklahoma State Fair fairgrounds since 1989. It features exhibitions, performances, classes, workshops, camps, and weekly programs.

The Science Museum Oklahoma (formerly Kirkpatrick Science and Air Space Museum at Omniplex) houses exhibits on science and aviation and an IMAX theater. The museum formerly housed the International Photography Hall of Fame (IPHF), which displays photographs and artifacts from an extensive collection of cameras and other artifacts preserving the history of photography. IPHF honors those who have contributed significantly to the art and/or science of photography and relocated to St. Louis, Missouri in 2013.

The Museum of Osteology displays over 450 real skeletons and houses over 7,000. [101] Focusing on the form and function of the skeletal system, this 7,000 sq ft

(650 m²) museum displays hundreds of skulls and skeletons from all corners of the world. Exhibits include adaptation, locomotion, classification, and diversity of the vertebrate kingdom. The Museum of Osteology is the only one of its kind in America.

The National Cowboy & Western Heritage Museum has galleries of western art^[102] and is home to the Hall of Great Western Performers.^[103]

In September 2021, the First Americans Museum opened to the public, focusing on the histories and cultures of the numerous tribal nations and many Indigenous peoples in the state of Oklahoma.^[104]

The Oklahoma City National Memorial in the northern part of Oklahoma City's downtown was created as the inscription on its eastern gate of the Memorial reads, "to honor the victims, survivors, rescuers, and all who were changed forever on April 19, 1995"; the memorial was built on the land formerly occupied by the Alfred P. Murrah Federal Building complex before its 1995 bombing. The outdoor Symbolic Memorial can be visited 24 hours a day for free, and the adjacent Memorial Museum, in the former *Journal Record* building damaged by the bombing, can be entered for a small fee. The site is also home to the National Memorial Institute for the Prevention of Terrorism, a non-partisan, nonprofit think tank devoted to preventing terrorism.

The American Banjo Museum in the Bricktown Entertainment district is dedicated to preserving and promoting the music and heritage of the banjo.^[105] Its collection is valued at \$3.5 million^[citation needed], and an interpretive exhibit tells the evolution of the banjo from its roots in American slavery, to bluegrass, to folk, and to world music.

The Oklahoma History Center is the state's history museum. Across the street from the governor's mansion at 800 Nazih Zuhdi Drive in northeast Oklahoma City, the museum opened in 2005 and is operated by the Oklahoma Historical Society. It preserves Oklahoma's history from the prehistoric to the present day.

The Oklahoma State Firefighters Museum contains early colonial firefighting tools, the first fire station in Oklahoma,^[106] and modern fire trucks.^[107]

Restaurants

[edit]

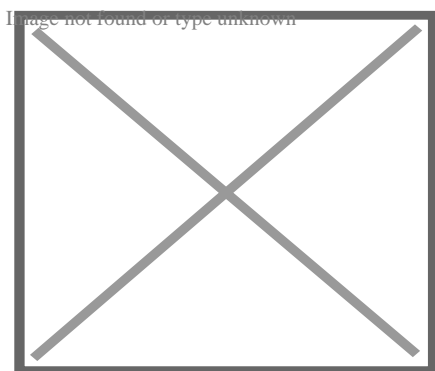
Florence's Restaurant in 2022 was named one of America's Classics by the James Beard Foundation.^[108]^[109] It was the first James Beard award for an Oklahoma entity.^[108] *The Oklahoman* called Florence's "The Grand Dame of all local restaurants".^[110] Andrew Black, chef/owner of Grey Sweater, won the 2023 James Beard Award for Best Chef Southwest.^[111]

The Food Network show *Diners, Drive-Ins, and Dives* has been to several restaurants in the Oklahoma City metropolitan area. Some of these include Cattlemen's Steakhouse, Chick N Beer, Clanton's Cafe, The Diner, Eischen's Bar, Florence's Restaurant, and Guyutes, among several others.^[112]

Sports

[edit]

Main article: Sports in Oklahoma City



Chickasaw Bricktown Ballpark, home of the Oklahoma City Comets

Oklahoma City is home to several professional sports teams, including the Oklahoma City Thunder of the National Basketball Association. The Thunder is the

city's second "permanent" major professional sports franchise after the now-defunct AFL Oklahoma Wranglers. It is the third major-league team to call the city home when considering the temporary hosting of the New Orleans/Oklahoma City Hornets for the 2005–06 and 2006–07 NBA seasons. However, the Thunder was formerly the Sonics before the movement of the Sonics to OKC in 2008.

Other professional sports clubs in Oklahoma City include the Oklahoma City Comets, the Triple-A affiliate of the Los Angeles Dodgers, the Oklahoma City Energy FC of the United Soccer League, and the Crusaders of Oklahoma Rugby Football Club of USA Rugby. The Oklahoma City Blazers, a name used for decades of the city's hockey team in the Central Hockey League, has been used for a junior team in the Western States Hockey League since 2014.

The Paycom Center in downtown is the main multipurpose arena in the city, which hosts concerts, NHL exhibition games, and many of the city's pro sports teams. In 2008, the Oklahoma City Thunder became the primary tenant. Nearby in Bricktown, the Chickasaw Bricktown Ballpark is the home to the city's baseball team, the Comets. "The Brick", as it is locally known, is considered one of the finest minor league parks in the nation.^[113]

Oklahoma City hosts the World Cup of Softball and the annual NCAA Women's College World Series. The city has held 2005 NCAA Men's Basketball First and Second round and hosted the Big 12 Men's and women's basketball tournaments in 2007 and 2009. The major universities in the area – University of Oklahoma, Oklahoma City University, and Oklahoma State University – often schedule major basketball games and other sporting events at Paycom Center and Chickasaw Bricktown Ballpark. However, most home games are played at their campus stadiums.

Other major sporting events include Thoroughbred and Quarter Horse racing circuits at Remington Park and numerous horse shows and equine events that take place at the state fairgrounds each year. There are multiple golf courses and country clubs spread around the city.

High school football

[edit]

The state of Oklahoma hosts a highly competitive high school football culture, with many teams in the Oklahoma City metropolitan area. The Oklahoma Secondary School Activities Association (OSSAA) organizes high school football into eight distinct classes based on school enrollment size. Beginning with the largest, the classes are 6A, 5A, 4A, 3A, 2A, A, B, and C. Class 6A is broken into two divisions. Oklahoma City schools include: Westmoore, Putnam City North, Putnam City, Putnam City West, Southeast, Capitol Hill, U.S. Grant, and Northwest Classen.^[114]

Oklahoma City Thunder

[edit]

The Oklahoma City Thunder of the National Basketball Association (NBA) has called Oklahoma City home since the 2008–09 season, when owner Clay Bennett relocated the franchise from Seattle, Washington. The Thunder plays home games in downtown Oklahoma City at the Paycom Center. The Thunder is known by several nicknames, including "OKC Thunder" and simply "OKC", and its mascot is Rumble the Bison.

After arriving in Oklahoma City for the 2008–09 season, the Oklahoma City Thunder secured a berth (8th) in the 2010 NBA Playoffs the following year after boasting its first 50-win season, winning two games in the first round against the Los Angeles Lakers. In 2012, Oklahoma City made it to the NBA Finals but lost to the Miami Heat in five games. In 2013, the Thunder reached the Western Conference semi-finals without All-Star guard Russell Westbrook, who was injured in their first-round series against the Houston Rockets, only to lose to the Memphis Grizzlies. In 2014, Oklahoma City reached the NBA's Western Conference Finals again but eventually lost to the San Antonio Spurs in six games.

Sports analysts have regarded the Oklahoma City Thunder as one of the elite franchises of the NBA's Western Conference and a media darling of the league's future. Oklahoma City earned Northwest Division titles every year from 2011 to 2014 and again in 2016 and has consistently improved its win record to 59 wins in 2014. The Thunder is led by third-year head coach Mark Daigneault and was anchored by All-Star point guard Russell Westbrook before a July 2019 trade that sent him to the Houston Rockets.

Hornets

[edit]

Main article: Effect of Hurricane Katrina on the New Orleans Hornets

In the aftermath of Hurricane Katrina, the NBA's New Orleans Hornets temporarily relocated to the Ford Center, playing the majority of its home games there during the 2005–06 and 2006–07 seasons. The team became the first NBA franchise to play regular-season games in Oklahoma.^[*citation needed*] The team was known as the New Orleans/Oklahoma City Hornets while playing in Oklahoma City. The team returned to New Orleans full-time for the 2007–08 season. The Hornets played their final home game in Oklahoma City during the exhibition season on October 9, 2007, against the Houston Rockets.

Professional sports teams

[edit]

Main article: Sports in Oklahoma City

Current professional sports teams

Sports Franchise	League	Sport	Founded	Stadium (capacity)
Oklahoma City Thunder	NBA	Basketball	2008	Paycom Center (18,203)
Oklahoma City Comets	MiLB	Baseball	1998	Chickasaw Bricktown Ballpark (13,066)

Oklahoma City Blue	NBA G League	Basketball	2018	Paycom Center (18,203)
Oklahoma City Energy	USL Championship (Division 2)	Soccer	2018	Taft Stadium (7,500)
Oklahoma City Football Club	Women's Premier Soccer League	Soccer	2022	Brian Harvey Field (1,500)
Oklahoma City Spark	Women's Professional Fastpitch	Softball	2023	USA Softball Hall of Fame Stadium (13,500)

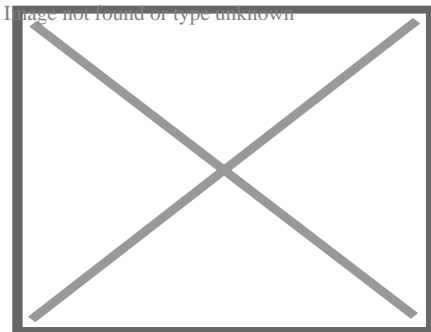
2028 Olympics

[edit]

Venues in Oklahoma City will host two events during the 2028 Summer Olympics, which will primarily be held in Los Angeles. The LA Olympic Organizing Committee opted to have canoe slalom and softball in Oklahoma City, given the lack of acceptable venues for those sports in Los Angeles. Riversport OKC will host the canoe slalom competition, while Devon Park will host the softball competition. Oklahoma City is located approximately 1,300 miles away from Los Angeles. ^[115]

Parks and recreation

[edit]



Myriad Botanical Gardens, the centerpiece of downtown OKC's central business district

One of the more prominent landmarks of downtown Oklahoma City is the Crystal Bridge tropical conservatory at the Myriad Botanical Gardens, a large downtown urban park. Designed by I. M. Pei, the park also includes the Water Stage amphitheater, a bandshell, and lawn, a sunken pond complete with koi, an interactive children's garden complete with a carousel and water sculpture, various trails and interactive exhibits that rotate throughout the year including the ice skating in the Christmas winter season. In 2007, following a renovation of the stage, *Oklahoma Shakespeare In The Park* relocated to the Myriad Gardens. Bicentennial Park, also downtown located near the Oklahoma City Civic Center campus, is home to the annual *Festival of the Arts* in April.

The Scissortail Park is just south of the Myriad Gardens, a large interactive park that opened in 2021. This park contains a large lake with paddleboats, a dog park, a concert stage with a great lawn, a promenade including the Skydance Bridge, a children's interactive splash park and playground, and numerous athletic facilities. Farmers Market is a common attraction at Scissortail Park during the season, and there are multiple film showings, food trucks, concerts, festivals, and civic gatherings.

Returning to the city's first parks masterplan, Oklahoma City has at least one major park in each quadrant outside downtown. Will Rogers Park, the Grand Boulevard loop once connected Lincoln Park, Trosper Park, and Woodson Park, some sections of which no longer exist. Martin Park Nature Center is a natural habitat in far northwest Oklahoma City. Will Rogers Park is home to the *Lycan Conservatory*, the Rose Garden, and the Butterfly Garden, all built in the WPA era. In April 2005, the *Oklahoma City Skate Park* at Wiley Post Park was renamed the *Mat Hoffman Action Sports Park* to recognize Mat Hoffman, an Oklahoma City area resident and businessman who was instrumental in the design of the skate park and is a 10-time BMX World Vert champion.^[116]

Walking trails line the Bricktown Canal and the Oklahoma River in downtown. The city's bike trail system follows around Lake Hefner and Lake Overholser in the northwest and west quadrants of the city. The majority of the east shore area of

Lake Hefner is taken up by parks and bike trails, including a new leashless dog park and the postwar-era *Stars and Stripes Park*, and eateries near the lighthouse. Lake Stanley Draper, in southeast Oklahoma City, is the city's largest and most remote lake, offering a genuine rural yet still urban experience.

The Oklahoma City Zoo and Botanical Garden is home to numerous natural habitats, WPA era architecture and landscaping, and major touring concerts during the summer at its amphitheater. Nearby is a combination racetrack and casino, Remington Park, which hosts both Quarter Horse (March – June) and Thoroughbred (August—December) seasons.

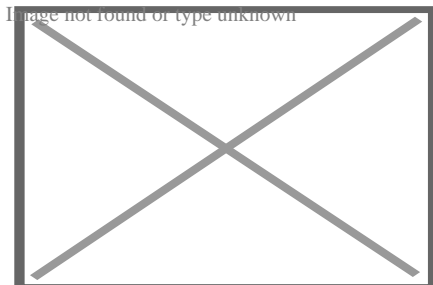
Oklahoma City is also home to the American Banjo Museum, which houses a large collection of highly decorated banjos from the early 20th century and exhibits the banjo's history and its place in American history. Concerts and lectures are also held there.

Government

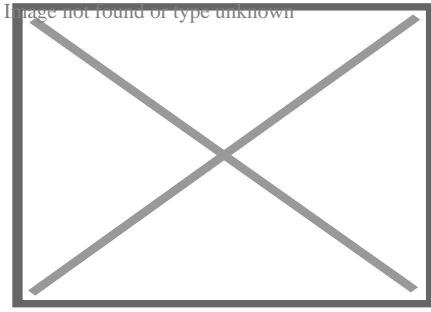
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Main article: Government of Oklahoma City

See also: List of mayors of Oklahoma City



Oklahoma State Capitol, seen from the OK History Center



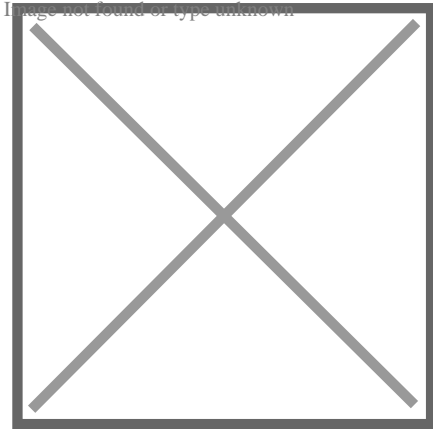
The Art Deco city hall building, a block from the Civic Center

The City of Oklahoma City has operated under a council–manager form of city government since 1927.^[117] David Holt assumed the office of Mayor on April 10, 2018, after being elected two months earlier.^[118] Eight councilpersons represent each of the eight wards of Oklahoma City. The City Council appointed current City Manager Craig Freeman on November 20, 2018. Freeman took office on January 2, 2018, succeeding James D. Couch, who had served in the role since 2000. Before becoming City Manager, Craig Freeman served as Finance Director for the city.^[119]

Politics





[edit]

Similar to many American cities, Oklahoma City is politically conservative in its suburbs and liberal in the central city. In the United States House of Representatives, it is represented by Republicans Stephanie Bice and Tom Cole of the 5th and 4th districts, respectively. The city has called on residents to vote for sales tax–based projects to revitalize parts of the city. The Bricktown district is the best example of such an initiative. In the recent MAPS 3 vote, the city's fraternal police order criticized the project proposals for not doing enough to expand the police presence to keep up with the growing residential population and increased commercial activity. In September 2013, Oklahoma City area attorney David Slane announced he would pursue legal action regarding MAPS3 on claims the multiple projects that made up the plan violate a state constitutional law limiting voter ballot issues to a single subject.^[120]



Oklahoma City region population dot map and 2016 presidential election results by precinct (click to enlarge).

Oklahoma County Voter Registration and Party Enrollment as of November 1, 2020^[121]

Party	Number of Voters	Percentage
 Democratic	164,628	37.26%
 Republican	189,991	43.00%
 Libertarian	3,385	0.77%
 Unaffiliated	83,799	18.97%
Total	441,803	100%

International relations

Consulates

[edit]

Consulate	Date	Consular District
Guatemalan Consulate-General, Oklahoma City ^[122]	06.2017	Oklahoma, Kansas
Mexican Consulate, Oklahoma City ^[123]	05.2023	Oklahoma
Germany Honorary Consulate, Oklahoma City		

Twin towns – sister cities

[edit]

Oklahoma City's sister cities are:[¹²⁴]

-  ~~Brazil~~ ~~Rio de Janeiro, Brazil~~
-  ~~China~~ ~~Haikou, China~~
-  ~~Mexico~~ ~~Puebla, Mexico~~
-  ~~Peru~~ ~~Piura, Peru~~
-  ~~Rwanda~~ ~~Kigali, Rwanda~~
- ~~Russia~~ ~~Ulyanovsk, Russia (suspended August, 2022)~~
-  ~~Taiwan~~ ~~Tainan, Taiwan~~
-  ~~Taiwan~~ ~~Taipei, Taiwan~~
-  ~~Australia~~ ~~Darwin, Australia~~

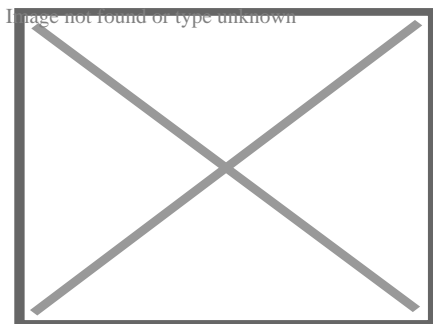
Education

[edit]

Higher education

[edit]

See also: List of colleges and universities in Oklahoma City



OU Health Sciences Center in Oklahoma City

The city is home to several colleges and universities. Oklahoma City University, formerly known as Epworth University, was founded by the United Methodist

Church on September 1, 1904, and is known for its performing arts, science, mass communications, business, law, and athletic programs. OCU has its main campus in the north-central section of the city, near the city's Asia District area. OCU Law is in the old Central High School building in the Midtown district near downtown.

The University of Oklahoma has several institutions of higher learning in the city and metropolitan area, with OU Medicine and the University of Oklahoma Health Sciences Center campuses east of downtown in the Oklahoma Health Center district, and the main campus to the south in the suburb of Norman. OU Medical Center hosts the state's only Level-One trauma center. OU Health Sciences Center is one of the nation's largest independent medical centers, employing over 12,000 people.^[125] OU is one of only four major universities in the nation to operate six medical schools. *[clarification needed]*

The third-largest university in the state, the University of Central Oklahoma, is just north of the city in the suburb of Edmond. Oklahoma Christian University, one of the state's private liberal arts institutions, is just south of the Edmond border, inside the Oklahoma City limits.^[126]

Oklahoma City Community College in south Oklahoma City is the second-largest community college in the state. Rose State College is east of Oklahoma City in suburban Midwest City. Oklahoma State University–Oklahoma City is in the "Furniture District" on the Westside. Northeast of the city is Langston University, the state's historically black college (HBCU). Langston also has an urban campus in the eastside section of the city. Southern Nazarene University, which was founded by the Church of the Nazarene, is a university in suburban Bethany, which is surrounded by the Oklahoma City city limits.

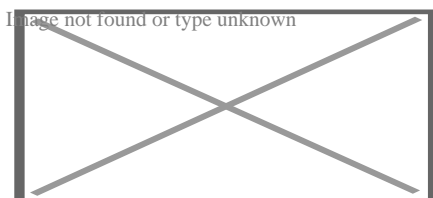
Although technically not a university, the FAA's Mike Monroney Aeronautical Center has many aspects of an institution of higher learning. Its FAA Academy is accredited by the Higher Learning Commission. Its Civil Aerospace Medical Institute (CAMI) has a medical education division responsible for aeromedical education in general, as well as the education of aviation medical examiners in the

U.S. and 93 other countries. In addition, The National Academy of Science offers Research Associateship Programs for fellowship and other grants for CAMI research.

Primary and secondary

[edit]

Main article: Education in Oklahoma City



Bishop McGuinness Catholic High School

Oklahoma City is home to (as of 2009) the state's largest school district, Oklahoma City Public Schools,^[127] which covers the most significant portion of the city.^[128] The district's Classen School of Advanced Studies and Harding Charter Preparatory High School rank high among public schools nationally according to a formula that looks at the number of Advanced Placement, International Baccalaureate and/or Cambridge tests taken by the school's students divided by the number of graduating seniors.^[129] In addition, OKCPS's Belle Isle Enterprise Middle School was named the top middle school in the state according to the Academic Performance Index and recently received the Blue Ribbon School Award, in 2004 and again in 2011.^[130]

Due to Oklahoma City's explosive growth, parts of several suburban districts spill into the city. All but one of the school districts in Oklahoma County includes portions of Oklahoma City. The other districts in that county covering OKC include: Choctaw/Nicoma Park, Crooked Oak, Crutch, Deer Creek, Edmond, Harrah, Jones, Luther, McLoud, Mid-Del, Millwood, Moore, Mustang, Oakdale, Piedmont, Putnam City, and Western Heights.^[128] School districts in Cleveland County covering portions of Oklahoma City include: Little Axe, McLoud, Mid-Del,

Moore, and Robin Hill.^[131] Within Canadian County, Banner, Mustang, Piedmont, Union City, and Yukon school districts include parts of OKC.^[132]

There are also charter schools. KIPP Reach College Preparatory School in Oklahoma City received the 2012 National Blue Ribbon, and its school leader, Tracy McDaniel Sr., was awarded the Terrel H. Bell Award for Outstanding Leadership.

The city also boasts several private and parochial schools. Casady School and Heritage Hall School are both examples of a private college preparatory school with rigorous academics that range among the top in Oklahoma. Providence Hall is a Protestant school. Two prominent schools of the Archdiocese of Oklahoma City include Bishop McGuinness High School and Mount Saint Mary High School. Other private schools include the Advanced Science and Technology Education Center and Crossings Christian School.

The Oklahoma School of Science and Mathematics, a school for some of the state's most gifted math and science pupils, is also in Oklahoma City.

CareerTech

[edit]

Oklahoma City has several public career and technology education schools associated with the Oklahoma Department of Career and Technology Education, the largest of which are Metro Technology Center and Francis Tuttle Technology Center.

Private career and technology education schools in Oklahoma City include Oklahoma Technology Institute, Platt College, Vatterott College, and Heritage College. The Dale Rogers Training Center is a nonprofit vocational training center for individuals with disabilities.

Media

[edit]

See also: Media in Oklahoma City

Print

[edit]

The Oklahoman is Oklahoma City's major daily newspaper and is the most widely circulated in the state. NewsOK.com is the Oklahoman's online presence. *Oklahoma Gazette* is Oklahoma City's independent newsweekly, featuring such staples as local commentary, feature stories, restaurant reviews, movie listings, and music and entertainment. *The Journal Record* is the city's daily business newspaper, and *okcBIZ* is a monthly publication that covers business news affecting those who live and work in Central Oklahoma.

Numerous community and international newspapers cater to the city's ethnic mosaic, such as *The Black Chronicle*, headquartered in the Eastside, the OK VIETIMES and *Oklahoma Chinese Times*, in Asia District, and various Hispanic community publications. *The Campus* is the student newspaper at Oklahoma City University. Gay publications include *The Gayly Oklahoman*.

An upscale lifestyle publication called *405 Magazine* (formerly Slice Magazine) is circulated throughout the metropolitan area.^[133] In addition, there is a magazine published by *Back40 Design Group* called *The Edmond Outlook*. It contains local commentary and human interest pieces directly mailed to over 50,000 Edmond residents.

Ready Player One is set in Oklahoma City in the year 2045.

Broadcast

[edit]

Oklahoma City was home to several pioneers in radio and television broadcasting. Oklahoma City's WKY Radio was the first radio station transmitting west of the Mississippi River and the third radio station in the United States.^[134] WKY received its federal license in 1921 and has continually broadcast under the same call letters since 1922. In 1928, WKY was purchased by E.K. Gaylord's Oklahoma Publishing Company and affiliated with the NBC Red Network; in 1949, WKY-TV (channel 4) went on the air and later became the first independently owned television station in the U.S. to broadcast in color.^[134] In mid-2002, WKY radio was purchased outright by Citadel Broadcasting, who was bought out by Cumulus Broadcasting in 2011. The Gaylord family earlier sold WKY-TV in 1976, which has gone through a succession of owners (what is now KFOR-TV is owned by Nexstar Media Group as of October 2019).

The major U.S. broadcast television networks have affiliates in the Oklahoma City market (ranked 41st for television by Nielsen and 48th for radio by Arbitron, covering a 34-county area serving the central, north-central and west-central sections of Oklahoma); including NBC affiliate KFOR-TV (channel 4), ABC affiliate KOCO-TV (channel 5), CBS affiliate KWTW-DT (channel 9, the flagship of locally based Griffin Media), PBS station KETA-TV (channel 13, the flagship of the state-run OETA member network), Fox affiliate KOKH-TV (channel 25), independent station KOCB (channel 34), CW owned-and-operated station KAUT-TV (channel 43), MyNetworkTV affiliate KSBI-TV (channel 52), and Ion Television affiliate KOPX-TV (channel 62). The market is also home to several religious stations, including TBN owned-and-operated station KTBO-TV (channel 14) and Norman-based Daystar owned-and-operated station KOCM (channel 46).

Despite the market's geographical size, none of the English-language commercial affiliates in the Oklahoma City designated market area operate full-power satellite stations covering the far northwestern part of the state (requiring cable or satellite to view them). However, KFOR-TV, KOCO-TV, KWTW-DT, and KOKH-TV each operate low-power translators in that portion of the market. Oklahoma City is one of the few markets between Chicago and Dallas to have affiliates of two or more

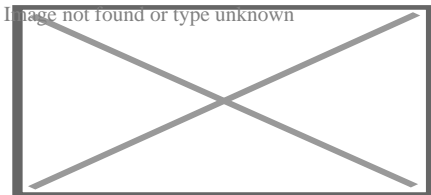
of the significant Spanish-language broadcast networks: Telemundo affiliate KTUZ-TV (channel 30), Woodward-based Univision/UniMás affiliate KUOK 35 (whose translator KUOK-CD, channel 36, serves the immediate Oklahoma City area), and Estrella TV affiliate KOCY-LD (channel 48). (Locally based Tyler Media Group, which owns the three stations above, also owns eight radio stations in the market, including Regional Mexican-formatted KTUZ-FM (106.7) and news-talk outlet KOKC (1520 AM).)

Infrastructure

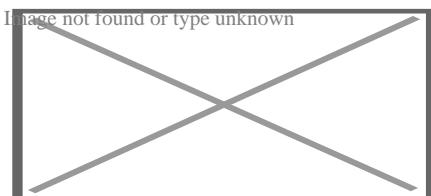
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Fire department

[edit]



OKCFD dive team at Lake Hefner



OKCFD ambulance

Oklahoma City is protected by the Oklahoma City Fire Department (OKCFD), which employs 1015 paid, professional firefighters. The current Chief of Department is Richard Kelley, and the department is commanded by three Deputy Chiefs, who – along with the department chief – oversee the Operational Services, Prevention Services, and Support Services bureaus. The OKCFD operates out of 37 fire stations throughout the city in six battalions. The OKCFD operates a fire apparatus fleet of 36 engine companies (including 30 paramedic engines), 13

ladder companies, 16 brush pumper units, six water tankers, two hazardous materials units, one Technical Rescue Unit, one Air Supply Unit, six Arson Investigation Units, and one Rehabilitation Unit along with several special units. Each engine Company is staffed with a driver, an officer, and one to two firefighters, while each ladder company is staffed with a driver, an officer, and one firefighter. The minimum staffing for each shift is 213 personnel. The Oklahoma City Fire Department responds to over 70,000 emergency calls annually. ^{[135][136][137]}

Transportation

[edit]

Main article: Transportation in Oklahoma City

Highway

[edit]

Oklahoma City is an integral point on the United States Interstate Network, with three major interstate highways – Interstate 35, Interstate 40, and Interstate 44 – bisecting the city. Interstate 240 connects Interstate 40 and Interstate 44 in south Oklahoma City. At the same time, Interstate 235 spurs from Interstate 44 in north-central Oklahoma City into downtown. Interstate 44, between NW 23rd St and NW 36th St, is the busiest roadway in the city and state, with an average daily traffic count of 167,200 vehicles per day in 2018. ^[138]

Major state expressways through the city include Lake Hefner Parkway (SH-74), the Kilpatrick Turnpike, Airport Road (SH-152), and Broadway Extension (US-77) which continues from I-235 connecting Central Oklahoma City to Edmond. Lake Hefner Parkway runs through northwest Oklahoma City, while Airport Road runs through southwest Oklahoma City and leads to Will Rogers World Airport. The Kilpatrick Turnpike loops around north and west Oklahoma City.

Oklahoma City also has several major national and state highways within its city limits. Shields Boulevard (US-77) continues from E.K. Gaylord Boulevard in downtown Oklahoma City and runs south, eventually connecting to I-35 near the suburb of Moore, Oklahoma. Northwest Expressway (Oklahoma State Highway 3) runs from North Classen Boulevard in north-central Oklahoma City to the northwestern suburbs.

The following significant expressways traverse Oklahoma City:

- Interstate 35
- Interstate 40 (Crosstown Expressway, Stanley Draper Expressway, Tinker Diagonal, Tom Stead Memorial Highway)
- Interstate 44 (Turner Turnpike, Belle Isle Freeway, Will Rogers Expressway, H.E. Bailey Turnpike)
- Interstate 235 (Centennial Expressway) / U.S. 77 (Broadway Extension)
- Interstate 240 (Southwest Expressway)
- Lake Hefner Parkway (State Highway 74)
- Airport Road (State Highway 152)
- Kilpatrick Turnpike

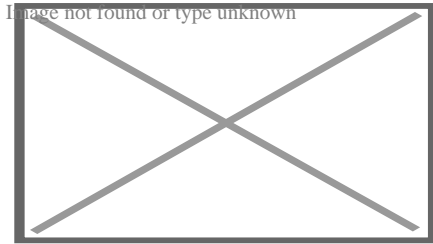
Air

[edit]

Oklahoma City is served by two primary airports, Will Rogers World Airport and the much smaller Wiley Post Airport (incidentally, the two honorees died in the same plane crash in Alaska)^[139] Will Rogers World Airport is the state's busiest commercial airport, with 4,341,159 passengers served in 2018, a historical record. [140]

Tinker Air Force Base, in southeast Oklahoma City, is the largest military air depot in the nation. It is a major maintenance and deployment facility for the Navy and the Air Force and the second largest military institution in the state (after Fort Sill

in Lawton).



United Airlines Embraer 170 aircraft at the East Concourse of Will Rogers World Airport

Rail and intercity bus

[edit]

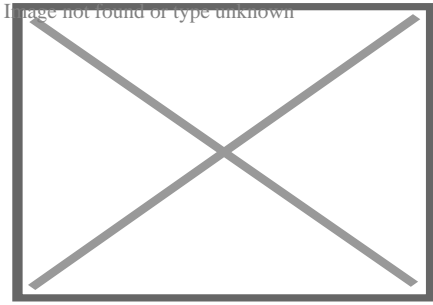
Amtrak has a station downtown at the Santa Fe Depot, with daily service to Fort Worth and the nation's rail network via the Heartland Flyer. Oklahoma City once was the crossroads of several interstate passenger railroads at the Santa Fe Depot, the Union Station, and the Missouri–Kansas–Texas Railroad station.^[141] But service at that level has long since been discontinued. However, several proposals to extend the current train service have been made, including a plan to expand the Heartland Flyer to Newton, Kansas, which is currently being connected through Amtrak Thruway. Freight service is provided by BNSF Railway, Union Pacific Railroad, and Stillwater Central.

Greyhound and several other intercity bus companies serve Oklahoma City at the Union Bus Station in downtown.

Public transit

[edit]

Main articles: Embark (transit authority) and Oklahoma City Streetcar



Streetcar of the OKC Streetcar system passing the historic First United Methodist Church, in downtown

Embark (formerly Metro Transit) is the city's public transit company. The primary transfer terminal is downtown at NW 5th Street and Hudson Avenue. Embark maintains limited coverage of the city's primary street grid using a hub-and-spoke system from the main terminal, making many journeys impractical due to the relatively small number of bus routes offered and that most trips require a transfer downtown. The city has recognized transit as a significant issue for the rapidly growing and urbanizing city. It has initiated several recent studies to improve the existing bus system, starting with a plan known as the Fixed Guideway Study.^[142] This study identified several potential commuter transit routes from the suburbs into downtown OKC as well as feeder-line bus and/or rail routes throughout the city.

Though Oklahoma City has no light rail or commuter rail service, city residents identified improved transit as one of their top priorities. From the fruits of the Fixed Guideway and other studies, city leaders strongly desire to incorporate urban rail transit into the region's future transportation plans. The greater Oklahoma City metropolitan transit plan identified from the Fixed Guideway Study includes a streetcar system in the downtown area, to be fed by enhanced city bus service and commuter rail from the suburbs including Edmond, Norman, and Midwest City. There is a significant push for a commuter rail line connecting downtown OKC with the eastern suburbs of Del City, Midwest City, and Tinker Air Force Base. In addition to commuter rail, a short heritage rail line that would run from Bricktown just a few blocks away from the Amtrak station to the Adventure District in northeast Oklahoma City is under reconstruction.

In December 2009, Oklahoma City voters passed MAPS 3, the \$777 million (7-year, 1-cent tax) initiative. This initiative would generate funding (approx. \$130 million) for the modern Oklahoma City Streetcar system in downtown Oklahoma City and the establishment of a transit hub.

On September 10, 2013, the federal government announced that Oklahoma City would receive a \$13.8-million grant from the U.S. Department of Transportation's TIGER program. This was the first-ever grant for Oklahoma City for a rail-based initiative and is thought to be a turning point for city leaders who have applied for grants in the past, only to be denied continuously. It is believed the city will use the TIGER grant along with approximately \$10 million from the MAPS 3 Transit budget to revitalize the city's Amtrak station, becoming an Intermodal Transportation Hub, taking over the role of the existing transit hub at NW 5th/Hudson Ave. ^[citation needed]

Construction of the Oklahoma City Streetcar system in Downtown OKC began in early 2017,^[143] and the system opened for service in December 2018.^{[144][145]} Also known as the Maps 3 Streetcar, it connects the areas of Bricktown, Midtown and Downtown. The 6.9 mi (11.1 km) system serves the greater Downtown area using modern low-floor streetcars. The initial system consists of two lines connecting Oklahoma City's Central Business District with the entertainment district, Bricktown, and the Midtown District. Expansion to other districts surrounding downtown and more routes in the CBD is already underway. ^[citation needed]

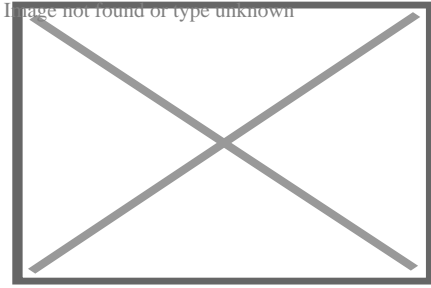
Walkability

[edit]

A 2013 study by Walk Score ranked Oklahoma City the 43rd most walkable out of the 50 largest U.S. cities. Oklahoma City has 18 neighborhoods with a Walk Score above 60, mainly close to the downtown core.^[146]

Health

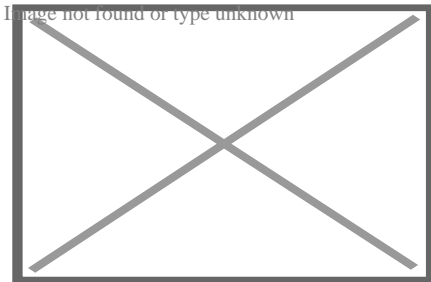
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OU Physicians Center

Oklahoma City and the surrounding metropolitan area have several healthcare facilities and specialty hospitals. In Oklahoma City's MidTown district near downtown resides the state's oldest and largest single-site hospital, St. Anthony Hospital and Physicians Medical Center.

OU Medicine, an academic medical institution on the campus of The University of Oklahoma Health Sciences Center, is home to OU Medical Center. OU Medicine operates Oklahoma's only level-one trauma center at the OU Medical Center and the state's only level-one trauma center for children at Children's Hospital at OU Medicine,^[147] both of which are in the Oklahoma Health Center district. Other medical facilities operated by OU Medicine include OU Physicians and OU Children's Physicians, the OU College of Medicine, the Oklahoma Cancer Center, and OU Medical Center Edmond, the latter in the northern suburb of Edmond.



INTEGRIS Baptist Medical Center

INTEGRIS Health owns several hospitals, including INTEGRIS Baptist Medical Center, the INTEGRIS Cancer Institute of Oklahoma,^[148] and the INTEGRIS Southwest Medical Center.^[149] INTEGRIS Health operates hospitals, rehabilitation

centers, physician clinics, mental health facilities, independent living centers, and home health agencies throughout much of Oklahoma. INTEGRIS Baptist Medical Center ranks high-performing in the following categories: Cardiology and Heart Surgery; Diabetes and Endocrinology; Ear, Nose and Throat; Gastroenterology; Geriatrics; Nephrology; Orthopedics; Pulmonology and Urology.

The Midwest Regional Medical Center is in the suburb of Midwest City; other significant hospitals include the Oklahoma Heart Hospital and the Mercy Health Center. There are 347 physicians for every 100,000 people in the city.

In the American College of Sports Medicine's annual ranking of the United States' 50 most populous metropolitan areas on the basis of community health, Oklahoma City took last place in 2010, falling five spots from its 2009 rank of 45.^[150] The ACSM's report, published as part of its American Fitness Index program, cited, among other things, the poor diet of residents, low levels of physical fitness, higher incidences of obesity, diabetes, and cardiovascular disease than the national average, low access to recreational facilities like swimming pools and baseball diamonds, the paucity of parks and low investment by the city in their development, the high percentage of households below the poverty level, and the lack of state-mandated physical education curriculum as contributing factors.^[151]

Notable people

[edit]

For a more comprehensive list, see List of people from Oklahoma City.

See also

[edit]

- Coyle v. Smith
- History of Oklahoma
- List of mayors of Oklahoma City
- USS *Oklahoma City*, 2 ships

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Notes

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1. ^ Mean monthly maxima and minima (i.e. the expected highest and lowest temperature readings at any point during the year or given month) calculated based on data at said location from 1991 to 2020.
2. ^ Official records for Oklahoma City were kept at the Weather Bureau Office from November 1890 to December 1953, and at Will Rogers World Airport since January 1954. For more information, see Threadex

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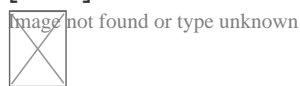
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External links

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City of Oklahoma City

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Districts

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- Asia District
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- Eastside
- Midtown
- Paseo
- 39th Street
- Uptown
- Western Avenue
- Oklahoma City Thunder
- Oklahoma City Blue
- Oklahoma City Comets
- Oklahoma City Energy FC
- Oklahoma City Spark

Professional sports teams

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Articles relating to Oklahoma City

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Municipalities of the Greater Oklahoma City metropolitan area

Population over 500,000

- Oklahoma City

Population over 100,000

- Norman

Population over 50,000

- Edmond
- Midwest City
- Moore
- Bethany

Population over 20,000

- Del City
- Mustang
- Shawnee
- Yukon
- Chickasha
- Choctaw

Population over 10,000

- El Reno
- Guthrie
- Newcastle
- Warr Acres
- Blanchard
- Harrah
- Noble

Population over 5,000

- Piedmont
- Purcell
- Tecumseh
- Tuttle
- The Village

**Population
over 2,000**

- Bethel Acres
- Chandler
- Goldsby
- Jones
- Lexington
- McLoud
- Nichols Hills
- Nicoma Park
- Pink
- Prague
- Slaughterville
- Spencer
- Stroud
- Crescent
- Forest Park
- Langston
- Luther
- Maud
- Meeker
- Minco
- Ninnekah
- Okarche
- Rush Springs
- Union City

**Population
over 1,000**

**Population
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- Cashion
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- Davenport
- Dibble
- Earlsboro
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- Asher
- Bridge Creek

**Population
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- Cedar Valley
- Coyle
- Johnson
- Marshall
- Mulhall
- Tribbey
- Tryon
- Wanette

**Population
under 200**

- Arcadia
- Bradley
- Brooksville
- Cimarron City
- Etowah
- Fallis
- Kendrick
- Lake Aluma
- Macomb
- Meridian
- Norge
- Orlando
- Pocasset
- Rosedale
- Smith Village
- Sparks
- St. Louis
- Warwick
- Woodlawn Park
- Canadian
- Cleveland
- Grady
- Logan
- Lincoln
- McClain
- Oklahoma
- Pottawatomie

Counties

**Metropolitan
planning
organization**

- Association of Central Oklahoma Governments

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Skyscrapers in Oklahoma City

- Devon Energy Center
- BancFirst Tower
- First National Center
- City Place
- Oklahoma Tower
- BOK Park Plaza
- Strata Tower
- Valliance Bank Tower
- Bank of Oklahoma Plaza
- Leadership Square
- Regency Tower
- Founders Tower
- Mid America Tower
- Union Plaza
- The Classen
- Dowell Center
- 101 Park Avenue Building
- 100 Park Avenue Building
- Colcord Hotel
- 50 Penn Place
- Skirvin Hilton Hotel
- Oklahoma County Courthouse

Current

See also

- List of tallest buildings in Oklahoma City

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State of Oklahoma

Oklahoma City (capital)

- Index
- Climate change
- Earthquakes
- Geography
- Government
 - governor (list)
- History
 - Land Rush of 1889, 1891, 1892, 1893, and 1895
 - Unassigned Lands

Topics

- Mass media
 - newspapers
 - radio
 - TV
- People
- Sports
- Symbols
- Tourist attractions
- Abortion
- Cannabis
- Culture
- Crime
- Demographics

Society

- Economy
- Education
- Gun laws
- LGBT rights
- Politics

Regions

- Arklatex
- Central
- Cherokee Outlet
- Choctaw Country
- Cross Timbers
- Four State Area
- Flint Hills
- Green Country
- Little Dixie
- Northwestern
- Oklahoma City Metro
- Ouachita Mountains
- The Ozarks
- Panhandle
- South Central
- Southwestern
- Texoma
- Tulsa Metro
- Western

Largest cities

- Ardmore
- Bartlesville
- Bixby
- Broken Arrow
- Del City
- Duncan
- Edmond
- Enid
- Lawton
- Midwest City
- Muskogee
- Moore
- Norman
- Oklahoma City
- Owasso
- Ponca City
- Shawnee
- Stillwater
- Tulsa
- Yukon

- Adair
- Alfalfa
- Atoka
- Beaver
- Beckham
- Blaine
- Bryan
- Caddo
- Canadian
- Carter
- Cherokee
- Choctaw
- Cimarron
- Cleveland
- Coal
- Comanche
- Cotton
- Craig
- Creek
- Custer
- Delaware
- Dewey
- Ellis
- Garfield
- Garvin
- Grady
- Grant
- Greer
- Harmon
- Harper
- Haskell
- Hughes
- Jackson
- Jefferson
- Johnston
- K

flag Oklahoma portal

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Municipalities and communities of Canadian County, Oklahoma,
United States

County seat: **El Reno**

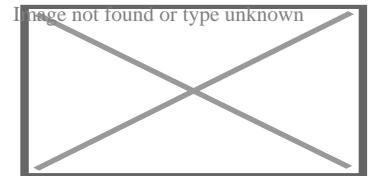
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| Cities | |
| | <ul style="list-style-type: none">o Okarche☒o Union City |
| Towns | |
| | <ul style="list-style-type: none">o Cedar Lake |
| CDP | |
| | <ul style="list-style-type: none">o Concho |
| Other communities | <ul style="list-style-type: none">o Scott☒ |

☒This populated place also has

Footnotes portions in an adjacent county or
counties

- o Oklahoma portal
- o United States portal

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Canadian County
map

Municipalities and communities of Cleveland County, Oklahoma,
United States

County seat: **Norman**

Cities

- Lexington
- Moore
- Noble
- Norman
- Oklahoma City☒
- Purcell☒

Towns

- Etowah
- Slaughterville

Neighborhood

- Hall Park

Footnotes

☒This populated place also has
portions in an adjacent county or
counties

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- United States portal

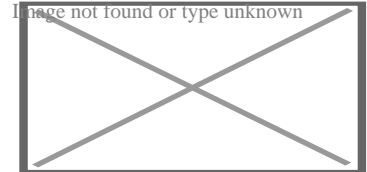
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Municipalities and communities of Oklahoma County, Oklahoma,
United States

County seat: **Oklahoma City**



Cleveland County
map

Cities

- Bethany
- Choctaw
- Del City
- Edmond
- Harrah
- Midwest City
- Nichols Hills
- Nicoma Park
- Oklahoma City☒
- Spencer
- The Village
- Warr Acres
- Arcadia
- Forest Park

Towns

- Jones
- Lake Aluma
- Luther
- Smith Village
- Valley Brook
- Woodlawn Park
- Britton

Unincorporated communities

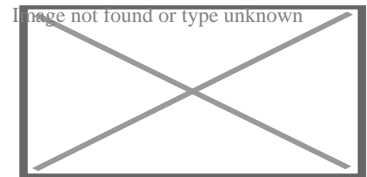
- Crutcho
- Newalla
- Wheatland

Footnotes

☒This populated place also has portions in an adjacent county or counties

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- United States portal

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Oklahoma County map

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Municipalities and communities of Pottawatomie County,
Oklahoma, United States

County seat: **Shawnee**

Cities

- o Maud
- o Oklahoma City
- o Shawnee
- o Tecumseh
- o Asher
- o Bethel Acres
- o Brooksville
- o Earlsboro
- o Johnson

Towns

- o Macomb
- o McLoud
- o Pink
- o St. Louis
- o Tribbey
- o Wanette

CDP

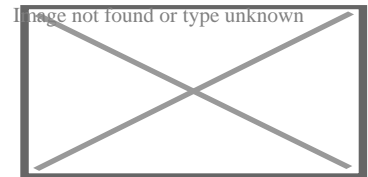
- o Dale
- o Aydelotte
- o Bellemont
- o Centerview

Other communities

- o Garden Grove
- o Harjo
- o Pearson
- o Romulus
- o Sacred Heart
- o Trousdale

Ghost towns

- o Avoca
- o Keokuk Falls



Pottawatomie County
map

☒This populated place also has

Footnotes portions in an adjacent county or counties

- Oklahoma portal
- United States portal

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Capitals of the United States by jurisdiction

Nation:

- **US** Washington, D.C.

States:

- **AL** Montgomery
- **AK** Juneau
- **AZ** Phoenix
- **AR** Little Rock
- **CA** Sacramento
- **CO** Denver
- **CT** Hartford
- **DE** Dover
- **FL** Tallahassee
- **GA** Atlanta
- **HI** Honolulu
- **ID** Boise
- **IL** Springfield
- **IN** Indianapolis
- **IA** Des Moines
- **KS** Topeka
- **KY** Frankfort
- **LA** Baton Rouge
- **ME** Augusta
- **MD** Annapolis
- **MA** Boston
- **MI** Lansing
- **MN** Saint Paul
- **MS** Jackson
- **MO** Jefferson City
- **MT** Helena
- **NE** Lincoln
- **NV** Carson City
- **NH** Concord
- **NJ** Trenton

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County seats in Oklahoma

- Ada
- Altus
- Alva
- Anadarko
- Antlers
- Arapaho
- Ardmore
- Arnett
- Atoka
- Bartlesville
- Beaver
- Boise City
- Buffalo
- Chandler
- Cherokee
- Cheyenne
- Chickasha
- Claremore
- Coalgate
- Duncan
- Durant
- El Reno
- Enid
- Eufaula
- Fairview
- Frederick
- Guthrie
- Guymon
- Hobart
- Holdenville
- Hollis
- Hugo
- Idabel
- Jay
- Kingfisher

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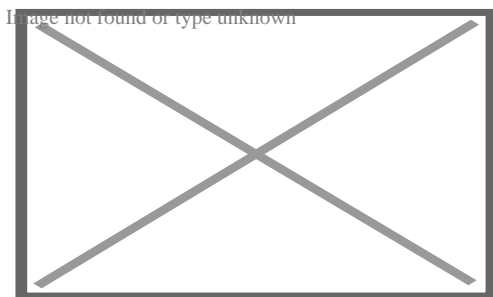
The 100 most populous cities of the United States

1. New York, New York
2. Los Angeles, California
3. Chicago, Illinois
4. Houston, Texas
5. Phoenix, Arizona
6. Philadelphia, Pennsylvania
7. San Antonio, Texas
8. Dallas, Texas
9. San Diego, California
10. Austin, Texas
11. Jacksonville, Florida
12. San Jose, California
13. Fort Worth, Texas
14. Columbus, Ohio
15. Charlotte, North Carolina
16. Indianapolis, Indiana
17. San Francisco, California
18. Seattle, Washington
19. Denver, Colorado
20. San Jose, California
21. San Diego, California
22. San Antonio, Texas
23. Dallas, Texas
24. Houston, Texas
25. Phoenix, Arizona
26. Portland, Oregon
27. Louisville, Kentucky
28. Memphis, Tennessee
29. Detroit, Michigan
30. Baltimore, Maryland
31. Milwaukee, Wisconsin
32. Albuquerque, New Mexico
33. Tucson, Arizona
34. Fresno, California
35. Sacramento, California
36. Mesa, Arizona
37. Kansas City, Missouri
38. Atlanta, Georgia
39. Colorado Springs, Colorado
40. Omaha, Nebraska
41. Raleigh, North Carolina
42. Virginia Beach, Virginia
43. San Jose, California
44. San Diego, California
45. San Antonio, Texas
46. Dallas, Texas
47. Houston, Texas
48. Phoenix, Arizona
49. Philadelphia, Pennsylvania
50. San Antonio, Texas
51. Arlington, Texas
52. Aurora, Colorado
53. New Orleans, Louisiana
54. Cleveland, Ohio
55. Anaheim, California
56. Honolulu, Hawaii
57. Henderson, Nevada
58. Stockton, California
59. Riverside, California
60. Lexington, Kentucky
61. Corpus Christi, Texas
62. Orlando, Florida
63. Irvine, California
64. Cincinnati, Ohio
65. Santa Ana, California
66. Newark, New Jersey
67. Saint Paul, Minnesota
68. San Jose, California
69. San Diego, California
70. San Antonio, Texas
71. Dallas, Texas
72. Houston, Texas
73. Phoenix, Arizona
74. Philadelphia, Pennsylvania
75. San Antonio, Texas
76. Chandler, Arizona
77. North Las Vegas, Nevada
78. Chula Vista, California
79. Buffalo, New York
80. Gilbert, Arizona
81. Reno, Nevada
82. Madison, Wisconsin
83. Fort Wayne, Indiana
84. Toledo, Ohio
85. Lubbock, Texas
86. St. Petersburg, Florida
87. Laredo, Texas
88. Irving, Texas
89. Chesapeake, Virginia
90. Glendale, Arizona
91. Winston-Salem, North Carolina
92. Scottsdale, Arizona

Cities ranked by United States Census Bureau population estimates for July 1, 2022.

Authority control databases	
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International	<ul style="list-style-type: none">o VIAFo FASTo WorldCato Germanyo United Stateso France
National	<ul style="list-style-type: none">o BnF datao Czech Republico Croatiao Israel
Geographic	<ul style="list-style-type: none">o MusicBrainz area
Other	<ul style="list-style-type: none">o IdRefo NARA

About Ventilation (architecture)



An ab anbar (water reservoir) with double domes and windcatchers (openings near the top of the towers) in the central desert city of Naeen,

Iran. Windcatchers are a form of natural ventilation.[¹]

Ventilation is the intentional introduction of outdoor air into a space. Ventilation is mainly used to control indoor air quality by diluting and displacing indoor pollutants; it can also be used to control indoor temperature, humidity, and air motion to benefit thermal comfort, satisfaction with other aspects of the indoor environment, or other objectives.

The intentional introduction of outdoor air is usually categorized as either mechanical ventilation, natural ventilation, or mixed-mode ventilation.[²]

- Mechanical ventilation is the intentional fan-driven flow of outdoor air into and/or out from a building. Mechanical ventilation systems may include supply fans (which push outdoor air into a building), exhaust[³] fans (which draw air out of a building and thereby cause equal ventilation flow into a building), or a combination of both (called balanced ventilation if it neither pressurizes nor depressurizes the inside air,[³] or only slightly depressurizes it). Mechanical ventilation is often provided by equipment that is also used to heat and cool a space.
- Natural ventilation is the intentional passive flow of outdoor air into a building through planned openings (such as louvers, doors, and windows). Natural ventilation does not require mechanical systems to move outdoor air. Instead, it relies entirely on passive physical phenomena, such as wind pressure, or the stack effect. Natural ventilation openings may be fixed, or adjustable. Adjustable openings may be controlled automatically (automated), owned by occupants (operable), or a combination of both. Cross ventilation is a phenomenon of natural ventilation.
- Mixed-mode ventilation systems use both mechanical and natural processes. The mechanical and natural components may be used at the same time, at different times of day, or in different seasons of the year.[⁴] Since natural ventilation flow depends on environmental conditions, it may not always provide an appropriate amount of ventilation. In this case, mechanical systems may be used to supplement or regulate the naturally driven flow.

Ventilation is typically described as separate from infiltration.

- Infiltration is the circumstantial flow of air from outdoors to indoors through leaks (unplanned openings) in a building envelope. When a building design relies on infiltration to maintain indoor air quality, this flow has been referred to as adventitious ventilation.^[5]

The design of buildings that promote occupant health and well-being requires a clear understanding of the ways that ventilation airflow interacts with, dilutes, displaces, or introduces pollutants within the occupied space. Although ventilation is an integral component of maintaining good indoor air quality, it may not be satisfactory alone.^[6] A clear understanding of both indoor and outdoor air quality parameters is needed to improve the performance of ventilation in terms of occupant health and energy.^[7] In scenarios where outdoor pollution would deteriorate indoor air quality, other treatment devices such as filtration may also be necessary.^[8] In kitchen ventilation systems, or for laboratory fume hoods, the design of effective effluent capture can be more important than the bulk amount of ventilation in a space. More generally, the way that an air distribution system causes ventilation to flow into and out of a space impacts the ability of a particular ventilation rate to remove internally generated pollutants. The ability of a system to reduce pollution in space is described as its "ventilation effectiveness". However, the overall impacts of ventilation on indoor air quality can depend on more complex factors such as the sources of pollution, and the ways that activities and airflow interact to affect occupant exposure.

An array of factors related to the design and operation of ventilation systems are regulated by various codes and standards. Standards dealing with the design and operation of ventilation systems to achieve acceptable indoor air quality include the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standards 62.1 and 62.2, the International Residential Code, the International Mechanical Code, and the United Kingdom Building Regulations Part F. Other standards that focus on energy conservation also impact the design and operation of ventilation systems, including ASHRAE Standard 90.1, and the

International Energy Conservation Code.

When indoor and outdoor conditions are favorable, increasing ventilation beyond the minimum required for indoor air quality can significantly improve both indoor air quality and thermal comfort through ventilative cooling, which also helps reduce the energy demand of buildings.^{[9][10]} During these times, higher ventilation rates, achieved through passive or mechanical means (air-side economizer, ventilative pre-cooling), can be particularly beneficial for enhancing people's physical health.^[11] Conversely, when conditions are less favorable, maintaining or improving indoor air quality through ventilation may require increased use of mechanical heating or cooling, leading to higher energy consumption.

Ventilation should be considered for its relationship to "venting" for appliances and combustion equipment such as water heaters, furnaces, boilers, and wood stoves. Most importantly, building ventilation design must be careful to avoid the backdraft of combustion products from "naturally vented" appliances into the occupied space. This issue is of greater importance for buildings with more air-tight envelopes. To avoid the hazard, many modern combustion appliances utilize "direct venting" which draws combustion air directly from outdoors, instead of from the indoor environment.

Design of air flow in rooms

[edit]

The air in a room can be supplied and removed in several ways, for example via ceiling ventilation, cross ventilation, floor ventilation or displacement ventilation.^{[citation n}

Ceiling ventilation

○

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Ceiling ventilation

Cross ventilation

○

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Cross ventilation

Floor ventilation

○

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Floor ventilation

Displacement ventilation

○

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Displacement

ventilation

Furthermore, the air can be circulated in the room using vortices which can be initiated in various ways:

Tangential flow vortices, initiated horizontally

○

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Tangential flow
vortices, initiated
horizontally

Tangential flow vortices, initiated vertically

○

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Tangential flow
vortices, initiated
vertically

Diffused flow vortices from air nozzles

○

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Diffused flow
vortices from air
nozzles

Diffused flow vortices due to roof vortices

○


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Diffused flow
vortices due to

roof vortices

Ventilation rates for indoor air quality

[edit]

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 2024) (Learn how and when to remove this message)*

The ventilation rate, for commercial, industrial, and institutional (CII) buildings, is normally expressed by the volumetric flow rate of outdoor air, introduced to the building. The typical units used are cubic feet per minute (CFM) in the imperial system, or liters per second (L/s) in the metric system (even though cubic meter per second is the preferred unit for volumetric flow rate in the SI system of units). The ventilation rate can also be expressed on a per person or per unit floor area basis, such as CFM/p or CFM/ft², or as air changes per hour (ACH).

Standards for residential buildings

[edit]

For residential buildings, which mostly rely on infiltration for meeting their ventilation needs, a common ventilation rate measure is the air change rate (or air changes per hour): the hourly ventilation rate divided by the volume of the space (/ or *ACH*; units of 1/h). During the winter, ACH may range from 0.50 to 0.41 in a tightly air-sealed house to 1.11 to 1.47 in a loosely air-sealed house.^[12]

ASHRAE now recommends ventilation rates dependent upon floor area, as a revision to the 62-2001 standard, in which the minimum ACH was 0.35, but no less than 15 CFM/person (7.1 L/s/person). As of 2003, the standard has been changed to 3 CFM/100 sq. ft. (15 L/s/100 sq. m.) plus 7.5 CFM/person (3.5 L/s/person).^[13]

Standards for commercial buildings

[edit]

Ventilation rate procedure

[edit]

Ventilation Rate Procedure is rate based on standard and prescribes the rate at which ventilation air must be delivered to space and various means to the condition that air.^[14] Air quality is assessed (through CO₂ measurement) and ventilation rates are mathematically derived using constants. Indoor Air Quality Procedure uses one or more guidelines for the specification of acceptable concentrations of certain contaminants in indoor air but does not prescribe ventilation rates or air treatment methods.^[14] This addresses both quantitative and subjective evaluations and is based on the Ventilation Rate Procedure. It also accounts for potential contaminants that may have no measured limits, or for which no limits are not set (such as formaldehyde off-gassing from carpet and furniture).

Natural ventilation

[edit]

Main article: Natural ventilation

Natural ventilation harnesses naturally available forces to supply and remove air in an enclosed space. Poor ventilation in rooms is identified to significantly increase the localized moldy smell in specific places of the room including room corners.^[11] There are three types of natural ventilation occurring in buildings: wind-driven ventilation, pressure-driven flows, and stack ventilation.^[15] The pressures generated by 'the stack effect' rely upon the buoyancy of heated or rising air. Wind-driven ventilation relies upon the force of the prevailing wind to pull and push air through the enclosed space as well as through breaches in the building's

envelope.

Almost all historic buildings were ventilated naturally.^[16] The technique was generally abandoned in larger US buildings during the late 20th century as the use of air conditioning became more widespread. However, with the advent of advanced Building Performance Simulation (BPS) software, improved Building Automation Systems (BAS), Leadership in Energy and Environmental Design (LEED) design requirements, and improved window manufacturing techniques; natural ventilation has made a resurgence in commercial buildings both globally and throughout the US.^[17]

The benefits of natural ventilation include:

- Improved indoor air quality (IAQ)
- Energy savings
- Reduction of greenhouse gas emissions
- Occupant control
- Reduction in occupant illness associated with sick building syndrome
- Increased worker productivity

Techniques and architectural features used to ventilate buildings and structures naturally include, but are not limited to:

- Operable windows
- Clerestory windows and vented skylights
- Lev/convection doors
- Night purge ventilation
- Building orientation
- Wind capture façades

Airborne diseases

[edit]

Natural ventilation is a key factor in reducing the spread of airborne illnesses such as tuberculosis, the common cold, influenza, meningitis or COVID-19.^[18] Opening doors and windows are good ways to maximize natural ventilation, which would make the risk of airborne contagion much lower than with costly and maintenance-requiring mechanical systems. Old-fashioned clinical areas with high ceilings and large windows provide the greatest protection. Natural ventilation costs little and is maintenance-free, and is particularly suited to limited-resource settings and tropical climates, where the burden of TB and institutional TB transmission is highest. In settings where respiratory isolation is difficult and climate permits, windows and doors should be opened to reduce the risk of airborne contagion. Natural ventilation requires little maintenance and is inexpensive.^[19]

Natural ventilation is not practical in much of the infrastructure because of climate. This means that the facilities need to have effective mechanical ventilation systems and or use Ceiling Level UV or FAR UV ventilation systems.

Ventilation is measured in terms of air changes per hour (ACH). As of 2023, the CDC recommends that all spaces have a minimum of 5 ACH.^[20] For hospital rooms with airborne contagions the CDC recommends a minimum of 12 ACH.^[21] Challenges in facility ventilation are public unawareness,^[22]^[23] ineffective government oversight, poor building codes that are based on comfort levels, poor system operations, poor maintenance, and lack of transparency.^[24]

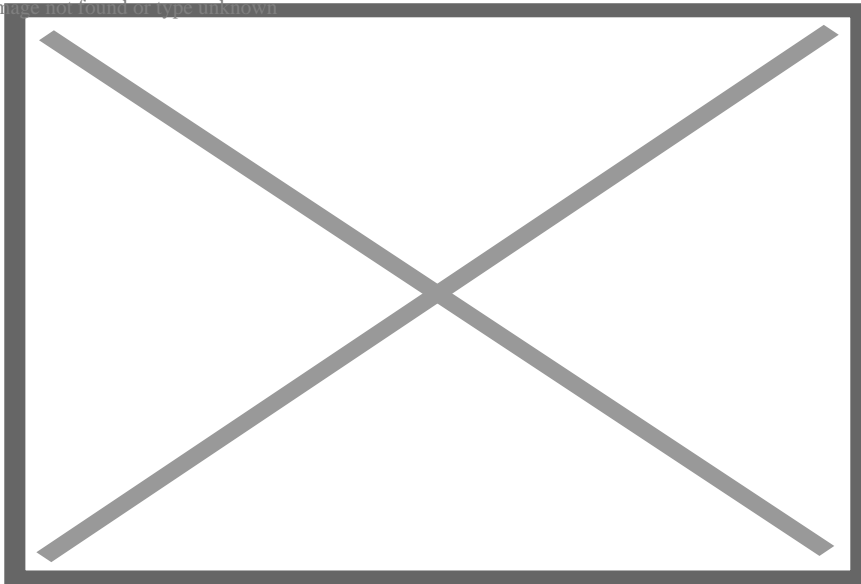
Pressure, both political and economic, to improve energy conservation has led to decreased ventilation rates. Heating, ventilation, and air conditioning rates have dropped since the energy crisis in the 1970s and the banning of cigarette smoke in the 1980s and 1990s.^[25]^[26]^[*better source needed*]

Mechanical ventilation

[edit]

Main article: HVAC

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An axial belt-drive exhaust fan serving an underground car park. This exhaust fan's operation is interlocked with the concentration of contaminants emitted by internal combustion engines.

Mechanical ventilation of buildings and structures can be achieved by the use of the following techniques:

- Whole-house ventilation
- Mixing ventilation
- Displacement ventilation
- Dedicated subaerial air supply

Demand-controlled ventilation (DCV)

[edit]

Demand-controlled ventilation (**DCV**, also known as Demand Control Ventilation) makes it possible to maintain air quality while conserving energy.^[27]^[28] ASHRAE has determined that "It is consistent with the ventilation rate procedure that demand control be permitted for use to reduce the total outdoor air supply during periods of less occupancy."^[29] In a DCV system, CO₂ sensors control the amount of ventilation.^[30]^[31] During peak occupancy, CO₂ levels rise, and the system adjusts to deliver the same amount of outdoor air as would be used by the

ventilation–rate procedure.[³²] However, when spaces are less occupied, CO₂ levels reduce, and the system reduces ventilation to conserve energy. DCV is a well-established practice,[³³] and is required in high occupancy spaces by building energy standards such as ASHRAE 90.1.[³⁴]

Personalized ventilation

[edit]



This section needs to be **updated**. Please help update this article to reflect recent events or newly available information. (*September 2024*)

Personalized ventilation is an air distribution strategy that allows individuals to control the amount of ventilation received. The approach delivers fresh air more directly to the breathing zone and aims to improve the air quality of inhaled air. Personalized ventilation provides much higher ventilation effectiveness than conventional mixing ventilation systems by displacing pollution from the breathing zone with far less air volume. Beyond improved air quality benefits, the strategy can also improve occupants' thermal comfort, perceived air quality, and overall satisfaction with the indoor environment. Individuals' preferences for temperature and air movement are not equal, and so traditional approaches to homogeneous environmental control have failed to achieve high occupant satisfaction. Techniques such as personalized ventilation facilitate control of a more diverse thermal environment that can improve thermal satisfaction for most occupants.

Local exhaust ventilation

[edit]

See also: Power tool

Local exhaust ventilation addresses the issue of avoiding the contamination of indoor air by specific high-emission sources by capturing airborne contaminants before they are spread into the environment. This can include water vapor control,

lavatory effluent control, solvent vapors from industrial processes, and dust from wood- and metal-working machinery. Air can be exhausted through pressurized hoods or the use of fans and pressurizing a specific area.^[35]

A local exhaust system is composed of five basic parts:

1. A hood that captures the contaminant at its source
2. Ducts for transporting the air
3. An air-cleaning device that removes/minimizes the contaminant
4. A fan that moves the air through the system
5. An exhaust stack through which the contaminated air is discharged^[35]

In the UK, the use of LEV systems has regulations set out by the Health and Safety Executive (HSE) which are referred to as the Control of Substances Hazardous to Health (CoSHH). Under CoSHH, legislation is set to protect users of LEV systems by ensuring that all equipment is tested at least every fourteen months to ensure the LEV systems are performing adequately. All parts of the system must be visually inspected and thoroughly tested and where any parts are found to be defective, the inspector must issue a red label to identify the defective part and the issue.

The owner of the LEV system must then have the defective parts repaired or replaced before the system can be used.

Smart ventilation

[edit]

Smart ventilation is a process of continually adjusting the ventilation system in time, and optionally by location, to provide the desired IAQ benefits while minimizing energy consumption, utility bills, and other non-IAQ costs (such as thermal discomfort or noise). A smart ventilation system adjusts ventilation rates in time or by location in a building to be responsive to one or more of the following: occupancy, outdoor thermal and air quality conditions, electricity grid needs, direct sensing of contaminants, operation of other air moving and air cleaning

systems. In addition, smart ventilation systems can provide information to building owners, occupants, and managers on operational energy consumption and indoor air quality as well as a signal when systems need maintenance or repair. Being responsive to occupancy means that a smart ventilation system can adjust ventilation depending on demand such as reducing ventilation if the building is unoccupied. Smart ventilation can time-shift ventilation to periods when a) indoor-outdoor temperature differences are smaller (and away from peak outdoor temperatures and humidity), b) when indoor-outdoor temperatures are appropriate for ventilative cooling, or c) when outdoor air quality is acceptable. Being responsive to electricity grid needs means providing flexibility to electricity demand (including direct signals from utilities) and integration with electric grid control strategies. Smart ventilation systems can have sensors to detect airflow, systems pressures, or fan energy use in such a way that systems failures can be detected and repaired, as well as when system components need maintenance, such as filter replacement.^[36]

Ventilation and combustion

[edit]

Combustion (in a fireplace, gas heater, candle, oil lamp, etc.) consumes oxygen while producing carbon dioxide and other unhealthy gases and smoke, requiring ventilation air. An open chimney promotes infiltration (i.e. natural ventilation) because of the negative pressure change induced by the buoyant, warmer air leaving through the chimney. The warm air is typically replaced by heavier, cold air.

Ventilation in a structure is also needed for removing water vapor produced by respiration, burning, and cooking, and for removing odors. If water vapor is permitted to accumulate, it may damage the structure, insulation, or finishes. ^[citation needed] When operating, an air conditioner usually removes excess moisture from the air. A dehumidifier may also be appropriate for removing airborne moisture.

Calculation for acceptable ventilation rate

[edit]

Ventilation guidelines are based on the minimum ventilation rate required to maintain acceptable levels of effluents. Carbon dioxide is used as a reference point, as it is the gas of highest emission at a relatively constant value of 0.005 L/s. The mass balance equation is:

$$Q = G / (C_i - C_a)$$

- Q = ventilation rate (L/s)
- G = CO₂ generation rate
- C_i = acceptable indoor CO₂ concentration
- C_a = ambient CO₂ concentration^[37]

Smoking and ventilation

[edit]

ASHRAE standard 62 states that air removed from an area with environmental tobacco smoke shall not be recirculated into ETS-free air. A space with ETS requires more ventilation to achieve similar perceived air quality to that of a non-smoking environment.

The amount of ventilation in an ETS area is equal to the amount of an ETS-free area plus the amount V , where:

$$V = DSD \times VA \times A / 60E$$

- V = recommended extra flow rate in CFM (L/s)
- DSD = design smoking density (estimated number of cigarettes smoked per hour per unit area)
- VA = volume of ventilation air per cigarette for the room being designed (ft³ /cig)
- E = contaminant removal effectiveness^[38]

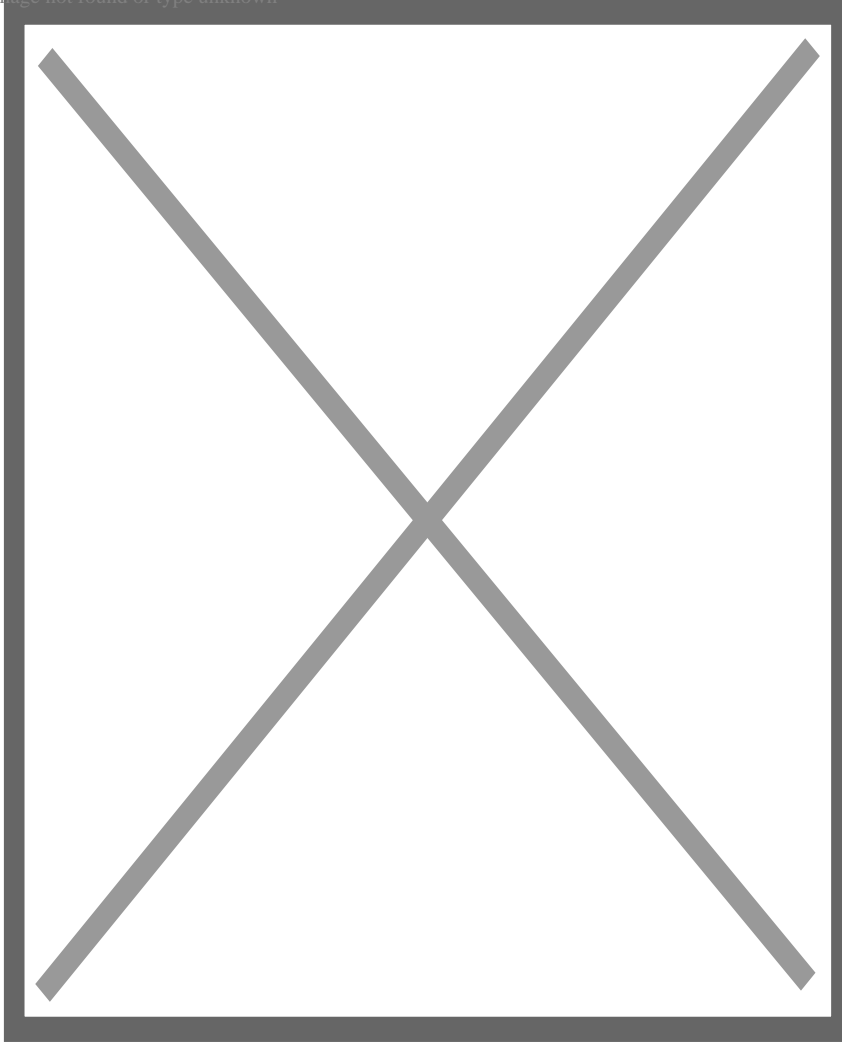
History

[edit]

This section needs expansion. You can help by adding to it. (*August 2020*)

[icon]

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This ancient Roman house uses a variety of passive cooling and passive ventilation techniques. Heavy masonry walls, small exterior windows, and a narrow walled garden oriented N-S shade the house, preventing heat gain. The house opens onto a central atrium with an impluvium (open to the sky); the evaporative cooling of the water causes a cross-draft from atrium to garden.

Primitive ventilation systems were found at the Ploče archaeological site (belonging to the Vinča culture) in Serbia and were built into early copper smelting furnaces. The furnace, built on the outside of the workshop, featured earthen pipe-like air vents with hundreds of tiny holes in them and a prototype chimney to ensure air goes into the furnace to feed the fire and smoke comes out safely.^[39]

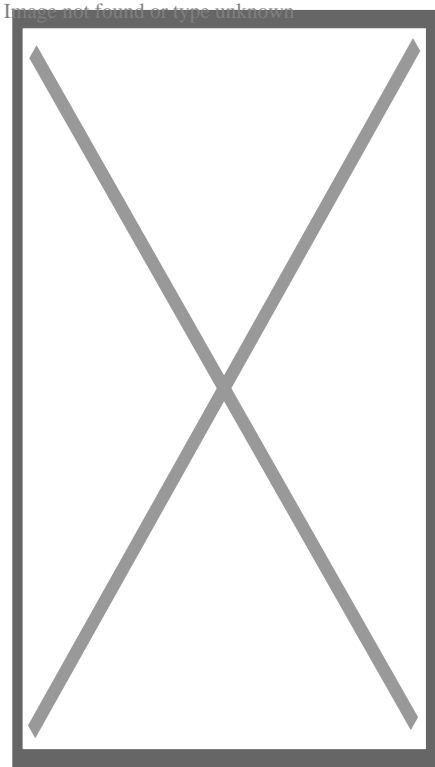
Passive ventilation and passive cooling systems were widely written about around the Mediterranean by Classical times. Both sources of heat and sources of cooling (such as fountains and subterranean heat reservoirs) were used to drive air circulation, and buildings were designed to encourage or exclude drafts, according to climate and function. Public bathhouses were often particularly sophisticated in their heating and cooling. Icehouses are some millennia old, and were part of a well-developed ice industry by classical times.

The development of forced ventilation was spurred by the common belief in the late 18th and early 19th century in the miasma theory of disease, where stagnant 'airs' were thought to spread illness. An early method of ventilation was the use of a ventilating fire near an air vent which would forcibly cause the air in the building to circulate. English engineer John Theophilus Desaguliers provided an early example of this when he installed ventilating fires in the air tubes on the roof of the House of Commons. Starting with the Covent Garden Theatre, gas burning chandeliers on the ceiling were often specially designed to perform a ventilating role.

Mechanical systems

[edit]

Further information: Heating, ventilation, and air conditioning § Mechanical or forced ventilation



The Central Tower of the Palace of Westminster. This octagonal spire was for ventilation purposes, in the more complex system imposed by Reid on Barry, in which it was to draw air out of the Palace. The design was for the aesthetic disguise of its function.^[40]^[41]

A more sophisticated system involving the use of mechanical equipment to circulate the air was developed in the mid-19th century. A basic system of bellows was put in place to ventilate Newgate Prison and outlying buildings, by the engineer Stephen Hales in the mid-1700s. The problem with these early devices was that they required constant human labor to operate. David Boswell Reid was called to testify before a Parliamentary committee on proposed architectural designs for the new House of Commons, after the old one burned down in a fire in 1834.^[40] In January 1840 Reid was appointed by the committee for the House of Lords dealing with the construction of the replacement for the Houses of Parliament. The post was in the capacity of ventilation engineer, in effect; and with its creation there began a long series of quarrels between Reid and Charles Barry, the architect.^[42]

Reid advocated the installation of a very advanced ventilation system in the new House. His design had air being drawn into an underground chamber, where it would undergo either heating or cooling. It would then ascend into the chamber through thousands of small holes drilled into the floor, and would be extracted through the ceiling by a special ventilation fire within a great stack.^[43]

Reid's reputation was made by his work in Westminster. He was commissioned for an air quality survey in 1837 by the Leeds and Selby Railway in their tunnel.^[44] The steam vessels built for the Niger expedition of 1841 were fitted with ventilation systems based on Reid's Westminster model.^[45] Air was dried, filtered and passed over charcoal.^[46]^[47] Reid's ventilation method was also applied more fully to St. George's Hall, Liverpool, where the architect, Harvey Lonsdale Elmes, requested that Reid should be involved in ventilation design.^[48] Reid considered this the only building in which his system was completely carried out.^[49]

Fans

[edit]

With the advent of practical steam power, ceiling fans could finally be used for ventilation. Reid installed four steam-powered fans in the ceiling of St George's Hospital in Liverpool, so that the pressure produced by the fans would force the incoming air upward and through vents in the ceiling. Reid's pioneering work provides the basis for ventilation systems to this day.^[43] He was remembered as "Dr. Reid the ventilator" in the twenty-first century in discussions of energy efficiency, by Lord Wade of Chorlton.^[50]

History and development of ventilation rate standards

[edit]

Ventilating a space with fresh air aims to avoid "bad air". The study of what constitutes bad air dates back to the 1600s when the scientist Mayow studied

asphyxia of animals in confined bottles.^[51] The poisonous component of air was later identified as carbon dioxide (CO₂), by Lavoisier in the very late 1700s, starting a debate as to the nature of "bad air" which humans perceive to be stuffy or unpleasant. Early hypotheses included excess concentrations of CO₂ and oxygen depletion. However, by the late 1800s, scientists thought biological contamination, not oxygen or CO₂, was the primary component of unacceptable indoor air. However, it was noted as early as 1872 that CO₂ concentration closely correlates to perceived air quality.

The first estimate of minimum ventilation rates was developed by Tredgold in 1836.^[52] This was followed by subsequent studies on the topic by Billings ^[53] in 1886 and Flugge in 1905. The recommendations of Billings and Flugge were incorporated into numerous building codes from 1900–the 1920s and published as an industry standard by ASHVE (the predecessor to ASHRAE) in 1914.^[51]

The study continued into the varied effects of thermal comfort, oxygen, carbon dioxide, and biological contaminants. The research was conducted with human subjects in controlled test chambers. Two studies, published between 1909 and 1911, showed that carbon dioxide was not the offending component. Subjects remained satisfied in chambers with high levels of CO₂, so long as the chamber remained cool.^[51] (Subsequently, it has been determined that CO₂ is, in fact, harmful at concentrations over 50,000ppm^[54])

ASHVE began a robust research effort in 1919. By 1935, ASHVE-funded research conducted by Lemberg, Brandt, and Morse – again using human subjects in test chambers – suggested the primary component of "bad air" was an odor, perceived by the human olfactory nerves.^[55] Human response to odor was found to be logarithmic to contaminant concentrations, and related to temperature. At lower, more comfortable temperatures, lower ventilation rates were satisfactory. A 1936 human test chamber study by Yaglou, Riley, and Coggins culminated much of this effort, considering odor, room volume, occupant age, cooling equipment effects, and recirculated air implications, which guided ventilation rates.^[56] The Yaglou research has been validated, and adopted into industry standards, beginning with

the ASA code in 1946. From this research base, ASHRAE (having replaced ASHVE) developed space-by-space recommendations, and published them as ASHRAE Standard 62-1975: Ventilation for acceptable indoor air quality.

As more architecture incorporated mechanical ventilation, the cost of outdoor air ventilation came under some scrutiny. In 1973, in response to the 1973 oil crisis and conservation concerns, ASHRAE Standards 62-73 and 62-81) reduced required ventilation from 10 CFM (4.76 L/s) per person to 5 CFM (2.37 L/s) per person. In cold, warm, humid, or dusty climates, it is preferable to minimize ventilation with outdoor air to conserve energy, cost, or filtration. This critique (e.g. Tiller^[57]) led ASHRAE to reduce outdoor ventilation rates in 1981, particularly in non-smoking areas. However subsequent research by Fanger,^[58] W. Cain, and Janssen validated the Yaglou model. The reduced ventilation rates were found to be a contributing factor to sick building syndrome.^[59]

The 1989 ASHRAE standard (Standard 62-89) states that appropriate ventilation guidelines are 20 CFM (9.2 L/s) per person in an office building, and 15 CFM (7.1 L/s) per person for schools, while 2004 Standard 62.1-2004 has lower recommendations again (see tables below). ANSI/ASHRAE (Standard 62-89) speculated that "comfort (odor) criteria are likely to be satisfied if the ventilation rate is set so that 1,000 ppm CO₂ is not exceeded"^[60] while OSHA has set a limit of 5000 ppm over 8 hours.^[61]

Historical ventilation rates

Author or source	Year	Ventilation rate (IP)	Ventilation rate (SI)	Basis or rationale
Tredgold	1836	4 CFM per person	2 L/s per person	Basic metabolic needs, breathing rate, and candle burning
Billings	1895	30 CFM per person	15 L/s per person	Indoor air hygiene, preventing spread of disease

Flugge	1905	30 CFM per person	15 L/s per person	Excessive temperature or unpleasant odor
ASHVE	1914	30 CFM per person	15 L/s per person	Based on Billings, Flugge and contemporaries
Early US Codes	1925	30 CFM per person	15 L/s per person	Same as above
Yaglou	1936	15 CFM per person	7.5 L/s per person	Odor control, outdoor air as a fraction of total air
ASA	1946	15 CFM per person	7.5 L/s per person	Based on Yahlou and contemporaries
ASHRAE	1975	15 CFM per person	7.5 L/s per person	Same as above
ASHRAE	1981	10 CFM per person	5 L/s per person	For non-smoking areas, reduced.
ASHRAE	1989	15 CFM per person	7.5 L/s per person	Based on Fanger, W. Cain, and Janssen

ASHRAE continues to publish space-by-space ventilation rate recommendations, which are decided by a consensus committee of industry experts. The modern descendants of ASHRAE standard 62-1975 are ASHRAE Standard 62.1, for non-residential spaces, and ASHRAE 62.2 for residences.

In 2004, the calculation method was revised to include both an occupant-based contamination component and an area-based contamination component.^[62] These two components are additive, to arrive at an overall ventilation rate. The change was made to recognize that densely populated areas were sometimes overventilated (leading to higher energy and cost) using a per-person methodology.

Occupant Based Ventilation Rates,^[62] ANSI/ASHRAE Standard 62.1-2004

IP Units	SI Units	Category	Examples
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0	0	Spaces where ventilation requirements are primarily associated with building elements, not occupants.	Storage Rooms, Warehouses
5	2.5	Spaces occupied by adults, engaged in low levels of activity	Office space
7.5	3.5	Spaces where occupants are engaged in higher levels of activity, but not strenuous, or activities generating more contaminants	Retail spaces, lobbies
10	5	Spaces where occupants are engaged in more strenuous activity, but not exercise, or activities generating more contaminants	Classrooms, school settings
20	10	Spaces where occupants are engaged in exercise, or activities generating many contaminants	dance floors, exercise rooms

Area-based ventilation rates,^[62] ANSI/ASHRAE Standard 62.1-2004

IP Units	SI Units	Category	Examples
0.06 cfm/ft ²	0.30 L/s/m ²	Spaces where space contamination is normal, or similar to an office environment	Conference rooms, lobbies
0.12 cfm/ft ²	0.60 L/s/m ²	Spaces where space contamination is significantly higher than an office environment	Classrooms, museums
0.18 cfm/ft ²	0.90 L/s/m ²	Spaces where space contamination is even higher than the previous category	Laboratories, art classrooms
0.30 cfm/ft ²	1.5 L/s/m ²	Specific spaces in sports or entertainment where contaminants are released	Sports, entertainment
0.48 cfm/ft ²	2.4 L/s/m ²	Reserved for indoor swimming areas, where chemical concentrations are high	Indoor swimming areas

The addition of occupant- and area-based ventilation rates found in the tables above often results in significantly reduced rates compared to the former standard. This is compensated in other sections of the standard which require that this minimum amount of air is delivered to the breathing zone of the individual occupant at all times. The total outdoor air intake of the ventilation system (in multiple-zone variable air volume (VAV) systems) might therefore be similar to the airflow required by the 1989 standard.

From 1999 to 2010, there was considerable development of the application protocol for ventilation rates. These advancements address occupant- and process-based ventilation rates, room ventilation effectiveness, and system ventilation effectiveness^[63]

Problems

[edit]

- In hot, humid climates, unconditioned ventilation air can daily deliver approximately 260 milliliters of water for each cubic meters per hour (m^3/h) of outdoor air (or one pound of water each day for each cubic feet per minute of outdoor air per day), annual average. ^[citation needed] This is a great deal of moisture and can create serious indoor moisture and mold problems. For example, given a $150 m^2$ building with an airflow of $180 m^3/h$ this could result in about 47 liters of water accumulated per day.
- Ventilation efficiency is determined by design and layout, and is dependent upon the placement and proximity of diffusers and return air outlets. If they are located closely together, supply air may mix with stale air, decreasing the efficiency of the HVAC system, and creating air quality problems.
- System imbalances occur when components of the HVAC system are improperly adjusted or installed and can create pressure differences (too much-circulating air creating a draft or too little circulating air creating stagnancy).
- Cross-contamination occurs when pressure differences arise, forcing potentially contaminated air from one zone to an uncontaminated zone. This

often involves undesired odors or VOCs.

- Re-entry of exhaust air occurs when exhaust outlets and fresh air intakes are either too close, prevailing winds change exhaust patterns or infiltration between intake and exhaust air flows.
- Entrainment of contaminated outdoor air through intake flows will result in indoor air contamination. There are a variety of contaminated air sources, ranging from industrial effluent to VOCs put off by nearby construction work.^[64] A recent study revealed that in urban European buildings equipped with ventilation systems lacking outdoor air filtration, the exposure to outdoor-originating pollutants indoors resulted in more Disability-Adjusted Life Years (DALYs) than exposure to indoor-emitted pollutants.^[65]

See also

[edit]

- Architectural engineering
- Biological safety
- Cleanroom
- Environmental tobacco smoke
- Fume hood
- Head-end power
- Heating, ventilation, and air conditioning
- Heat recovery ventilation
- Mechanical engineering
- Room air distribution
- Sick building syndrome
- Siheyuan
- Solar chimney
- Tulou
- Windcatcher

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 - EBC Annex 9 Minimum Ventilation Rates
 - EBC Annex 18 Demand Controlled Ventilation Systems
 - EBC Annex 26 Energy Efficient Ventilation of Large Enclosures
 - EBC Annex 27 Evaluation and Demonstration of Domestic Ventilation Systems
 - EBC Annex 35 Control Strategies for Hybrid Ventilation in New and Retrofitted Office Buildings (HYBVENT)

- EBC Annex 62 Ventilative Cooling

International Society of Indoor Air Quality and Climate

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- Indoor Air Journal
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- ASHRAE Standard 62.1 – Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 62.2 – Ventilation for Acceptable Indoor Air Quality in Residential Buildings
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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

- 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
- Radiant heating and cooling

Technology

- 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 unit

**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
- AHRI
- AMCA
- ASHRAE
- ASTM International
- BRE

**Industry
organizations**

- BSRIA
- CIBSE
- Institute of Refrigeration
- IIR
- LEED
- SMACNA
- UMC
- Indoor air quality (IAQ)

Health and safety

- 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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National

- Czech Republic

Other

- NARA

About Durham Supply Inc

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Things To Do in Tulsa County

Photo

Woodward Park and Gardens

4.7 (2580)

Photo

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OkieTundra

4.5 (84)

Photo

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The Blue Dome

4.5 (60)

Photo

The Tulsa Arts District

4.7 (22)

Photo

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Tulsa Zoo

4.5 (10481)

Photo

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Golden Driller Statue

4.6 (1935)

Driving Directions in Tulsa County

Driving Directions From Oakwood Homes to Durham Supply Inc

Driving Directions From Lincoln Christian School to Durham Supply Inc

Driving Directions From Tulsa VA Behavioral Medicine Clinic to Durham Supply Inc

Driving Directions From Reception Jehovah's Witnesses to Durham Supply Inc

https://www.google.com/maps/dir/Subway/Durham+Supply+Inc/@36.146335,-95.8525478,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sChIJM9DFTBnztocR4Q462chGcK95.8525478!2d36.146335!1m5!1m1!1sChIJDzPLSIrytocRY_EaORpHGro!2m2!1d-95.8384781!2d36.1563128!3e0

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Driving Directions From Bob Dylan Center to Durham Supply Inc

Driving Directions From Woodward Park and Gardens to Durham Supply Inc

Driving Directions From Golden Driller Statue to Durham Supply Inc

Driving Directions From Gathering Place to Durham Supply Inc

Driving Directions From Woodward Park and Gardens to Durham Supply Inc

Driving Directions From Blue Whale of Catoosa to Durham Supply Inc

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Reviews for Durham Supply Inc

Durham Supply Inc

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Ty Spears

(5)

Bought a door/storm door combo. Turns out it was the wrong size. They swapped it out, quick and easy no problems. Very helpful in explaining the size differences from standard door sizes.

Durham Supply Inc

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Gerald Clifford Brewster

(5)

We will see, the storm door I bought says on the tag it's 36x80, but it's 34x80. If they return it.....they had no problems returning it. And it was no fault of there's, you measure a mobile home door different than a standard door!

Durham Supply Inc

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B Mann

(5)

I was in need of some items for a double wide that I am remodeling and this place is the only place in town that had what I needed (I didn't even try the other rude place)while I was there I learned the other place that was in Tulsa that also sold mobile home supplies went out of business (no wonder the last time I was in there they were VERY RUDE and high priced) I like the way Dunham does business they answered all my questions and got me the supplies I needed, very friendly, I will be back to purchase the rest of my items when the time comes.

Durham Supply Inc

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Ethel Schiller

(5)

This place is really neat, if they don't have it they can order it from another of their stores and have it there overnight in most cases. Even hard to find items for a trailer! I definitely recommend this place to everyone! O and the prices is awesome too!

Durham Supply Inc

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Dennis Champion

(5)

Durham supply and Royal supply seems to find the most helpful and friendly people to work in their stores, we are based out of Kansas City out here for a few remodels and these guys treated us like we've gone there for years.

Scheduling Regular Cleanings for Mobile Home Ventilation [View GBP](#)

Frequently Asked Questions

How often should I schedule regular cleanings for my mobile home HVAC systems ventilation?

It is recommended to schedule a thorough cleaning of your mobile home HVAC systems ventilation at least once a year. However, if you have pets or experience allergies, more frequent cleanings every six months may be beneficial.

What signs indicate that my mobile home HVAC systems ventilation needs cleaning?

Common signs include reduced airflow, unusual odors when the system is running, visible dust and debris around vents, and increased allergy symptoms among occupants.

Can I clean the mobile home HVAC system's ventilation myself, or should I hire a professional?

While some basic maintenance tasks like changing air filters can be done yourself, it is advisable to hire a professional for thorough cleaning of the ductwork and internal components to ensure safety and effectiveness.

What are the benefits of regularly cleaning my mobile homes HVAC system ventilation?

Regular cleaning can improve indoor air quality, enhance energy efficiency by ensuring optimal airflow, extend the lifespan of your HVAC system, and reduce potential allergens

in your living space.

Royal Supply Inc

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Google Business Profile

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

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