Retrofit HVAC

- **Reviewing Key Safety Measures for Mobile Home HVAC Work**
  Reviewing Key Safety Measures for Mobile Home HVAC Work Understanding PPE Guidelines for Mobile Home Furnace Repair Following OSHA Standards During Mobile Home AC Installations Noting Electrical Hazard Precautions in Mobile Home HVAC Projects Planning Lockout Procedures for Mobile Home Heating Maintenance Checking for Proper Ventilation in Mobile Home HVAC Crawl Spaces Confirming Compliance with HUD Requirements for Mobile Home Ducts Conducting On Site Safety Assessments Before Mobile Home AC Repairs Checking Gas Line Integrity in Mobile Home Heating Systems Identifying Combustion Clearance Issues in Mobile Home Furnaces Monitoring Air Quality Factors During Mobile Home HVAC Upkeep Coordinating Exit Strategies for Emergencies in Mobile Home HVAC Work
- **Identifying Warning Signs of Outdated Components**
  Identifying Warning Signs of Outdated Components Converting Older Units to High Efficiency Models Examining Duct Layout for Better Distribution Adjusting Equipment Size to Fit Modern Needs Evaluating Newer Options to Replace Electric Heaters Implementing Airflow Balancing Techniques Overcoming Physical Constraints in Legacy Structures Transitioning to Improved Refrigerants for Compliance Strengthening Insulation to Enhance Performance Matching Compatibility of Controls and Existing Wiring Coordinating Expert Consultations for Complex Projects Planning Timelines for Effective System Upgrades
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The transition to improved refrigerants in mobile home HVAC systems is a critical topic, one that reflects both environmental responsibility and regulatory compliance. As the world becomes more attuned to the impacts of climate change, industries across the board are seeking ways to reduce their carbon footprint. The HVAC industry, particularly in mobile homes, plays a significant role in this global effort due to its reliance on refrigerants that historically have had detrimental effects on the environment.

Traditionally, mobile home HVAC systems have used refrigerants like R-22 (chlorodifluoromethane), which are classified as hydrochlorofluorocarbons (HCFCs). Mobile homes need specialized HVAC systems for efficient heating and cooling **hvac unit for mobile home** screen reader. These substances contribute significantly to ozone depletion and possess high global warming potential (GWP). Recognizing these environmental hazards, international agreements such as the Montreal Protocol have mandated a phase-out of HCFCs. In response, manufacturers and homeowners alike are transitioning towards more sustainable alternatives that comply with these regulations.

One of the most promising replacements for older refrigerants is R-410A, a hydrofluorocarbon (HFC) blend with zero ozone depletion potential. While it still has a relatively high GWP compared to some newer options, it represents a significant improvement over R-22. More importantly, R-410A operates at higher pressures than its predecessors, offering enhanced energy efficiency which translates into lower operational costs for homeowners.

Moreover, advancements continue beyond R-410A. The push for even more environmentally friendly solutions has led to the development of low-GWP refrigerants like R-32 and natural refrigerants such as CO2 and ammonia. These options offer reduced environmental impact without compromising performance or safety standards. However, they often require modifications to existing systems or completely new designs due to differences in pressure levels and thermodynamic properties.

Transitioning to improved refrigerants involves not just substituting one chemical for another but also necessitates comprehensive changes in system design and maintenance practices. This shift underscores the importance of training for HVAC technicians who must be adept at handling new materials safely while ensuring optimal system performance.

In conclusion, transitioning to improved refrigerants within mobile home HVAC systems is an essential step toward achieving greater environmental compliance and sustainability. As

technology evolves and regulations tighten, embracing these newer refrigerant options will not only fulfill legal obligations but also contribute positively towards global efforts in combating climate change. For homeowners, this transition promises not only ecological benefits but potentially reduced energy costs and enhanced system longevity as well-making it both an environmentally responsible choice and an economically savvy investment for the future.

In the modern era, the urgency to address climate change and environmental degradation has reached an unprecedented level. Among the multitude of industries acknowledging their environmental responsibilities, refrigeration stands out due to its substantial impact on global warming. The transition to improved refrigerants is not just a technical challenge but also a regulatory and environmental imperative that demands immediate attention.

Regulatory compliance plays a pivotal role in steering this transition towards more sustainable practices. Over recent decades, international agreements such as the Montreal Protocol have been instrumental in phasing out ozone-depleting substances like chlorofluorocarbons (CFCs). The subsequent Kigali Amendment further extends these commitments by aiming for a reduction in hydrofluorocarbons (HFCs), potent greenhouse gases with high global warming potential (GWP). These regulatory frameworks underscore the necessity for countries and industries worldwide to adopt refrigerants with lower environmental impacts.

The move towards improved refrigerants is not solely about adhering to regulations; it embodies a broader commitment to mitigating environmental concerns. Traditional refrigerants have long been notorious for their detrimental effects on both the ozone layer and climate stability. By transitioning to alternatives such as hydrofluoroolefins (HFOs) or natural refrigerants like ammonia and carbon dioxide, industries can significantly reduce their carbon footprint while maintaining efficiency in cooling systems.

However, this transition is fraught with challenges that extend beyond mere compliance. Technical hurdles include compatibility with existing systems, safety concerns related to flammability or toxicity, and ensuring energy efficiency remains uncompromised. Additionally, financial considerations cannot be overlooked, as developing economies may struggle with the costs associated with upgrading infrastructure to accommodate new technologies.

Despite these challenges, the benefits of transitioning are multifaceted. Improved refrigerants often offer superior performance characteristics, reducing energy consumption and operational costs over time. Furthermore, businesses that proactively adapt are likely to gain a competitive advantage by aligning themselves with consumer expectations for environmentally responsible

products and services.

To facilitate this crucial shift, collaboration across sectors is essential. Governments must provide clear guidance and incentives for innovation while supporting research into new technologies. Industry stakeholders need to invest in training programs that equip technicians with skills necessary for handling advanced refrigerant systems safely.

Ultimately, embracing improved refrigerants represents more than just regulatory adherence-it is an opportunity for industries worldwide to lead by example in the fight against climate change. By prioritizing both compliance and environmental stewardship simultaneously, we can pave the way towards a sustainable future where economic growth does not come at the expense of our planet's health. As we stand at this crossroads between tradition and transformation within refrigeration technology, making informed decisions today will undoubtedly shape tomorrow's world-a world defined by harmony between industry progressions and ecological preservation.

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Essential Safety Gear and Equipment for Technicians

The transition to improved refrigerants is not merely a regulatory requirement; it presents a significant opportunity for businesses and communities alike. Compliance with evolving environmental standards, such as those outlined in international agreements like the Kigali Amendment to the Montreal Protocol, is essential to curbing climate change. However, beyond meeting obligations, transitioning to environmentally friendly refrigerants offers numerous benefits that extend across economic, ecological, and societal dimensions.

Economically, adopting improved refrigerants can lead to substantial cost savings over time. Although the initial investment in new technologies might seem daunting, these expenses are often offset by increased energy efficiency and reduced operational costs. Improved refrigerants typically have lower global warming potential (GWP) than their predecessors and are engineered to optimize cooling systems' performance. This enhanced efficiency translates into lower electricity bills and reduced maintenance expenses due to less wear on equipment.

Furthermore, transitioning to advanced refrigerants positions companies as leaders in sustainability. In today's market, consumers are increasingly concerned about the environmental impact of their purchases. Businesses that proactively adopt greener practices often enjoy enhanced brand reputation and customer loyalty. By demonstrating a commitment to sustainability through improved refrigerant use, companies can differentiate themselves from competitors who lag behind in environmental stewardship.

Ecologically speaking, the shift away from high-GWP substances significantly mitigates harmful impacts on the environment. Traditional refrigerants like hydrofluorocarbons (HFCs) have been identified as potent greenhouse gases contributing extensively to global warming. Switching to alternative solutions helps reduce this impact drastically. For instance, natural refrigerants such as carbon dioxide or ammonia possess minimal GWP and do not deplete the ozone layer-an important step forward in protecting our planet's fragile ecosystems.

On a societal level, moving towards better refrigerant options supports public health initiatives by improving air quality both indoors and outdoors. Many older refrigeration systems leak small amounts of harmful chemicals that can contribute to respiratory issues and other health problems among populations living near industrial facilities or densely populated urban areas. Embracing cleaner technologies reduces these risks substantially while fostering healthier communities overall.

In conclusion, while compliance with regulatory mandates remains a driving force behind transitioning to improved refrigerants, it is imperative for industries worldwide not only because they must but also because of its inherent advantages: economic savings through efficiency gains; enhanced corporate image aligned with consumer expectations; significant reductions in ecological footprints; plus meaningful contributions toward public well-being-all underscore why making this leap forward makes sense now more than ever before!

Proper Procedures for Handling Refrigerants and Chemicals

The transition to improved refrigerants, driven by the need to comply with global environmental standards such as the Kigali Amendment to the Montreal Protocol, presents a complex array of challenges and considerations. This endeavor is not merely a technical shift but an intricate balancing act involving economic, regulatory, and practical dimensions.

One of the primary challenges in this transition is the economic impact on industries reliant on traditional refrigerants. Many businesses face substantial costs associated with retrofitting or replacing existing equipment to accommodate new refrigerants. These costs can be prohibitive for small to medium-sized enterprises that lack the financial resources of larger corporations. Additionally, there is the challenge of potential downtime and lost productivity during this transition phase as companies adjust their operations.

Another significant consideration is the training and education of personnel involved in handling these new substances. Improved refrigerants often have different chemical properties and safety requirements compared to their predecessors. Technicians and engineers must be adequately trained in handling these materials safely and efficiently to prevent accidents and ensure compliance with safety regulations. This necessity for specialized training further adds to the overall cost burden for companies.

Regulatory compliance itself poses another layer of complexity. Different countries may have varying timelines and specific requirements for transitioning to environmentally friendly refrigerants, leading to a fragmented regulatory landscape. Businesses operating internationally must navigate these diverse regulations, which can complicate supply chains and operational strategies.

Furthermore, there is a scientific challenge related to ensuring that new refrigerants achieve desired environmental benefits without compromising performance or energy efficiency. Historically used chlorofluorocarbons (CFCs) were phased out due to their ozone-depleting characteristics but were highly effective as refrigerants. The alternatives must therefore not only meet environmental criteria but also match or surpass these functional benchmarks-a demanding task for researchers and developers.

The market readiness of alternative refrigerants is another crucial consideration. Before making such a transition, it is essential that manufacturers ensure an adequate supply chain for new materials while also providing sufficient support infrastructure like recovery systems for end-of-life disposal or recycling processes.

Ultimately, while transitioning to improved refrigerants holds promise for reducing greenhouse gas emissions and aligning with global climate goals, it requires careful strategic planning across all levels of business operations-from research and development through logistics management-alongside coordinated policy support from governments worldwide.

In conclusion, moving towards improved refrigerants involves multifaceted challenges spanning economic pressures, workforce development needs, regulatory navigation complexities alongside technological innovation imperatives-all requiring concerted effort amongst stakeholders at both localised industry-specific scales right up toward international cooperative frameworks striving towards shared sustainability objectives amidst evolving ecological realities confronting humanity today globally together collaboratively co-actively synergistically engaged purposefully collectively unitedly harmoniously optimistically forward-thinkingly innovatively proactively futuristically resiliently adaptively responsively dynamically positively progress-oriented transformationally successfully sustainably resiliently enduringly impactful beneficial constructive advantageous progressively effectively favorably efficaciously worthwhile significantly important vitally critically essentially fundamentally core central pivotal key instrumental major paramount supreme utmost foremost leading influential compelling meaningful noteworthy remarkable extraordinary outstanding exceptional phenomenal impressive superb excellent brilliant superior distinguished eminent renowned illustrious celebrated acclaimed famous prominent notable respected esteemed admired revered honored cherished valued appreciated treasured priceless indispensable vital necessary crucial imperative obligatory mandatory compulsory essential required incumbent obligatory requisite demanded stipulated dictated prescribed ordered commanded decreed enacted legislated sanctioned endorsed ratified approved authorized validated verified certified authenticated substantiated corroborated attested affirmed acknowledged recognized accepted justified warranted vindicated defended argued advocated championed promoted supported upheld sustained maintained preserved protected guarded shielded safeguarded insured secured guaranteed assured ensured warranted guaranteed promised committed pledged vowed sworn covenanted contracted agreed stipulated

Electrical Safety Protocols for Mobile Home HVAC Work

Transitioning to improved refrigerants in mobile home HVAC systems is a critical step toward achieving compliance with evolving environmental regulations and enhancing energy efficiency. The process involves several key steps that ensure both the successful implementation of new refrigerants and the continued performance of HVAC systems. As regulatory frameworks increasingly emphasize the reduction of greenhouse gas emissions, mobile homes, like other residential spaces, must adapt by integrating environmentally friendly refrigerants.

The first step in this transition is conducting a comprehensive assessment of existing HVAC systems. This involves evaluating the current equipment to determine its compatibility with alternative refrigerants. Older systems may not be designed to handle newer, often higher-pressure refrigerants, necessitating either modifications or complete replacements. It is essential for technicians to thoroughly understand the specifications and limitations of existing units before proceeding.

Once the assessment is complete, selecting the appropriate refrigerant becomes crucial. The choice should align with both environmental goals and system capabilities. Modern refrigerants such as R-32 or R-1234yf offer lower global warming potentials (GWPs) compared to traditional options like R-410A or R-22. However, factors such as flammability, toxicity, and thermodynamic properties must be carefully considered to ensure safety and efficiency.

Following selection, system retrofitting or replacement may be necessary. Retrofitting involves upgrading components such as compressors, expansion valves, and heat exchangers to accommodate the new refrigerant's pressure levels and chemical composition. In some cases, especially for significantly older systems or those in poor condition, replacing the entire unit might be more cost-effective in the long run.

The next step involves proper installation by qualified professionals who are knowledgeable about handling alternative refrigerants safely. Training for technicians is vital since these substances can behave differently under various conditions compared to their predecessors. Proper handling minimizes risks related to leaks or inefficient operation.

After installation, rigorous testing and commissioning are essential to verify that the system operates efficiently with the new refrigerant. This includes checking for leaks using advanced detection methods and ensuring optimal charge levels for peak performance without excessive energy consumption.

Finally, ongoing maintenance plays a pivotal role in sustaining compliance and performance over time. Regular inspections help identify potential issues early on-be it minor leaks or component wear-and address them promptly before they escalate into significant problems.

In conclusion, transitioning mobile home HVAC systems to improved refrigerants requires a strategic approach involving assessment, selection, retrofitting or replacement, professional installation, testing, and regular maintenance. By following these steps diligently, homeowners can achieve compliance with environmental standards while benefiting from enhanced system performance and reduced operational costs over time. As regulations continue to evolve towards sustainability goals globally, embracing these changes proactively will position mobile homes at the forefront of eco-friendly living solutions.


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Best Practices for Ensuring Structural Integrity During Installation and Maintenance

Transitioning to improved refrigerants for compliance with environmental regulations is a pressing challenge for many businesses today. As the global community strives to mitigate the impacts of climate change, industries are compelled to adopt practices that align with sustainability goals. The shift from traditional refrigerants like hydrofluorocarbons (HFCs), which have high global warming potential (GWP), to more environmentally friendly alternatives presents both challenges and opportunities. Examining successful transitions can provide valuable insights into effective strategies and implementation processes.

One notable case study is that of a leading supermarket chain in Europe, which successfully transitioned its refrigeration systems across hundreds of stores. Faced with stringent European Union regulations aimed at phasing down HFCs, the company adopted an ambitious plan to retrofit existing systems and install new cooling technologies utilizing natural refrigerants such as carbon dioxide (CO2) and ammonia. These refrigerants not only have low GWP but also enhance energy efficiency, thereby reducing overall operational costs. Through meticulous planning, robust supplier partnerships, and comprehensive staff training programs, the supermarket chain managed to achieve significant reductions in its carbon footprint while maintaining product quality and safety standards.

Another example can be found in the hospitality industry, where a major hotel group in Asia-Pacific undertook a similar transition. Recognizing the opportunity to enhance its brand image by aligning with global sustainability trends, the group replaced conventional air conditioning units with advanced systems using hydrocarbon refrigerants. Although hydrocarbons require careful handling due to flammability concerns, their adoption was facilitated by investing in state-of-the-art leak detection technologies and fire safety measures. The hotel group reported not only compliance with international environmental protocols but also increased customer satisfaction due to improved indoor air quality.

The automotive sector also offers insightful examples of successful transitions. An American car manufacturer made headlines when it became one of the first companies globally to adopt HFO-1234yf refrigerant for its vehicle air conditioning systems. This move was prompted by regulatory requirements under the U.S. Environmental Protection Agency's Significant New Alternatives Policy program, which encourages lower-GWP alternatives. By working closely with suppliers and investing in new manufacturing processes, the company was able to introduce this change without disrupting production timelines or increasing costs significantly for consumers.

These examples illustrate key factors contributing to successful transitions: proactive engagement with regulatory bodies, strategic partnerships with technology providers,

investment in employee training programs, and commitment to consumer education regarding sustainable practices. Additionally, companies that approach these transitions as opportunities rather than obligations are likely to derive greater competitive advantages through enhanced brand reputation and customer loyalty.

In conclusion, transitioning to improved refrigerants is not merely about compliance; it represents a pivotal step toward sustainable business operations that benefit both the environment and long-term economic performance. By learning from successful case studies across various industries, organizations can navigate this complex process more effectively while contributing positively toward global ecological goals.

As the world continues to grapple with the pressing challenges of climate change and environmental sustainability, the transition to improved refrigerants in mobile homes represents a pivotal step toward achieving regulatory compliance and reducing ecological impact. Mobile homes, which serve as important living solutions for many individuals, must evolve alongside technological advancements to ensure both comfort and environmental responsibility. The shift towards better refrigerants is not merely about adhering to regulations but also about embracing innovations that promise efficiency, safety, and sustainability.

The traditional refrigerants used in mobile home air conditioning systems have long been criticized for their high global warming potential (GWP) and ozone depletion capabilities. Hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs), once common in these systems, have faced stringent international regulation under agreements like the Montreal Protocol due to their deleterious effects on the ozone layer. As a result, there has been a concerted effort globally to phase out these harmful substances in favor of more environmentally friendly alternatives.

One of the most promising trends in refrigerant technology is the development and adoption of hydrofluoroolefins (HFOs) and natural refrigerants such as carbon dioxide (CO2), propane,

and ammonia. These options boast significantly lower GWPs compared to their predecessors, addressing both regulatory requirements and environmental concerns. HFOs are particularly notable for their near-zero GWP while maintaining energy efficiency comparable to traditional refrigerants. Their adoption in mobile home systems can substantially mitigate the carbon footprint associated with temperature regulation.

Moreover, transitioning to improved refrigerants offers an opportunity for innovation beyond mere compliance. Newer technologies harness advanced materials science and engineering principles to enhance system performance while minimizing leakage risks-a critical factor considering that even environmentally friendly refrigerants can cause harm if they escape into the atmosphere unchecked. Innovations such as microchannel heat exchangers increase efficiency by improving heat transfer capabilities without necessitating larger or more resource-intensive components.

This transition also prompts a reevaluation of existing infrastructure within mobile homes' HVAC systems. Retrofitting older units with new technologies or replacing them entirely might require upfront investments; however, these costs are often offset by long-term savings through enhanced energy efficiency and reduced maintenance needs. Additionally, manufacturers are increasingly focusing on designing adaptable systems capable of accommodating future advances in refrigerant technology without extensive overhauls-ensuring longevity and adaptability amid rapidly evolving standards.

Public awareness campaigns play a vital role in this transition process by educating consumers about both the benefits of improved refrigerants and any necessary adjustments involved with upgrading current systems. Ensuring that mobile homeowners understand not only how these changes align with broader environmental goals but also how they contribute directly toward personal economic savings through increased energy efficiency is essential for widespread acceptance.

In conclusion, transitioning to improved refrigerants within mobile homes is a multifaceted endeavor driven by regulatory compliance imperatives yet fueled by innovative technological developments aimed at fostering sustainability across daily life practices. By prioritizing low-GWP alternatives like HFOs alongside natural options such as CO2 or propane-and investing in cutting-edge system designs-this sector stands poised not just meet today's standards but actively shape tomorrow's sustainable living environments through conscientious adaptation strategies rooted firmly within science-driven progress paradigms.

About Indoor air quality

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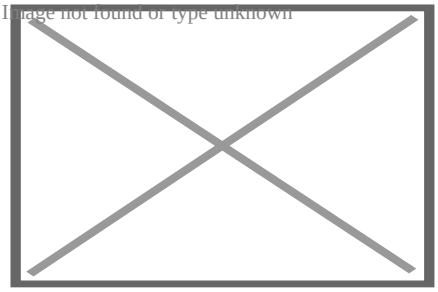

An air filter being cleaned

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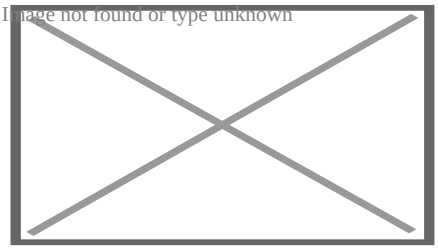

Air pollution from a factory

Air

- Acid rain
- Air quality index
- Atmospheric dispersion modeling
- Chlorofluorocarbon
- Combustion
- Exhaust gas
- Haze
- Global dimming
- Global distillation
- Indoor air quality
- Non-exhaust emissions
- Ozone depletion
- Particulates
- Persistent organic pollutant
- Smog
- Soot
- Volatile organic compound

Biological

- Biological hazard
- Genetic
- Illegal logging
- Introduced species
  - Invasive species

Digital

- Information

Electromagnetic

- Light
  - Ecological
  - Overillumination
- Radio spectrum

Natural

- Ozone
- Radium and radon in the environment
- Volcanic ash
- Wildfire

Noise

- Transportation
- Health effects from noise
- Marine mammals and sonar
- Noise barrier
- Noise control
- Soundproofing

Radiation

- Actinides
- Bioremediation
- Depleted uranium
- Nuclear fission
- Nuclear fallout
- Plutonium
- Poisoning
- Radioactivity
- Uranium
- Radioactive waste

Soil

- Agricultural
- Land degradation
- Bioremediation
- Defecation
- Electrical resistance heating
- Illegal mining
- Soil guideline values
- Phytoremediation

Solid waste

- Advertising mail
- Biodegradable waste
- Brown waste
- Electronic waste
- Foam food container
- Food waste
- Green waste
- Hazardous waste
- Industrial waste
- Litter
- Mining
- Municipal solid waste
- Nanomaterials
- Plastic
- Packaging waste
- Post-consumer waste
- Waste management

Space

- Space debris

Thermal

- Urban heat island

Visual

- Air travel
- Advertising clutter
- Overhead power lines
- Traffic signs
- Urban blight
- Vandalism

War

- Chemical warfare
- Herbicidal warfare
  - Agent Orange
- Nuclear holocaust
  - Nuclear fallout
  - Nuclear famine
  - Nuclear winter
- Scorched earth
- Unexploded ordnance
- War and environmental law

Water

- Agricultural wastewater
- Biosolids
- Diseases
- Eutrophication
- Firewater
- Freshwater
- Groundwater
- Hypoxia
- Industrial wastewater
- Marine
- Monitoring
- Nonpoint source
- Nutrient
- Ocean acidification
- Oil spill
- Pharmaceuticals
- Freshwater salinization
- Septic tanks
- Sewage
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- Stagnation
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- icon Environment portal
- icon Ecology portal

Indoor air quality (**IAQ**) is the air quality within buildings and structures. Poor indoor air quality due to **indoor air pollution** is known to affect the health, comfort, and well-being of building occupants. It has also been linked to sick building syndrome, respiratory issues, reduced productivity, and impaired learning in schools. Common pollutants of indoor air include: secondhand tobacco smoke, air pollutants from indoor combustion, radon, molds and other allergens, carbon monoxide, volatile organic compounds, legionella and other bacteria, asbestos fibers, carbon dioxide,[1] ozone and particulates.

Source control, filtration, and the use of ventilation to dilute contaminants are the primary methods for improving indoor air quality. Although ventilation is an integral component of maintaining good indoor air quality, it may not be satisfactory alone.[2] In scenarios where outdoor pollution would deteriorate indoor air quality, other treatment devices such as filtration may also be necessary.[3]

IAQ is evaluated through collection of air samples, monitoring human exposure to pollutants, analysis of building surfaces, and computer modeling of air flow inside buildings. IAQ is part of indoor environmental quality (IEQ), along with other factors that exert an influence on physical and psychological aspects of life indoors (e.g., lighting, visual quality, acoustics, and thermal comfort).[4]

Indoor air pollution is a major health hazard in developing countries and is commonly referred to as "household air pollution" in that context.[5] It is mostly relating to cooking and heating methods by burning biomass fuel, in the form of wood, charcoal, dung, and crop residue, in indoor environments that lack proper ventilation. Millions of people, primarily women and children, face serious health risks. In total, about three billion people in developing countries are affected by this problem. The World Health Organization (WHO) estimates that cooking-related indoor air pollution causes 3.8 million annual deaths.[6] The Global Burden of Disease study estimated the number of deaths in 2017 at 1.6 million.[7]

Definition

[edit]

For health reasons it is crucial to breathe clean air, free from chemicals and toxicants as much as possible. It is estimated that humans spend approximately 90% of their lifetime indoors[8] and that indoor air pollution in some places can be much worse than that of the ambient air.[9][10]

Various factors contribute to high concentrations of pollutants indoors, ranging from influx of pollutants from external sources, off-gassing by furniture, furnishings including carpets, indoor activities (cooking, cleaning, painting, smoking, etc. in homes to using office equipment in offices), thermal comfort parameters such as temperature, humidity, airflow and physio-chemical properties of the indoor air.[*citation needed*] Air pollutants can enter a building in many ways, including through open doors or windows. Poorly maintained air conditioners/ventilation systems can harbor mold, bacteria, and other contaminants, which are then circulated throughout indoor spaces, contributing to respiratory problems and allergies.

There have been many debates among indoor air quality specialists about the proper definition of indoor air quality and specifically what constitutes "acceptable" indoor air quality.

Health effects

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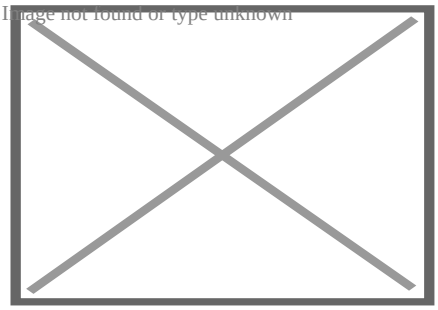

Share of deaths from indoor air pollution. Darker colors mean higher numbers.

IAQ is significant for human health as humans spend a large proportion of their time in indoor environments. Americans and Europeans on average spend approximately 90% of their time indoors.[11][12]

The World Health Organization (WHO) estimates that 3.2 million people die prematurely every year from illnesses attributed to indoor air pollution caused by indoor cooking, with over 237 thousand of these being children under 5. These include around an eighth of all global ischaemic heart disease, stroke, and lung cancer deaths. Overall the WHO estimated that poor indoor air quality resulted in the loss of 86 million healthy life years in 2019.[13]

Studies in the UK and Europe show exposure to indoor air pollutants, chemicals and biological contamination can irritate the upper airway system, trigger or exacerbate asthma and other respiratory or cardiovascular conditions, and may even have carcinogenic effects.[14][15][16][17][18][19]

Poor indoor air quality can cause sick building syndrome. Symptoms include burning of the eyes, scratchy throat, blocked nose, and headaches.[20]

Common pollutants

[edit]

Generated by indoor combustion

[edit]
Main article: Household air pollution
Further information: Energy poverty and cooking

a 3-stone stove

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A traditional wood-fired 3-stone stove in Guatemala, which causes indoor air pollution

Indoor combustion, such as for cooking or heating, is a major cause of indoor air pollution and causes significant health harms and premature deaths. Hydrocarbon fires cause air pollution. Pollution is caused by both biomass and fossil fuels of various types, but some forms of fuels are more harmful than others.

Indoor fire can produce black carbon particles, nitrogen oxides, sulfur oxides, and mercury compounds, among other emissions.[21] Around 3 billion people cook over open fires or on rudimentary cook stoves. Cooking fuels are coal, wood, animal dung, and crop residues.[22] IAQ is a particular concern in low and middle-income countries where such practices are common.[23]

Cooking using natural gas (also called fossil gas, methane gas or simply gas) is associated with poorer indoor air quality. Combustion of gas produces nitrogen dioxide and carbon monixide, and can lead to increased concentrations of nitrogen dioxide throughout the home environment which is linked to respiratory issues and diseases.[24][25]

Carbon monoxide

[edit]
Main article: Carbon monoxide poisoning

One of the most acutely toxic indoor air contaminants is carbon monoxide (CO), a colourless and odourless gas that is a by-product of incomplete combustion. Carbon monoxide may be emitted from tobacco smoke and generated from malfunctioning fuel

burning stoves (wood, kerosene, natural gas, propane) and fuel burning heating systems (wood, oil, natural gas) and from blocked flues connected to these appliances.[26] In developed countries the main sources of indoor CO emission come from cooking and heating devices that burn fossil fuels and are faulty, incorrectly installed or poorly maintained.[27] Appliance malfunction may be due to faulty installation or lack of maintenance and proper use.[26] In low- and middle-income countries the most common sources of CO in homes are burning biomass fuels and cigarette smoke.[27]

Health effects of CO poisoning may be acute or chronic and can occur unintentionally or intentionally (self-harm). By depriving the brain of oxygen, acute exposure to carbon monoxide may have effects on the neurological system (headache, nausea, dizziness, alteration in consciousness and subjective weakness), the cardiovascular and respiratory systems (myocardial infarction, shortness of breath, or rapid breathing, respiratory failure). Acute exposure can also lead to long-term neurological effects such as cognitive and behavioural changes. Severe CO poisoning may lead to unconsciousness, coma and death. Chronic exposure to low concentrations of carbon monoxide may lead to lethargy, headaches, nausea, flu-like symptoms and neuropsychological and cardiovascular issues.[28][26]

The WHO recommended levels of indoor CO exposure in 24 hours is 4 mg/m^3.[29] Acute exposure should not exceed 10 mg/m^3 in 8 hours, 35 mg/m^3 in one hour and 100 mg/m^3 in 15 minutes.[27]

Secondhand tobacco smoke

[edit]
Main article: Passive smoking

Secondhand smoke is tobacco smoke which affects people other than the 'active' smoker. It is made up of the exhaled smoke (15%) and mostly of smoke coming from the burning end of the cigarette, known as sidestream smoke (85%).[30]

Secondhand smoke contains more than 7000 chemicals, of which hundreds are harmful to health.[30] Secondhand tobacco smoke includes both a gaseous and a particulate materials which, with particular hazards arising from levels of carbon monoxide and very small particulates (fine particulate matter, especially PM2.5 and PM10) which get into the bronchioles and alveoles in the lung.[31] Inhaling secondhand smoke on multiple occasions can cause asthma, pneumonia, lung cancer, and sudden infant death syndrome, among other conditions.[32]

Thirdhand smoke (THS) refers to chemicals that settle on objects and bodies indoors after smoking. Exposure to thirdhand smoke can happen even after the actual cigarette smoke is not present anymore and affect those entering the indoor environment much later. Toxic substances of THS can react with other chemicals in the air and produce new toxic

chemicals that are otherwise not present in cigarettes.[33]

The only certain method to improve indoor air quality as regards secondhand smoke is to eliminate smoking indoors.[34] Indoor e-cigarette use also increases home particulate matter concentrations.[35]

Particulates

[edit]

Atmospheric particulate matter, also known as particulates, can be found indoors and can affect the health of occupants. Indoor particulate matter can come from different indoor sources or be created as secondary aerosols through indoor gas-to-particle reactions. They can also be outdoor particles that enter indoors. These indoor particles vary widely in size, ranging from nanomet (nanoparticles/ultrafine particles emitted from combustion sources) to micromet (resuspensed dust).[36] Particulate matter can also be produced through cooking activities. Frying produces higher concentrations than boiling or grilling and cooking meat produces higher concentrations than cooking vegetables.[37] Preparing a Thanksgiving dinner can produce very high concentrations of particulate matter, exceeding 300 ?g/m^3.[38]

Particulates can penetrate deep into the lungs and brain from blood streams, causing health problems such as heart disease, lung disease, cancer and preterm birth.[39]

Generated from building materials, furnishing and consumer products

[edit]
See also: Building materials and Red List building materials

Volatile organic compounds

[edit]

Volatile organic compounds (VOCs) include a variety of chemicals, some of which may have short- and long-term adverse health effects. There are numerous sources of VOCs indoors, which means that their concentrations are consistently higher indoors (up to ten times higher) than outdoors.[40] Some VOCs are emitted directly indoors, and some are formed through the subsequent chemical reactions that can occur in the gas-phase, or on surfaces.[41][42] VOCs presenting health hazards include benzene, formaldehyde,

tetrachloroethylene and trichloroethylene.[43]

VOCs are emitted by thousands of indoor products. Examples include: paints, varnishes, waxes and lacquers, paint strippers, cleaning and personal care products, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.[44] Chlorinated drinking water releases chloroform when hot water is used in the home. Benzene is emitted from fuel stored in attached garages.

Human activities such as cooking and cleaning can also emit VOCs.[45][46] Cooking can release long-chain aldehydes and alkanes when oil is heated and terpenes can be released when spices are prepared and/or cooked.[45] Leaks of natural gas from cooking appliances have been linked to elevated levels of VOCs including benzene in homes in the USA.[47] Cleaning products contain a range of VOCs, including monoterpenes, sesquiterpenes, alcohols and esters. Once released into the air, VOCs can undergo reactions with ozone and hydroxyl radicals to produce other VOCs, such as formaldehyde.[46]

Health effects include eye, nose, and throat irritation; headaches, loss of coordination, nausea; and damage to the liver, kidney, and central nervous system.[48]

Testing emissions from building materials used indoors has become increasingly common for floor coverings, paints, and many other important indoor building materials and finishes.[49] Indoor materials such as gypsum boards or carpet act as VOC 'sinks', by trapping VOC vapors for extended periods of time, and releasing them by outgassing. The VOCs can also undergo transformation at the surface through interaction with ozone.[42] In both cases, these delayed emissions can result in chronic and low-level exposures to VOCs.[50]

Several initiatives aim to reduce indoor air contamination by limiting VOC emissions from products. There are regulations in France and in Germany, and numerous voluntary ecolabels and rating systems containing low VOC emissions criteria such as EMICODE,[51] M1,[52] Blue Angel[53] and Indoor Air Comfort[54] in Europe, as well as California Standard CDPH Section 01350[55] and several others in the US. Due to these initiatives an increasing number of low-emitting products became available to purchase.

At least 18 microbial VOCs (MVOCs) have been characterised[56][57] including 1-octen-3-ol (mushroom alcohol), 3-Methylfuran, 2-pentanol, 2-hexanone, 2-heptanone, 3-octanone, 3-octanol, 2-octen-1-ol, 1-octene, 2-pentanone, 2-nonanone, borneol, geosmin, 1-butanol, 3-methyl-1-butanol, 3-methyl-2-butanol, and thujopsene. The last four are products of *Stachybotrys chartarum*, which has been linked with sick building syndrome.[56]

Asbestos fibers

[edit]

Many common building materials used before 1975 contain asbestos, such as some floor tiles, ceiling tiles, shingles, fireproofing, heating systems, pipe wrap, taping muds, mastics, and other insulation materials. Normally, significant releases of asbestos fiber do not occur unless the building materials are disturbed, such as by cutting, sanding, drilling, or building remodelling. Removal of asbestos-containing materials is not always optimal because the fibers can be spread into the air during the removal process. A management program for intact asbestos-containing materials is often recommended instead.

When asbestos-containing material is damaged or disintegrates, microscopic fibers are dispersed into the air. Inhalation of asbestos fibers over long exposure times is associated with increased incidence of lung cancer, mesothelioma, and asbestosis. The risk of lung cancer from inhaling asbestos fibers is significantly greater for smokers. The symptoms of disease do not usually appear until about 20 to 30 years after the first exposure to asbestos.

Although all asbestos is hazardous, products that are friable, e.g. sprayed coatings and insulation, pose a significantly higher hazard as they are more likely to release fibers to the air.[58]

Microplastics

[edit]
Main article: Microplastics
See also: Renovation and Particulates

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Microplastic is a type of airborne particulates and is found to prevail in air.[59][60][61][62] A 2017 study found indoor airborne microfiber concentrations between 1.0 and 60.0 microfibers per cubic meter (33% of which were found to be microplastics).[63] Airborne microplastic dust can be produced during renovation, building, bridge and road reconstruction projects[64] and the use of power tools.[65]

Ozone

[edit]
See also: Ground-level ozone

Indoors ozone (O_3) is produced by certain high-voltage electric devices (such as air ionizers), and as a by-product of other types of pollution. It appears in lower concentrations indoors than outdoors, usually at 0.2-0.7 of the outdoor concentration.[66] Typically, most ozone is lost to surface reactions indoors, rather than to reactions in air, due to the large surface to volume ratios found indoors.[67]

Outdoor air used for ventilation may have sufficient ozone to react with common indoor pollutants as well as skin oils and other common indoor air chemicals or surfaces. Particular concern is warranted when using "green" cleaning products based on citrus or terpene extracts, because these chemicals react very quickly with ozone to form toxic and irritating chemicals[46] as well as fine and ultrafine particles.[68] Ventilation with outdoor air containing elevated ozone concentrations may complicate remediation attempts.[69]

The WHO standard for ozone concentration is 60 ?g/m^3 for long-term exposure and 100 ?g/m^3 as the maximum average over an 8-hour period.[29] The EPA standard for ozone concentration is 0.07 ppm average over an 8-hour period.[70]

Biological agents

[edit]

Mold and other allergens

[edit]
Main articles: Indoor mold and Mold health issues

Occupants in buildings can be exposed to fungal spores, cell fragments, or mycotoxins which can arise from a host of means, but there are two common classes: (a) excess moisture induced growth of mold colonies and (b) natural substances released into the air such as animal dander and plant pollen.[71]

While mold growth is associated with high moisture levels,[72] it is likely to grow when a combination of favorable conditions arises. As well as high moisture levels, these conditions include suitable temperatures, pH and nutrient sources.[73] Mold grows primarily on surfaces, and it reproduces by releasing spores, which can travel and settle in different locations. When these spores experience appropriate conditions, they can germinate and lead to mycelium growth.[74] Different mold species favor different environmental conditions to germinate and grow, some being more hydrophilic (growing at higher levels of relative humidity) and other more xerophilic (growing at levels of relative humidity as low as 75–80%).[74][75]

Mold growth can be inhibited by keeping surfaces at conditions that are further from condensation, with relative humidity levels below 75%. This usually translates to a relative humidity of indoor air below 60%, in agreement with the guidelines for thermal comfort that recommend a relative humidity between 40 and 60 %. Moisture buildup in buildings may arise from water penetrating areas of the building envelope or fabric, from plumbing leaks, rainwater or groundwater penetration, or from condensation due to improper ventilation, insufficient heating or poor thermal quality of the building envelope.[76] Even something as simple as drying clothes indoors on radiators can increase the risk of mold growth, if the humidity produced is not able to escape the building via ventilation.[77]

Mold predominantly affects the airways and lungs. Known effects of mold on health include asthma development and exacerbation,[78] with children and elderly at greater risk of more severe health impacts.[79] Infants in homes with mold have a much greater risk of developing asthma and allergic rhinitis.[80][71] More than half of adult workers in moldy or humid buildings suffer from nasal or sinus symptoms due to mold exposure.[71] Some varieties of mold contain toxic compounds (mycotoxins). However, exposure to hazardous levels of mycotoxin via inhalation is not possible in most cases, as toxins are produced by the fungal body and are not at significant levels in the released spores.

Legionella

[edit]

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Legionnaires' disease is caused by a waterborne bacterium *Legionella* that grows best in slow-moving or still, warm water. The primary route of exposure is through the creation of an aerosol effect, most commonly from evaporative cooling towers or showerheads. A common source of *Legionella* in commercial buildings is from poorly placed or maintained evaporative cooling towers, which often release water in an aerosol which may enter nearby ventilation intakes. Outbreaks in medical facilities and nursing homes, where patients are immuno-suppressed and immuno-weak, are the most commonly reported cases of Legionellosis. More than one case has involved outdoor fountains at public attractions. The presence of *Legionella* in commercial building water supplies is highly under-reported, as healthy people require heavy exposure to acquire infection.

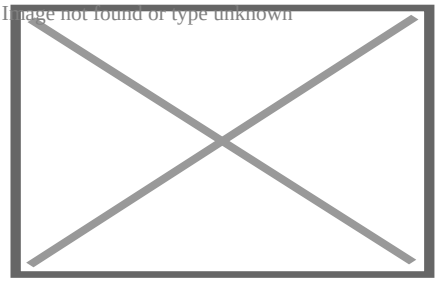
Legionella testing typically involves collecting water samples and surface swabs from evaporative cooling basins, shower heads, faucets/taps, and other locations where warm water collects. The samples are then cultured and colony forming units (cfu) of Legionella are quantified as cfu/liter.

Legionella is a parasite of protozoans such as amoeba, and thus requires conditions suitable for both organisms. The bacterium forms a biofilm which is resistant to chemical

and antimicrobial treatments, including chlorine. Remediation for *Legionella* outbreaks in commercial buildings vary, but often include very hot water flushes (160 °F (71 °C)), sterilisation of standing water in evaporative cooling basins, replacement of shower heads, and, in some cases, flushes of heavy metal salts. Preventive measures include adjusting normal hot water levels to allow for 120 °F (49 °C) at the tap, evaluating facility design layout, removing faucet aerators, and periodic testing in suspect areas.

Other bacteria

[edit]



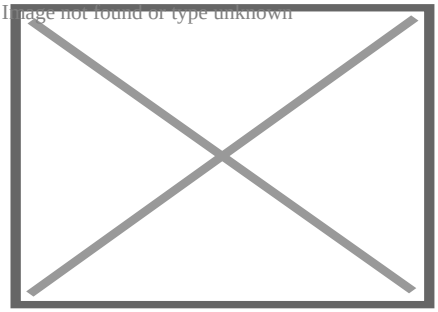
Airborne bacteria

There are many bacteria of health significance found in indoor air and on indoor surfaces. The role of microbes in the indoor environment is increasingly studied using modern gene-based analysis of environmental samples. Currently, efforts are under way to link microbial ecologists and indoor air scientists to forge new methods for analysis and to better interpret the results.[81]

A large fraction of the bacteria found in indoor air and dust are shed from humans. Among the most important bacteria known to occur in indoor air are Mycobacterium tuberculosis, Staphylococcus aureus, Streptococcus pneumoniae.[*citation needed*]

Virus

[edit]



Ninth floor layout of the Metropole Hotel in Hong Kong, showing where an outbreak of the severe acute respiratory syndrome (SARS) occurred

Viruses can also be a concern for indoor air quality. During the 2002–2004 SARS outbreak, virus-laden aerosols were found to have seeped into bathrooms from the bathroom floor drains, exacerbated by the draw of bathroom exhaust fans, resulting in the rapid spread of SARS in Amoy Gardens in Hong Kong.[82][83] Elsewhere in Hong Kong, SARS CoV RNA was found on the carpet and in the air intake vents of the Metropole Hotel, which showed that secondary environmental contamination could generate infectious aerosols and resulted in superspreading events.[84]

Carbon dioxide

[edit]

Humans are the main indoor source of carbon dioxide (CO_2) in most buildings. Indoor CO_2 levels are an indicator of the adequacy of outdoor air ventilation relative to indoor occupant density and metabolic activity.

Indoor CO_2 levels above 500 ppm can lead to higher blood pressure and heart rate, and increased peripheral blood circulation.[85] With CO_2 concentrations above 1000 ppm cognitive performance might be affected, especially when doing complex tasks, making decision making and problem solving slower but not less accurate.[86][87] However, evidence on the health effects of CO_2 at lower concentrations is conflicting and it is difficult to link CO_2 to health impacts at exposures below 5000 ppm – reported health outcomes may be due to the presence of human bioeffluents, and other indoor air pollutants related to inadequate ventilation.[88]

Indoor carbon dioxide concentrations can be used to evaluate the quality of a room or a building's ventilation.[89] To eliminate most complaints caused by CO_2, the total indoor CO_2 level should be reduced to a difference of no greater than 700 ppm above outdoor levels.[90] The National Institute for Occupational Safety and Health (NIOSH) considers that indoor air concentrations of carbon dioxide that exceed 1000 ppm are a marker suggesting inadequate ventilation.[91] The UK standards for schools say that carbon dioxide levels of 800 ppm or lower indicate that the room is well-ventilated.[92] Regulations and standards from around the world show that CO_2 levels below 1000 ppm represent good IAQ, between 1000 and 1500 ppm represent moderate IAQ and greater than 1500 ppm represent poor IAQ.[88]

Carbon dioxide concentrations in closed or confined rooms can increase to 1,000 ppm within 45 minutes of enclosure. For example, in a 3.5-by-4-metre (11 ft × 13 ft) sized office, atmospheric carbon dioxide increased from 500 ppm to over 1,000 ppm within 45 minutes

of ventilation cessation and closure of windows and doors.[93]

Radon

[edit]
Main article: Radon

Radon is an invisible, radioactive atomic gas that results from the radioactive decay of radium, which may be found in rock formations beneath buildings or in certain building materials themselves.

Radon is probably the most pervasive serious hazard for indoor air in the United States and Europe. It is a major cause of lung cancer, responsible for 3–14% of cases in countries, leading to tens of thousands of deaths.[94]

Radon gas enters buildings as a soil gas. As it is a heavy gas it will tend to accumulate at the lowest level. Radon may also be introduced into a building through drinking water particularly from bathroom showers. Building materials can be a rare source of radon, but little testing is carried out for stone, rock or tile products brought into building sites; radon accumulation is greatest for well insulated homes.[95] There are simple do-it-yourself kits for radon gas testing, but a licensed professional can also check homes.

The half-life for radon is 3.8 days, indicating that once the source is removed, the hazard will be greatly reduced within a few weeks. Radon mitigation methods include sealing concrete slab floors, basement foundations, water drainage systems, or by increasing ventilation.[96] They are usually cost effective and can greatly reduce or even eliminate the contamination and the associated health risks.[*citation needed*]

Radon is measured in picocuries per liter of air (pCi/L) or becquerel per cubic meter (Bq m $^{-3)}$. Both are measurements of radioactivity. The World Health Organization (WHO) sets the ideal indoor radon levels at 100 Bq/m-^{3}.[97] In the United States, it is recommend to fix homes with radon levels at or above 4 pCi/L. At the same time it is also recommends that people think about fixing their homes for radon levels between 2 pCi/L and 4 pCi/L.[98] In the United Kingdom the ideal is presence of radon indoors is 100 Bq/m-^{3}. Action needs to be taken in homes with 200 Bq/m$^{?3}$ or more.[99]

Interactive maps of radon affected areas are available for various regions and countries of the world.[100][101][102]

IAQ and climate change

[edit]

See also: Effects of climate change on human health

Indoor air quality is linked inextricably to outdoor air quality. The Intergovernmental Panel on Climate Change (IPCC) has varying scenarios that predict how the climate will change in the future.[103] Climate change can affect indoor air quality by increasing the level of outdoor air pollutants such as ozone and particulate matter, for example through emissions from wildfires caused by extreme heat and drought.[104][105] Numerous predictions for how indoor air pollutants will change have been made,[106][107][108][109] and models have attempted to predict how the forecasted IPCC scenarios will vary indoor air quality and indoor comfort parameters such as humidity and temperature.[110]

The net-zero challenge requires significant changes in the performance of both new and retrofitted buildings. However, increased energy efficient housing will trap pollutants inside, whether produced indoors or outdoors, and lead to an increase in human exposure.[111][112]

Indoor air quality standards and monitoring

[edit]

Quality guidelines and standards

[edit]

For occupational exposure, there are standards, which cover a wide range of chemicals, and applied to healthy adults who are exposed over time at workplaces (usually industrial environments).These are published by organisations such as Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the UK Health and Safety Executive (HSE).

There is no consensus globally about indoor air quality standards, or health-based guidelines. However, there are regulations from some individual countries and from health organisations. For example, the World Health Organization (WHO) has published health-based global air quality guidelines for the general population that are applicable both to outdoor and indoor air,[29] as well as the WHO IAQ guidelines for selected compounds,[113] whereas the UK Health Security Agency published IAQ guidelines for selected VOCs.[114] The Scientific and Technical Committee (STC34) of the International Society of Indoor Air Quality and Climate (ISIAQ) created an open database that collects indoor environmental quality guidelines worldwide.[115] The database is focused on indoor air quality (IAQ), but is currently extended to include standards, regulations, and guidelines related to ventilation, comfort, acoustics, and lighting.[116][117]

Real-time monitoring

[edit]

Since indoor air pollutants can adversely affect human health, it is important to have real-time indoor air quality assessment/monitoring system that can help not only in the improvement of indoor air quality but also help in detection of leaks, spills in a work environment and boost energy efficiency of buildings by providing real-time feedback to the heating, ventilation, and air conditioning (HVAC) system(s).[118] Additionally, there have been enough studies that highlight the correlation between poor indoor air quality and loss of performance and productivity of workers in an office setting.[119]

Combining the Internet of Things (IoT) technology with real-time IAQ monitoring systems has tremendously gained momentum and popularity as interventions can be done based on the real-time sensor data and thus help in the IAQ improvement.[120]

Improvement measures

[edit]

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See also: Air purifier, Air conditioner, Air filter, Cleanroom, Particulates § Controlling technologies and measures, Pollution control, and Ventilation (architecture)
Further information: Fan (machine), Dehumidifier, and Heater

Indoor air quality can be addressed, achieved or maintained during the design of new buildings or as mitigating measures in existing buildings. A hierarchy of measures has been proposed by the Institute of Air Quality Management. It emphasises removing pollutant sources, reducing emissions from any remaining sources, disrupting pathways between sources and the people exposed, protecting people from exposure to pollutants, and removing people from areas with poor air quality.[121]

A report assisted by the Institute for Occupational Safety and Health of the German Social Accident Insurance can support in the systematic investigation of individual health problems arising at indoor workplaces, and in the identification of practical solutions.[122]

Source control

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HVAC design

[edit]
Main articles: HVAC, Air handler, and Ventilation (architecture)

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Environmentally sustainable design concepts include aspects of commercial and residential heating, ventilation and air-conditioning (HVAC) technologies. Among several considerations, one of the topics attended to is the issue of indoor air quality throughout the design and construction stages of a building's life.[*citation needed*]

One technique to reduce energy consumption while maintaining adequate air quality, is demand-controlled ventilation. Instead of setting throughput at a fixed air replacement rate, carbon dioxide sensors are used to control the rate dynamically, based on the emissions of actual building occupants.[*citation needed*]

One way of quantitatively ensuring the health of indoor air is by the frequency of effective turnover of interior air by replacement with outside air. In the UK, for example, classrooms are required to have 2.5 outdoor air changes per hour. In halls, gym, dining, and physiotherapy spaces, the ventilation should be sufficient to limit carbon dioxide to 1,500 ppm. In the US, ventilation in classrooms is based on the amount of outdoor air per occupant plus the amount of outdoor air per unit of floor area, not air changes per hour. Since carbon dioxide indoors comes from occupants and outdoor air, the adequacy of ventilation per occupant is indicated by the concentration indoors minus the concentration outdoors. The value of 615 ppm above the outdoor concentration indicates approximately 15 cubic feet per minute of outdoor air per adult occupant doing sedentary office work where outdoor air contains over 400 ppm[123] (global average as of 2023). In classrooms, the requirements in the ASHRAE standard 62.1, Ventilation for Acceptable Indoor Air Quality, would typically result in about 3 air changes per hour, depending on the occupant density. As the occupants are not the only source of pollutants, outdoor air ventilation may need to be higher when unusual or strong sources of pollution exist indoors.

When outdoor air is polluted, bringing in more outdoor air can actually worsen the overall quality of the indoor air and exacerbate some occupant symptoms related to outdoor air pollution. Generally, outdoor country air is better than indoor city air.[*citation needed*]

The use of air filters can trap some of the air pollutants. Portable room air cleaners with HEPA filters can be used if ventilation is poor or outside air has high level of PM 2.5.[122] Air filters are used to reduce the amount of dust that reaches the wet coils.[*citation needed*]

Dust can serve as food to grow molds on the wet coils and ducts and can reduce the efficiency of the coils.[*citation needed*]

The use of trickle vents on windows is also valuable to maintain constant ventilation. They can help prevent mold and allergen build up in the home or workplace. They can also reduce the spread of some respiratory infections.[124]

Moisture management and humidity control requires operating HVAC systems as designed. Moisture management and humidity control may conflict with efforts to conserve energy. For example, moisture management and humidity control requires systems to be set to supply make-up air at lower temperatures (design levels), instead of the higher temperatures sometimes used to conserve energy in cooling-dominated climate conditions. However, for most of the US and many parts of Europe and Japan, during the majority of hours of the year, outdoor air temperatures are cool enough that the air does not need further cooling to provide thermal comfort indoors.[*citation needed*] However, high humidity outdoors creates the need for careful attention to humidity levels indoors. High humidity give rise to mold growth and moisture indoors is associated with a higher prevalence of occupant respiratory problems.[*citation needed*]

The "dew point temperature" is an absolute measure of the moisture in air. Some facilities are being designed with dew points in the lower 50s °F, and some in the upper and lower 40s °F.[*citation needed*] Some facilities are being designed using desiccant wheels with gas-fired heaters to dry out the wheel enough to get the required dew points.[*citation needed*] On those systems, after the moisture is removed from the make-up air, a cooling coil is used to lower the temperature to the desired level.[*citation needed*]

Commercial buildings, and sometimes residential, are often kept under slightly positive air pressure relative to the outdoors to reduce infiltration. Limiting infiltration helps with moisture management and humidity control.

Dilution of indoor pollutants with outdoor air is effective to the extent that outdoor air is free of harmful pollutants. Ozone in outdoor air occurs indoors at reduced concentrations because ozone is highly reactive with many chemicals found indoors. The products of the reactions between ozone and many common indoor pollutants include organic compounds that may be more odorous, irritating, or toxic than those from which they are formed. These products of ozone chemistry include formaldehyde, higher molecular weight aldehydes, acidic aerosols, and fine and ultrafine particles, among others. The higher the outdoor ventilation rate, the higher the indoor ozone concentration and the more likely the reactions will occur, but even at low levels, the reactions will take place. This suggests that ozone should be removed from ventilation air, especially in areas where outdoor ozone levels are frequently high.

Effect of indoor plants

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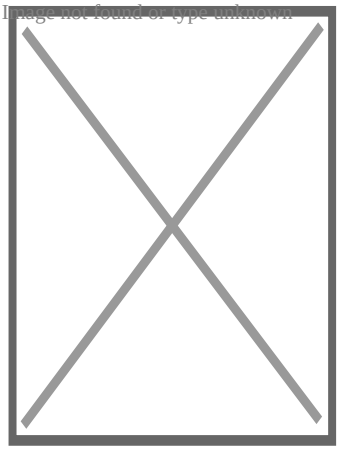

Spider plants *(Chlorophytum comosum)* absorb some airborne contaminants.

Houseplants together with the medium in which they are grown can reduce components of indoor air pollution, particularly volatile organic compounds (VOC) such as benzene, toluene, and xylene. Plants remove CO_2 and release oxygen and water, although the quantitative impact for house plants is small. The interest in using potted plants for removing VOCs was sparked by a 1989 NASA study conducted in sealed chambers designed to replicate the environment on space stations. However, these results suffered from poor replication[125] and are not applicable to typical buildings, where outdoor-to-indoor air exchange already removes VOCs at a rate that could only be matched by the placement of 10–1000 plants/m^2 of a building's floor space.[126]

Plants also appear to reduce airborne microbes and molds, and to increase humidity.[127] However, the increased humidity can itself lead to increased levels of mold and even VOCs.[128]

Since extremely high humidity is associated with increased mold growth, allergic responses, and respiratory responses, the presence of additional moisture from houseplants may not be desirable in all indoor settings if watering is done inappropriately.[129]

Institutional programs

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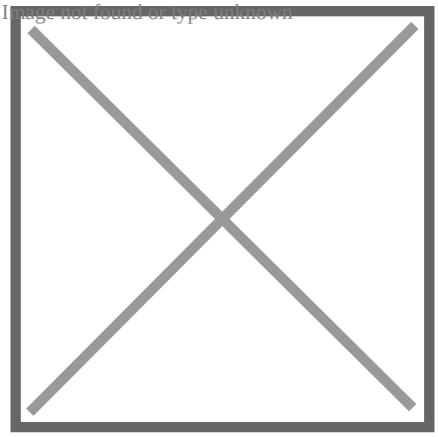

EPA graphic about asthma triggers

The topic of IAQ has become popular due to the greater awareness of health problems caused by mold and triggers to asthma and allergies.

In the US, the Environmental Protection Agency (EPA) has developed an "IAQ Tools for Schools" program to help improve the indoor environmental conditions in educational institutions. The National Institute for Occupational Safety and Health conducts Health Hazard Evaluations (HHEs) in workplaces at the request of employees, authorized representative of employees, or employers, to determine whether any substance normally found in the place of employment has potentially toxic effects, including indoor air quality.[130]

A variety of scientists work in the field of indoor air quality, including chemists, physicists, mechanical engineers, biologists, bacteriologists, epidemiologists, and computer scientists. Some of these professionals are certified by organizations such as the American Industrial Hygiene Association, the American Indoor Air Quality Council and the Indoor Environmental Air Quality Council.

In the UK, under the Department for Environment Food and Rural Affairs, the Air Quality Expert Group considers current knowledge on indoor air quality and provides advice to government and devolved administration ministers.[131]

At the international level, the International Society of Indoor Air Quality and Climate (ISIAQ), formed in 1991, organizes two major conferences, the Indoor Air and the Healthy Buildings series.[132]

See also

[edit]

- Environmental management
- Healthy building
- Indoor bioaerosol
- Microbiomes of the built environment
- Olfactory fatigue

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[edit]

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Further reading

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External links

[edit]

- US Environmental Protection Agency info on IAQ
- Best Practices for Indoor Air Quality when Remodeling Your Home, US EPA
- Addressing Indoor Environmental Concerns During Remodeling, US EPA
- Renovation and Repair, Part of Indoor Air Quality Design Tools for Schools, US EPA

- The 9 Foundations of a Healthy Building, Harvard T.H. Chan School of Public Health

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Pollution

History	
Air	○ Acid rain ○ Air quality index ○ Atmospheric dispersion modeling ○ Chlorofluorocarbon ○ Combustion ○ Biofuel ○ Biomass ○ Joss paper ○ Open burning of waste ○ Construction ○ Renovation ○ Demolition ○ Exhaust gas ○ Diesel exhaust ○ Haze ○ Smoke ○ Indoor air quality ○ Internal combustion engine ○ Global dimming ○ Global distillation ○ Mining ○ Ozone depletion ○ Particulates ○ Asbestos ○ Metal working ○ Oil refining ○ Wood dust ○ Welding ○ Persistent organic pollutant ○ Smelting ○ Smog ○ Soot ○ Black carbon ○ Volatile organic compound ○ Waste

Biological	○ Biological hazard ○ Genetic pollution ○ Introduced species ○ Invasive species
Digital	○ Information pollution

Electromagnetic	○ Light
	  ○ Ecological light pollution
	  ○ Overillumination
	○ Radio spectrum pollution

Natural	○ Ozone ○ Radium and radon in the environment ○ Volcanic ash ○ Wildfire

Noise	○ Transportation
	  ○ Land
	  ○ Water
	  ○ Air
	  ○ Rail
	  ○ Sustainable transport
	○ Urban
	○ Sonar
	  ○ Marine mammals and sonar
	○ Industrial
	○ Military

Radiation	○ Abstract ○ Noise control ○ Actinides ○ Bioremediation ○ Nuclear fission ○ Nuclear fallout ○ Plutonium ○ Poisoning ○ Radioactivity ○ Uranium ○ Electromagnetic radiation and health ○ Radioactive waste

Soil

- Agricultural pollution
  - Herbicides
  - Manure waste
  - Pesticides
- Land degradation
- Bioremediation
- Open defecation
- Electrical resistance heating
- Soil guideline values
- Phytoremediation

Solid waste

- Advertising mail
- Biodegradable waste
- Brown waste
- Electronic waste
  - Battery recycling
- Foam food container
- Food waste
- Green waste
- Hazardous waste
  - Biomedical waste
  - Chemical waste
  - Construction waste
  - Lead poisoning
  - Mercury poisoning
  - Toxic waste
- Industrial waste
  - Lead smelting
- Litter
- Mining
  - Coal mining
  - Gold mining
  - Surface mining
  - Deep sea mining
  - Mining waste
  - Uranium mining
- Municipal solid waste
  - Garbage
- Nanomaterials
- Plastic pollution
  - Microplastics
- Packaging waste
- Post-consumer waste
- Waste management
  - Landfill
  - Thermal treatment

Space	○ Satellite ○ Air travel
Visual	○ Clutter (advertising) ○ Traffic signs ○ Overhead power lines ○ Vandalism
War	○ Chemical warfare ○ Herbicidal warfare (Agent Orange) ○ Nuclear holocaust (Nuclear fallout - nuclear famine - nuclear winter) ○ Scorched earth ○ Unexploded ordnance ○ War and environmental law

Water	○ Agricultural wastewater
	○ Biological pollution
	○ Diseases
	○ Eutrophication
	○ Firewater
	○ Freshwater
	○ Groundwater
	○ Hypoxia
	○ Industrial wastewater
	○ Marine
	  ○ debris
	○ Monitoring
	○ Nonpoint source pollution
	○ Nutrient pollution
	○ Ocean acidification
	○ Oil exploitation
	○ Oil exploration
	○ Oil spill
	○ Pharmaceuticals
	○ Sewage
	  ○ Septic tanks
	  ○ Pit latrine
	○ Shipping
	○ Stagnation
	○ Sulfur water
	○ Surface runoff
	○ Thermal
	○ Turbidity
	○ Urban runoff
	○ Water quality

Topics	○ Pollutants ○ Heavy metals ○ Paint ○ Brain health and pollution ○ Area source ○ Debris ○ Dust
Misc	○ Garbology ○ Legacy pollution ○ Midden ○ Point source ○ Waste
Responses	○ Cleaner production ○ Industrial ecology ○ Pollution haven hypothesis ○ Pollutant release and transfer register ○ Polluter pays principle ○ Pollution control ○ Waste minimisation ○ Zero waste
Lists	○ Diseases ○ Law by country ○ Most polluted cities ○ Least polluted cities by $PM_{2.5}$ ○ Most polluted countries ○ Most polluted rivers ○ Treaties

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Natural resources

Air

Pollution / quality
- Ambient standards (US)
- Index
- Indoor
- Law
  - Clean Air Act (US)
- Ozone depletion

Emissions
- Airshed
- Trading
- Deforestation (REDD)

Energy
- Bio
- Law
- Resources
- Fossil fuels (gas, peak coal, peak gas, peak oil)
- Geothermal
- Hydro
- Nuclear
- Solar
  - sunlight
  - shade
- Wind

Land

- Agricultural
  - arable
    - peak farmland
- Degradation
- Field
- Landscape
  - cityscape
  - seascape
  - soundscape
  - viewshed
- Law
  - property
- Management
  - habitat conservation
- Minerals
  - gemstone
  - industrial
  - ore
    - metal
  - mining
    - law
    - sand
  - peak
    - copper
    - phosphorus
  - rights
- Soil
  - conservation
  - fertility
  - health
  - resilience
- Use
  - planning
  - reserve

- Biodiversity
- Bioprospecting
  - biopiracy
- Biosphere
- Bushfood
- Bushmeat
- Fisheries
  - climate change
  - law
  - management
- Forests
  - genetic resources
  - law
  - management
  - non-timber products
- Game
  - law
- Marine conservation
- Meadow
- Pasture
- Plants
  - FAO Plant Treaty
  - food
  - genetic resources
  - gene banks
  - herbal medicines
  - UPOV Convention
  - wood
- Rangeland
- Seed bank
- Wildlife
  - conservation
  - management

Life

Water

Types / location

- Aquifer
  - storage and recovery
- Drinking
- Fresh
- Groundwater
  - pollution
  - recharge
  - remediation
- Hydrosphere
- Ice
  - bergs
  - glacial
  - polar
- Irrigation
  - *huerta*
- Marine
- Rain
  - harvesting
- Stormwater
- Surface water
- Sewage
  - reclaimed water
- Watershed
- Desalination
- Floods
- Law
- Leaching
- Sanitation
  - improved
- Scarcity
- Security
- Supply

Aspects

- Efficiency
- Conflict
- Conservation
- Peak water
- Pollution
- Privatization
- Quality
- Right
- Resources
  - improved
  - policy

- Commons
  - enclosure
  - global
  - land
  - tragedy of
- Economics
  - ecological
  - land
- Ecosystem services
- Exploitation
  - overexploitation
  - Earth Overshoot Day
- Management
  - adaptive
- Natural capital
  - accounting
  - good
- Natural heritage
- Nature reserve
  - remnant natural area
- Systems ecology
- Urban ecology
- Wilderness

Related

Resource
- Common-pool
- Conflict (perpetuation)
- Curse
- Depletion
- Extraction
- Nationalism
- Renewable / Non-renewable

Politics
- Oil war
- Petrostate
- Resource war

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Category

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Occupational safety and health

Occupational diseases and injuries

- Acrodynia
- Asbestosis
- Asthma
- Barotrauma
- Berylliosis
- Brucellosis
- Burnout
- Byssinosis ("brown lung")
- Cardiovascular
- Chalicosis
- Chronic solvent-induced encephalopathy
- Chronic stress
- Chimney sweeps' carcinoma
- Coalworker's pneumoconiosis ("black lung")
- Concussions in sport
- Decompression sickness
- De Quervain syndrome
- Erethism
- Exposure to human nail dust
- Farmer's lung
- Fiddler's neck
- Flock worker's lung
- Glassblower's cataract
- Golfer's elbow
- Hearing loss
- Hospital-acquired infection
- Indium lung
- Laboratory animal allergy
- Lead poisoning
- Low back pain
- Mesothelioma
- Metal fume fever
- Mule spinners' cancer
- Noise-induced hearing loss
- Phossy jaw
- Pneumoconiosis
- Radium jaw
- Repetitive strain injury
- Silicosis
- Silo-filler's disease
- Sports injury
- Surfer's ear
- Tennis elbow
- Tinnitus
- Writer's cramp

Occupational hygiene		○ Occupational hazard
		  ○ Biological hazard
		  ○ Chemical hazard
		  ○ Physical hazard
		  ○ Psychosocial hazard
		○ Occupational stress
		○ Hierarchy of hazard controls
		○ Prevention through design
		○ Exposure assessment
		○ Occupational exposure limit
		○ Occupational epidemiology
		○ Workplace health surveillance

Professions		○ Environmental health ○ Industrial engineering ○ Occupational health nursing ○ Occupational health psychology ○ Occupational medicine ○ Occupational therapist ○ Safety engineering
Agencies and organizations	**International**	○ European Agency for Safety and Health at Work ○ International Labour Organization ○ World Health Organization
	National	○ Canadian Centre for Occupational Health and Safety (Canada) ○ Istituto nazionale per l'assicurazione contro gli infortuni sul lavoro (Italy) ○ National Institute for Safety and Health at Work (Spain) ○ Health and Safety Executive (UK) ○ Occupational Safety and Health Administration ○ National Institute for Occupational Safety and Health (US)
Standards		○ Bangladesh Accord ○ OHSAS 18001 ○ ISO 45001 ○ Occupational Safety and Health Convention, 1981 ○ Worker Protection Standard (US) ○ Working Environment Convention, 1977

Safety

- Checklist
- Code of practice
- Contingency plan
- Diving safety
- Emergency procedure
- Emergency evacuation
- Hazard
- Hierarchy of hazard controls
  - Hazard elimination
  - Administrative controls
  - Engineering controls
  - Hazard substitution
  - Personal protective equipment
- Job safety analysis
- Lockout-tagout
- Permit To Work
- Operations manual
- Redundancy (engineering)
- Risk assessment
- Safety culture
- Standard operating procedure
- Immediately dangerous to life or health

Legislation

- Diving regulations
- Occupational Safety and Health Act (United States)
- Potty parity (United States)
- Right to sit (United States)
- Workers' right to access the toilet

- Aerosol
- Break
- Break room
- Drug policy
- Effects of overtime
- Environment, health and safety
- Environmental toxicology
- Ergonomics
- Fire Fighter Fatality Investigation and Prevention Program
- Hawks Nest Tunnel disaster
- Health physics
- Hostile work environment
- Indoor air quality
- International Chemical Safety Card

See also

- Job strain
- National Day of Mourning (Canada)
- NIOSH air filtration rating
- Overwork
- Process safety
- Public health
- Quality of working life
- Risk management
- Safety data sheet
- Source control
- Toxic tort
- Toxic workplace
- Workers' compensation
- Workplace hazard controls for COVID-19
- Workplace health promotion

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  - Occupational diseases
  - Journals
  - Organizations
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Heating, ventilation, and air conditioning

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

Technology

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

Components

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

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

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

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National	○ United States ○ Latvia ○ Israel

About Oklahoma City

For other uses, see Oklahoma City (disambiguation).

Oklahoma City is located in the United States

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Oklahoma City
Oklahoma
City
Location within the United States

Oklahoma City

State capital city

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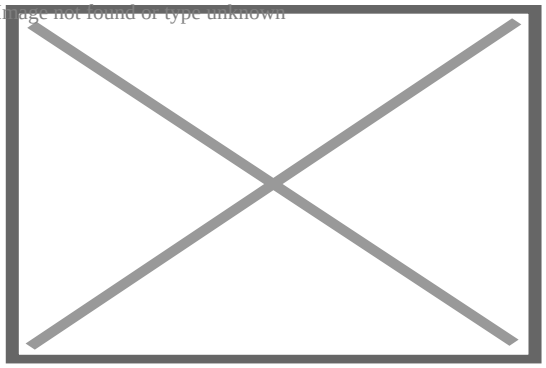

Downtown Oklahoma City

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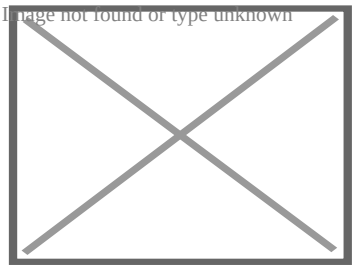

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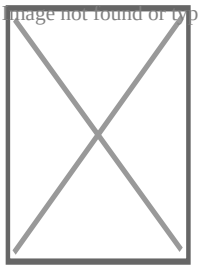

Skydance Bridge

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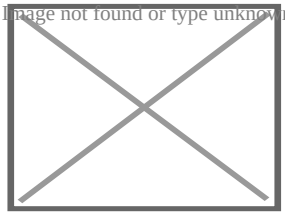

Oklahoma City National Memorial

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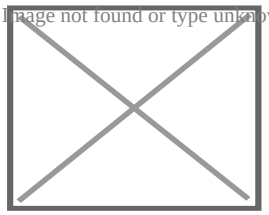

Oklahoma State Capitol

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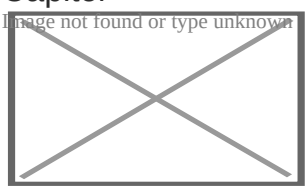

Paycom Center

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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
Oklahoma
City
Location within the state of
Oklahoma

Coordinates: 35°28?7?N 97°31?17?W
ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¯ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â»ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚¿ /
ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¯ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â»ÃƒÆ’Ã¢â‚¬Å¡Ãƒâ€šÃ‚¿35.46861°N
97.52139°WCountryUnited StatesStateOklahomaCounties

- Oklahoma
- Canadian
- Cleveland
- Pottawatomie

FoundedApril 22, 1889[3]IncorporatedJuly 15, 1890[3]Government

• TypeCouncil–manager • BodyOklahoma City Council • MayorDavid Holt (R) • City managerCraig FreemanArea

[4]
• City

620.79 sq mi (1,607.83 km^2) • Land606.48 sq mi (1,570.77 km^2) • Water14.31 sq mi (37.06 km^2) • Urban

421.73 sq mi (1,092.3 km^2)Elevation

[5]

1,198 ft (365 m)Population

(2020)
• City

681,054 (Rank62nd in North America
20th in the United States
1st in Oklahoma • Density1,122.96/sq mi (433.58/km^2) • Urban

982,276 (US: 46th) • Urban density2,329.2/sq mi (899.3/km^2) • Metro

[6]

1,441,695 (US: 42nd)

- Oklahoma Cityan
- Oklahoma Citian

Demonyms
GDP

[7]

• Metro$100.054 billion (2023)Time zoneUTC?6 (Central (CST)) • Summer (DST)UTC?5 (CDT)ZIP Codes

Zip codes[8]

Area code(s)405/572FIPS code40-55000GNIS feature ID1102140[5]Websitewww.okc.gov

Oklahoma City (/ÃƒÆ'Ã†â€™Ãƒâ€šÃ¬Ã‚Â¹ÃƒÆ'Ã¢â‚¬Â¦Ãƒâ€šÃ¬Ã¢â€šÂ¬ÃƒÆ'Ã†â€™Ãƒâ€¹Ã‚Â ÃƒÆ'Ã¢â‚¬Â¦Ãƒâ€šÃ‚Â klÃƒÆ'Ã†â€™Ãƒâ€šÃ¬Ã¢â€šÂ¬Ã‚Â°ÃƒÆ'Ã‚Â¢Ãƒâ€šÃ¬Ã¢â€šÂ¬Ã‚Â¦Ã‚¾Ãƒâ€šÃ‚Â¢ÃƒÆ'Ã†â€™Ãƒâ€šÃ¬Ã¢â€šÂ¬Ã‚Â¹ÃƒÆ'Ã¢â‚¬Â¦Ãƒâ€šÃ¬Ã‚Â hoÃƒÆ'Ã†â€™Ãƒâ€¹Ã‚Â ÃƒÆ'Ã¢â‚¬Â¦Ãƒâ€šÃ‚Â mÃƒÆ'Ã†â€™Ãƒâ€šÃ¬Ã¢â€šÂ¬Ã‚Â°ÃƒÆ'Ã‚Â¢Ãƒâ€šÃ¬Ã¢â€šÂ¬Ã‚Â¦Ã‚¾Ãƒâ€šÃ‚Â¢ -/ÃƒÆ'Ã†â€™Ãƒâ€šÃ‚Â¢ÃƒÆ'Ã‚Â¢Ã¢â‚¬Å¡Ã‚Â¬Ã¢â€žÃ¢â‚¬Å“ÃƒÆ'Ã¢â‚¬Â¦Ã¢â‚¬Å“), officially the **City of Oklahoma City**, and often shortened to **OKC**, is the capital and most populous city of the U.S. state of Oklahoma. The county seat of Oklahoma County,[9] its population ranks 20th among United States cities and 8th in the Southern United States. The population grew following the 2010 census and reached 681,054 in the 2020 census.[10] The Oklahoma City metropolitan area had a population of 1,396,445,[11] and the Oklahoma City–Shawnee Combined Statistical Area had a population of 1,469,124,[11] making it Oklahoma's largest municipality and metropolitan area by population.

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).

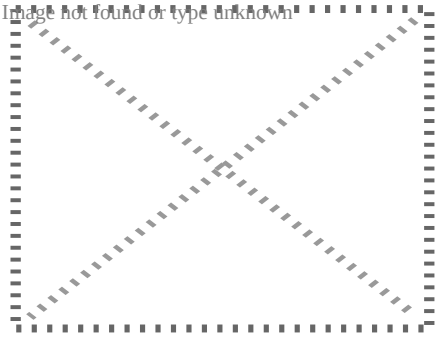
Oklahoma City is on the I-35 and I-40 corridors, one of the primary travel corridors south into neighboring Texas and New Mexico, north towards Wichita and Kansas City, west to Albuquerque, and east towards Little Rock and Memphis. Located in the state's Frontier Country region, the city's northeast 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.

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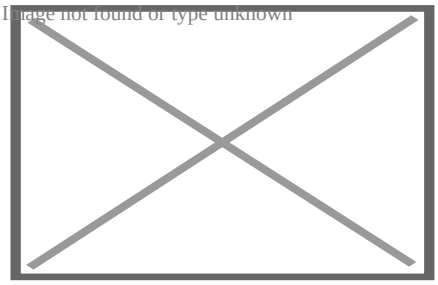
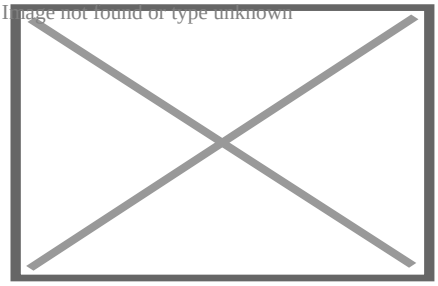
Oklahoma City was settled on April 22, 1889,[17] when the area known as the "Unassigned Lands" was opened for settlement in an event known as "The Land Run".[18]

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.

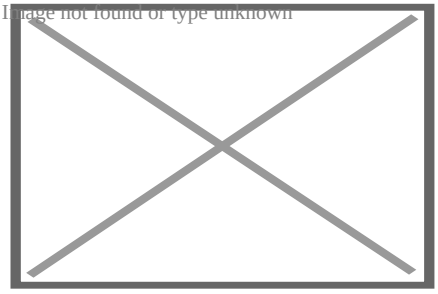
Before World War II, Oklahoma City developed significant stockyards, attracting jobs and revenue formerly in Chicago and Omaha, Nebraska. With the 1928 discovery of oil within the city limits (including under the State Capitol), Oklahoma City became a major center of oil production.[21] Post-war growth 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.

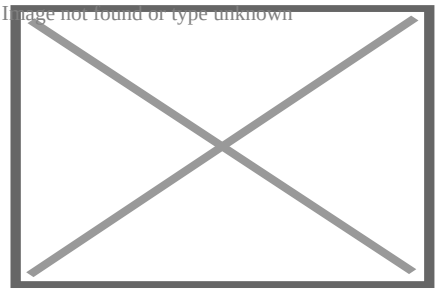
Residents of Oklahoma City suffered substantial losses on April 19, 1995, when Timothy McVeigh detonated a bomb in front of the Murrah building. The building was destroyed (the remnants of which had to be imploded in a controlled demolition later that year), more than 100 nearby buildings suffered severe 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 km^2),[35] of which 601.11 square miles (1,556.9 km^2) is land and 19.23 square miles (49.8 km^2) 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 km^2) resulting in a 2013 estimated density of 2,500 per square mile (970/km^2), compared with larger rural watershed areas incorporated by the city, which cover the remaining 377 sq mi (980 km^2) 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

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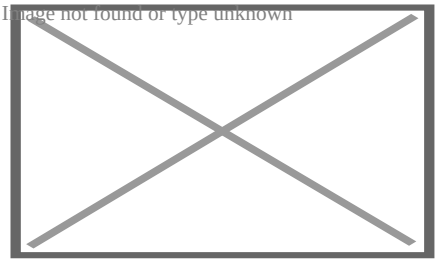

Automobile Alley in Oklahoma City

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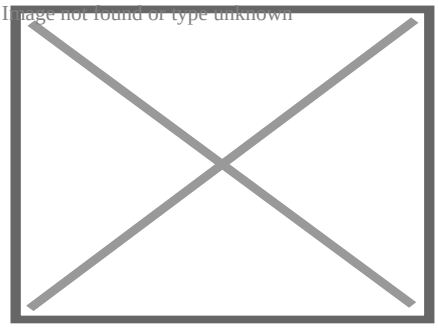

Looking up in the heart of Oklahoma City's Central Business District

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 derechoes. 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] extrem 1890?present[b]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yea
Record high °F (°C)	83 (28)	92 (33)	97 (36)	100 (38)	104 (40)	107 (42)	110 (43)	113 (45)	108 (42)	97 (36)	87 (31)	86 (30)	11 (45
Mean maximum °F (°C)	71.7 (22.1)	77.1 (25.1)	84.2 (29.0)	86.9 (30.5)	92.3 (33.5)	96.4 (35.8)	102.4 (39.1)	101.5 (38.6)	96.2 (35.7)	88.9 (31.6)	79.1 (26.2)	71.2 (21.8)	103 (39.
Mean daily maximum °F (°C)	49.3 (9.6)	53.8 (12.1)	62.9 (17.2)	71.1 (21.7)	78.9 (26.1)	87.5 (30.8)	93.1 (33.9)	92.2 (33.4)	83.9 (28.8)	72.8 (22.7)	60.7 (15.9)	50.4 (10.2)	71. (21.
Daily mean °F (°C)	38.2 (3.4)	42.3 (5.7)	51.2 (10.7)	59.3 (15.2)	68.2 (20.1)	76.9 (24.9)	81.7 (27.6)	80.7 (27.1)	72.7 (22.6)	61.1 (16.2)	49.2 (9.6)	40.0 (4.4)	60. (15.
Mean daily minimum °F (°C)	27.0 (?2.8)	30.8 (?0.7)	39.5 (4.2)	47.5 (8.6)	57.6 (14.2)	66.2 (19.0)	70.3 (21.3)	69.1 (20.6)	61.5 (16.4)	49.4 (9.7)	37.7 (3.2)	29.5 (?1.4)	48. (9.3
Mean minimum °F (°C)	11.7 (?11.3)	15.4 (?9.2)	21.5 (?5.8)	32.3 (0.2)	43.8 (6.6)	56.6 (13.7)	63.6 (17.6)	61.7 (16.5)	48.4 (9.1)	33.8 (1.0)	21.7 (?5.7)	14.3 (?9.8)	7.5 (?13
Record low °F (°C)	?11 (?24)	?17 (?27)	1 (?17)	20 (?7)	32 (0)	46 (8)	53 (12)	49 (9)	35 (2)	16 (?9)	9 (?13)	?8 (?22)	?1 (?2
Average precipitation inches (mm)	1.32 (34)	1.42 (36)	2.55 (65)	3.60 (91)	5.31 (135)	4.49 (114)	3.59 (91)	3.60 (91)	3.72 (94)	3.32 (84)	1.68 (43)	1.79 (45)	36.3 (924
Average snowfall inches (cm)	1.8 (4.6)	1.8 (4.6)	0.8 (2.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.5 (1.3)	1.8 (4.6)	6.7 (17

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	82.
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	4.9
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.
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)	46. (7.8
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	3,089
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.
Percent possible sunshine	64	62	66	69	68	75	80	79	71	70	60	60	69
Average ultraviolet index	3	4	6	8	9	10	10	9	8	5	3	2	6.4

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/km^2). There were 256,930 housing units at an average density of 375.9 per square mile (145.1/km^2). 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]

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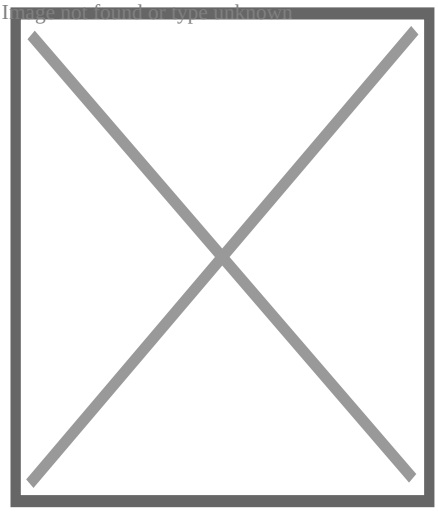


Map of racial distribution of the Oklahoma City area, 2020 U.S. census. Each dot is one person:
ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€šÃ‚Â¬Ã‚Â¬Ã‚Â¦Ãƒâ€šÃ‚Â¤
White

ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€šÃ‚Â¬Ã‚Â¬Ã‚Â¦Ãƒâ€šÃ‚Â¤ Black

ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€šÃ‚Â¬Ã‚Â¬Ã‚Â¦Ãƒâ€šÃ‚Â¤ Asian

ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€šÃ‚Â¬Ã‚Â¬Ã‚Â¦Ãƒâ€šÃ‚Â¤ Hispanic

ÃƒÆ’Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€šÃ‚Â¬Ã‚Â¬Ã‚Â¦Ãƒâ€šÃ‚Â¤ Multiracial

ÃƒÆ'Ã†â€™Ãƒâ€šÃ‚Â¢Ãƒâ€™Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â¬Ã‚Â¬Ãƒâ€™Ã¢â‚¬Å¡Ãƒâ€šÃ‚Â¤ 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

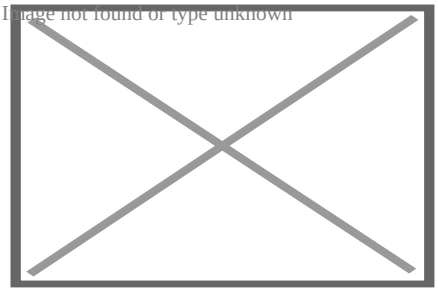
Note: the US Census treats Hispanic/Latino as an ethnic category. This table excludes Latinos from the racial categories and assigns them to a separate category. Hispanics/Latinos may be of any race.

Race / Ethnicity (*NH* = *Non-Hispanic*)	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]

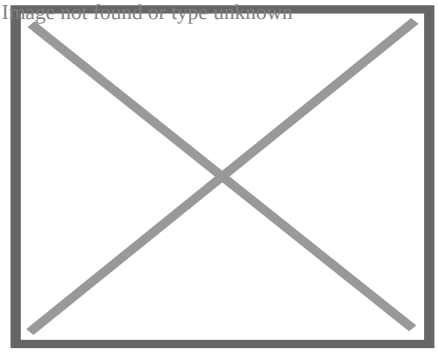
Crime

[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.

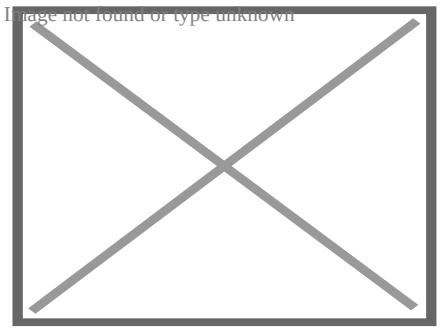


The Murrah Federal Building after the attack

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	Integris 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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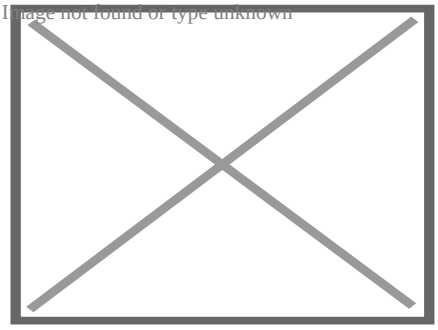
Water taxis in Oklahoma City's downtown Bricktown neighborhood

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.

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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 m^2) 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

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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 in 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)

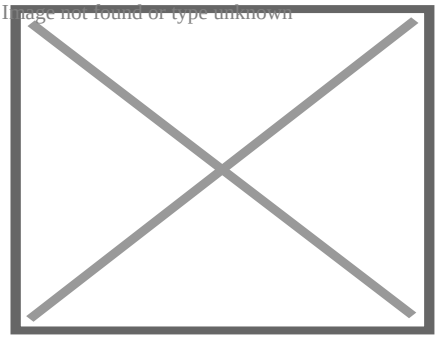
2028 Olympics

[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]

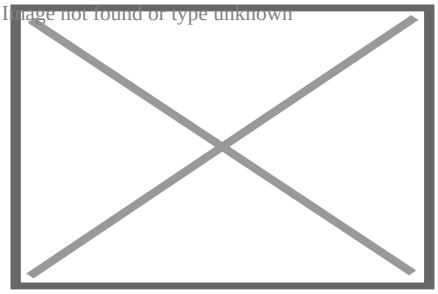
Walking trails line the Bricktown Canal and the Oklahoma River in downtown. The city's bike trail system follows around Lake Hefner and Lake Overholser in the northwest and west quadrants of the city. The majority of the east shore area of Lake Hefner is taken up by parks and bike trails, including a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

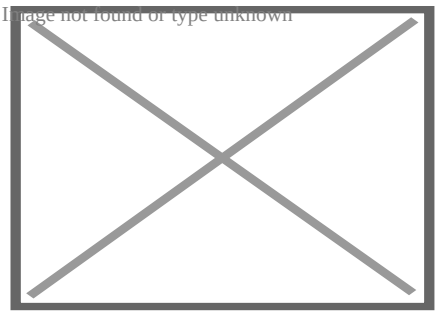
Oklahoma City is also home to the American Banjo Museum, which houses a large collection of highly decorated banjos from the early 20th century and exhibits the banjo's history and its place in American history. Concerts and lectures are also held there.

Government

[edit]
Main article: Government of Oklahoma City
See also: List of mayors of Oklahoma City



Oklahoma State Capitol, seen from the OK History Center



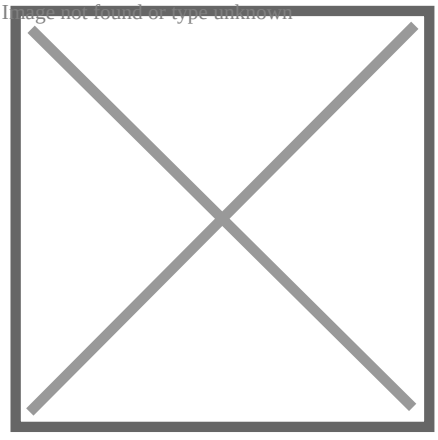
The Art Deco city hall building, a block from the Civic Center

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]

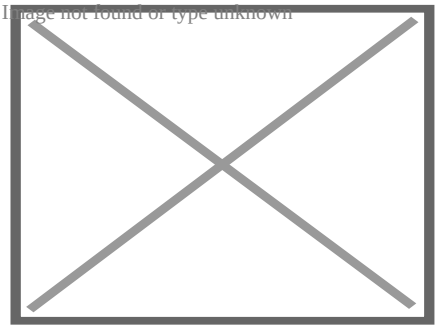
- Brazil Rio de Janeiro, Brazil
- China Haikou, China
- Mexico Puebla, Mexico
- Peru Piura, Peru
- Rwanda Kigali, Rwanda
- Russia Ulyanovsk, Russia (suspended August, 2022)
- Taiwan Tainan, Taiwan
- Taiwan Taipei, Taiwan
- Australia Darwin, Australia

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*]

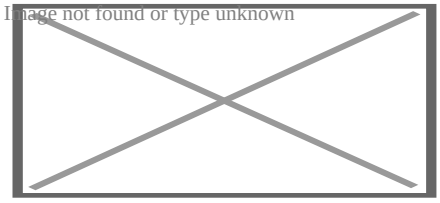
The third-largest university in the state, the University of Central Oklahoma, is just north of the city in the suburb of Edmond. Oklahoma Christian University, one of the state's private liberal arts institutions, is just south of the Edmond border, inside the Oklahoma City limits.[126]

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, Crutcho, 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 KWTV-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).

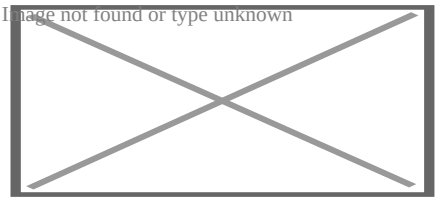
Despite the market's geographical size, none of the English-language commercial affiliates in the Oklahoma City designated market area operate full-power satellite stations covering the far northwestern part of the state (requiring cable or satellite to view them). However, KFOR-TV, KOCO-TV, KWTV-DT, 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

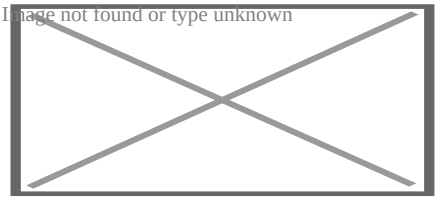
[edit]

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)

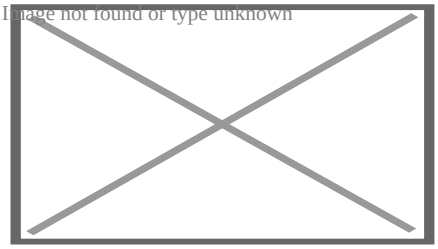
- Interstate 235 (Centennial Expressway) / U.S. 77 (Broadway Extension)
- Interstate 240 (Southwest Expressway)
- Lake Hefner Parkway (State Highway 74)
- Airport Road (State Highway 152)
- Kilpatrick Turnpike

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

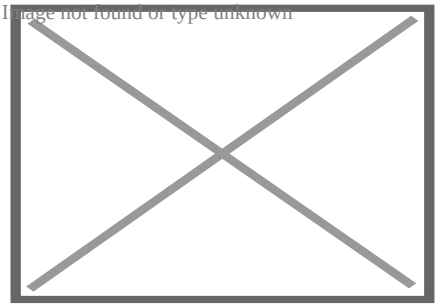
[edit]

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*]

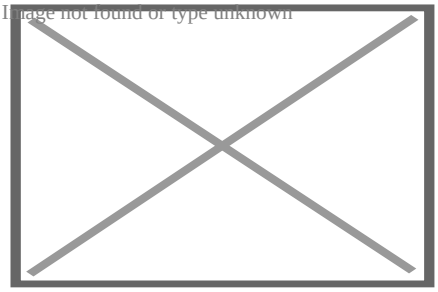
Walkability

[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

[edit]

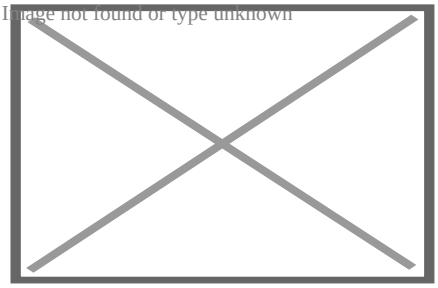


OU Physicians Center

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

Portals:

- icon Geography
- map North America
- flag Oklahoma
- flag United States
- Cities

Notes

[edit]

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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- Official city website
- Oklahoma City tourism information
- Convention & Visitors' Bureau
- City-Data page
- Oklahoma City Historic Film Row District website Archived March 11, 2018, at the Wayback Machine
- *New York Times* travel article about Oklahoma City
- OKC.NET cultural commentary about Oklahoma City
- Voices of Oklahoma interview with Ron Norick Archived April 25, 2010, at the Wayback Machine, mayor during the Oklahoma City bombing

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City of Oklahoma City

- Bombing
- Climate
- Education
- Government
- People
- History
- Timeline
- Mayors
- Media
- Transportation
  - Streetcar

Districts

- Adventure District
- Asia District
- Capitol Hill
- Downtown
- Eastside
- Midtown
- Paseo
- 39th Street
- Uptown
- Western Avenue

Professional sports teams	○ Oklahoma City Thunder ○ Oklahoma City Blue ○ Oklahoma City Comets ○ Oklahoma City Energy FC ○ Oklahoma City Spark

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○ Metro area
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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
Population over 20,000	○ Bethany ○ Del City ○ Mustang ○ Shawnee ○ Yukon
Population over 10,000	○ Chickasha ○ Choctaw ○ El Reno ○ Guthrie ○ Newcastle ○ Warr Acres
Population over 5,000	○ Blanchard ○ Harrah ○ Noble ○ 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
Population over 1,000	○ Crescent ○ Forest Park ○ Langston ○ Luther ○ Maud ○ Meeker ○ Minco ○ Ninnekah ○ Okarche ○ Rush Springs ○ Union City
Population over 500	○ Carney ○ Cashion ○ Cole ○ Davenport ○ Dibble ○ Earlsboro ○ Valley Brook ○ Verden ○ Washington ○ Wayne ○ Wellston

Population over 200	○ Alex ○ Agra ○ Amber ○ Asher ○ Bridge Creek ○ Byars ○ Calumet ○ 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
Counties	○ Canadian ○ Cleveland ○ Grady ○ Logan ○ Lincoln ○ McClain ○ Oklahoma ○ Pottawatomie
Metropolitan planning organization	○ Association of Central Oklahoma Governments

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Skyscrapers in Oklahoma City

Current

- 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

See also

- List of tallest buildings in Oklahoma City

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State of Oklahoma

Oklahoma City (capital)

Topics

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

- Abortion
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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

Counties

- 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
- Kay
- Kingfisher
- Kiowa
- Latimer
- Le Flore
- Lincoln
- Logan
- Love
- Major
- Marshall
- Mayes
- McClain
- McCurtain
- McIntosh
- Murray

flag **Oklahoma portal**

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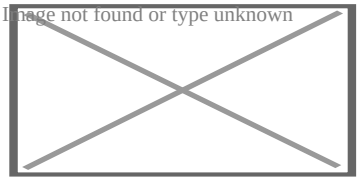
Municipalities and communities of Canadian County, Oklahoma, United States

County seat: **El Reno**

Cities	○ El Reno ○ Geary‡ ○ Mustang ○ Oklahoma City‡ ○ Piedmont‡ ○ Yukon
Towns	○ Calumet ○ Okarche‡ ○ Union City
CDP	○ Cedar Lake
Other communities	○ Concho ○ Scott‡
Footnotes	‡This populated place also has portions in an adjacent county or counties


Canadian County map

- Oklahoma portal
- United States portal

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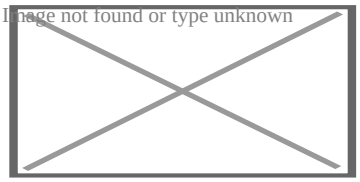
Municipalities and communities of Cleveland County, Oklahoma, United States

County seat: **Norman**

Cities	○ Lexington ○ Moore ○ Noble ○ Norman ○ Oklahoma City‡ ○ Purcell‡
Towns	○ Etowah ○ Slaughterville


Cleveland County map

Neighborhood	○ Hall Park
Footnotes	‡This populated place also has portions in an adjacent county or counties

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Municipalities and communities of Oklahoma County, Oklahoma, United States

County seat: **Oklahoma City**

Cities	○ Bethany ○ Choctaw ○ Del City ○ Edmond ○ Harrah ○ Midwest City ○ Nichols Hills ○ Nicoma Park ○ Oklahoma City‡ ○ Spencer ○ The Village ○ Warr Acres
Towns	○ Arcadia ○ Forest Park ○ Jones ○ Lake Aluma ○ Luther ○ Smith Village ○ Valley Brook ○ Woodlawn Park
Unincorporated communities	○ Britton ○ Crutcho ○ Newalla ○ Wheatland
Footnotes	‡This populated place also has portions in an adjacent county or counties

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Oklahoma County map

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- United States portal

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Municipalities and communities of Pottawatomie County, Oklahoma, United States

County seat: **Shawnee**

Cities	○ Maud‡ ○ Oklahoma City‡ ○ Shawnee ○ Tecumseh
Towns	○ Asher ○ Bethel Acres ○ Brooksville ○ Earlsboro ○ Johnson ○ Macomb ○ McLoud ○ Pink ○ St. Louis ○ Tribbey ○ Wanette
CDP	○ Dale
Other communities	○ Aydelotte ○ Bellemont ○ Centerview ○ Garden Grove ○ Harjo ○ Pearson ○ Romulus ○ Sacred Heart ○ Trousdale
Ghost towns	○ Avoca ○ Keokuk Falls
Footnotes	‡This populated place also has portions in an adjacent county or counties

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Pottawatomie County map

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- 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
- **NM** Santa Fe
- **NY** Albany
- **NC** Raleigh
- **ND** Bismarck
- **OH** Columbus
- **OK** Oklahoma City
- **OR** Salem
- **PA** Harrisburg
- **RI** Providence
- **SC** Columbia
- **SD** Pierre
- **TN** Nashville
- **TX** Austin

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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
- Lawton
- Madill
- Mangum
- Marietta
- McAlester
- Medford
- Miami
- Muskogee
- New Cordell
- Newkirk
- Norman
- Nowata
- Okemah
- Oklahoma City
- Okmulgee

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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. Oklahoma City, Oklahoma
21. Nashville, Tennessee
22. El Paso, Texas
23. Washington, D.C.
24. Las Vegas, Nevada
25. Boston, Massachusetts
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. Long Beach, California
44. Miami, Florida
45. Oakland, California
46. Minneapolis, Minnesota
47. Tulsa, Oklahoma
48. Bakersfield, California
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. Pittsburgh, Pennsylvania
69. Greensboro, North Carolina
70. Lincoln, Nebraska
71. Durham, North Carolina
72. Plano, Texas
73. Anchorage, Alaska
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
93. Garland, Texas
94. Boise, Idaho
95. Norfolk, Virginia
96. Port St. Lucie, Florida
97. Spokane, Washington
98. Richmond, Virginia
99. Fremont, California

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

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International	○ VIAF ○ FAST ○ WorldCat
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Geographic	○ MusicBrainz area
Other	○ IdRef ○ NARA

About Durham Supply Inc

Photo

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Things To Do in Tulsa County

Photo

The Tulsa Arts District

4.7 (22)

Photo

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The Blue Dome

4.5 (60)

Photo

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Streetwalker Tours

0 (0)

Photo

OkieTundra

4.5 (84)

Photo

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Bob Dylan Center

4.9 (245)

Photo

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The Outsiders House Museum

4.7 (885)

Driving Directions in Tulsa County

Driving Directions From Nights Stay Hotel to Durham Supply Inc

Driving Directions From Waffle House to Durham Supply Inc

Driving Directions From Harmon Security Group LLC. to Durham Supply Inc

Driving Directions From Subway to Durham Supply Inc

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Driving Directions From Blue Whale of Catoosa to Durham Supply Inc

Driving Directions From Tulsa Air and Space Museum & Planetarium to Durham Supply Inc

Driving Directions From Guthrie Green to Durham Supply Inc

Driving Directions From The Cave House to Durham Supply Inc

Driving Directions From Route 66 Historical Village to Durham Supply Inc

Driving Directions From Tours of Tulsa to Durham Supply Inc

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Reviews for Durham Supply Inc

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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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.

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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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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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.

Check our other pages :

- **Reviewing Key Safety Measures for Mobile Home HVAC Work**
- **Matching Compatibility of Controls and Existing Wiring**
- **Evaluating Newer Options to Replace Electric Heaters**
- **Monitoring Air Quality Factors During Mobile Home HVAC Upkeep**

Royal Supply Inc

Phone : +16362969959

City : Oklahoma City

State : OK

Zip : 73149

Address : Unknown Address

Google Business Profile

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

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