INDOOR AIR QUALITY

Health, Safety, and Well-being Guarantee

ABRAVA
BRAZILIAN ASSOCIATION OF REFRIGERATION, AIR CONDITIONING, VENTILATION AND HEATING
SINCE 1962

PNQAI
NATIONAL INDOOR AIR QUALITY PLAN

2nd Edition – April 2023

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Special thanks to the Technical Team

Eng. Arnaldo Basile – President of ABRAVA

Eng. Carlos Braga – Director of ABRAVA Regional Office MG, mechanical engineer and director at CBTEC Engenharia

Eng. Leonardo Cozac – ABRAVA Director, founder of Qualindoor – PNQAI manager – Indoor Air Quality specialist and CEO of Conforlab

Marcelo Munhoz – President of Qualindoor – PNQAI manager – Indoor Air Quality specialist – managing partner at Sicflux

Fábio Brevi – Qualindoor and PNQAI Consultant

ABRAVA
Av. Rio Branco, 1492
(11) 3361.7266
www.abrava.com.br

Credits

Produced by
ABRAVA – Brazilian Association of Refrigeration,
Air Conditioning, Ventilation and Heating
PNQAI – National Indoor Air Quality Plan

Technical Support
Eng. Carlos Henrique Madeira

Coordination and Editing
Alessandra Lopes –
Communications Agency

Contributors
Layout and Design – Daniella Miconi
Illustration – Fernando Pereira
Proofreading – Márcia Farias

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Introduction

Engineering in the service of everyone's well-being

The Brazilian Association of Refrigeration, Air Conditioning, Ventilation and Heating (ABRAVA) is yet another engineering entity bringing to the forefront the importance of implementing professional solutions to address indoor air quality.

In light of the serious consequences of the SARS-CoV-2 pandemic, engineering—as a key branch of science—has a responsibility to help ensure the well-being, health, and biosafety of people in enclosed spaces. ABRAVA fulfills this role by shedding light on this crucial issue.

To ensure that this and all activities exclusive to the fields of engineering, agronomy, and geosciences are carried out by properly qualified professionals, CREA-MG has increasingly strengthened its inspection process. The presence of a Technical Responsible professional and the registration of the Technical Responsibility Annotation (ART) are basic legal requirements for engineering services and projects.

I thank ABRAVA for the opportunity to address companies in the refrigeration, air conditioning, ventilation, and heating sectors, and I commend the initiative to raise public awareness about the importance of engineering, agronomy, and geosciences professionals in the daily life of our cities for the collective well-being.

Civil Engineer Lúcio Fernando Borges, President of CREA-MG

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Introduction

Quality of life and health depend on many factors.
Breathing clean, high-quality, impurity-free air is essential!

Research on the effects of pollution on health has shown a clear link between exposure to fine particulate matter found in the air and premature deaths, chronic illnesses, and respiratory problems. The danger caused by inhaling these particles depends not only on their shape and size, but also on their chemical composition and the place in the respiratory system where they are deposited.

With the expansion of urban activities—whether in homes, commercial spaces, industries, or service establishments—the average person now spends around 90% of their time indoors, which amounts to about 21 hours a day.

The present and future of high-quality indoor environments are increasingly tied to indoor air quality. Indoor Environmental Quality and Indoor Air Quality are two complementary concepts that play a growing role in shaping the design of spaces, architecture, systems and equipment definitions, solution integration, and energy use.

In this context, ABRAVA, together with specialists in Indoor Air Quality from industry and service sectors, has been actively promoting and implementing engineering best practices to protect people's health.

However, it's important to remember that change must go beyond the professionals in these represented sectors. A cultural shift in society is needed. Breathing air of proper quality in indoor environments is a right for all—governed by existing standards and regulations!

We work to ensure that everyone enjoys proper indoor air quality in their environments!

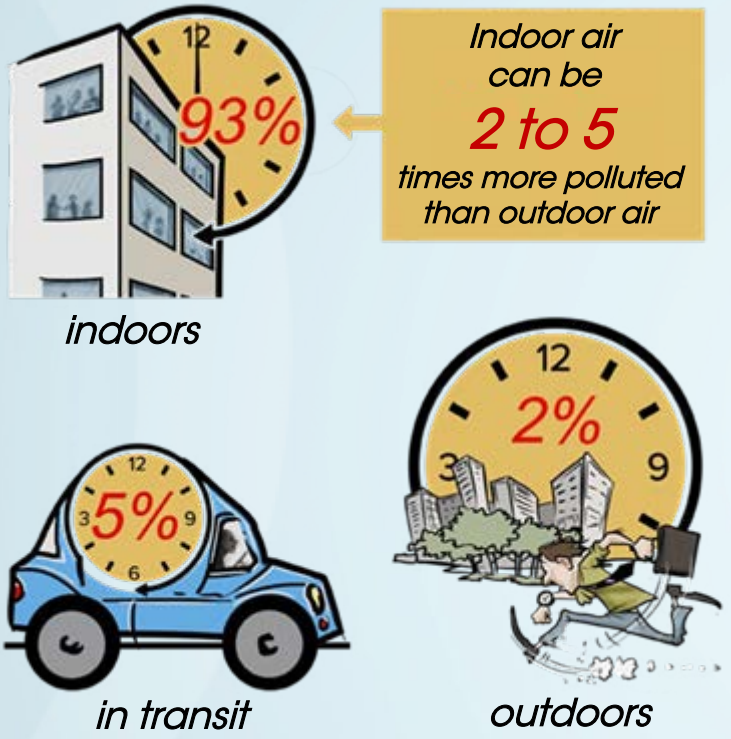
Eng. Carlos Braga – Regional Director, ABRAVA MG

Eng. Arnaldo Basile – President of ABRAVA

Air Conditioning and IAQ

Did you know that an adult breathes about 450 liters of air per hour, 10,000 liters per day, and spends approximately 93% of their day indoors?*

HVAC systems serve multiple purposes, and one of their most important functions is **maintaining indoor air quality**, which is vital for human health. In our daily lives, climate control is also essential for the proper functioning of society in a wide range of environments—such as the manufacturing and storage of medications, food production, hospitals, data centers, shopping malls, industrial facilities, airports, residences, and many other spaces where people gather.



*Source: EPA – United States Environmental Protection Agency

Air conditioning is good—and it's good for you!

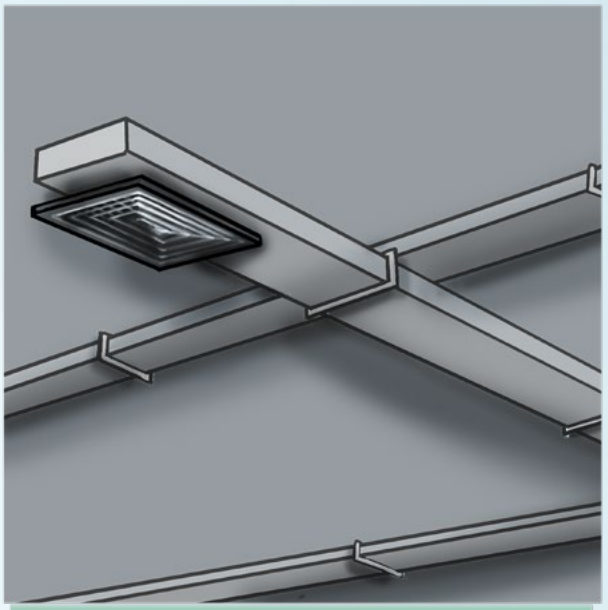
Artificial Climate Control and Its Benefits

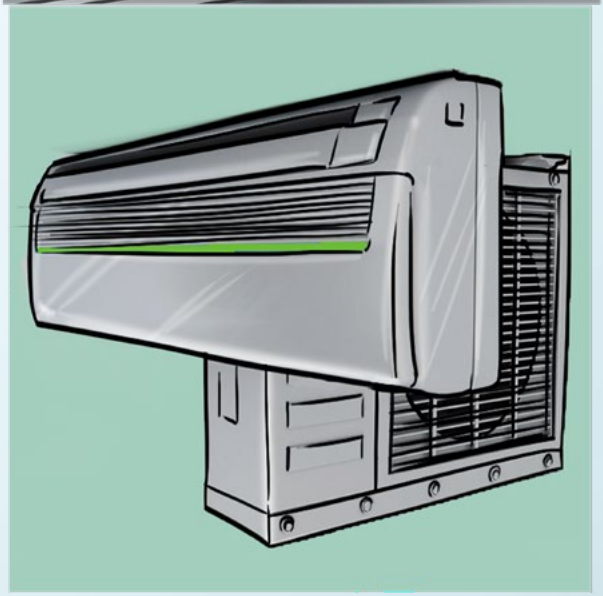
"Air-conditioned environments are physically defined spaces characterized by specific dimensions and installations, subjected to a climate control process through equipment." (Definition from ANVISA Resolution 09/03)

A mechanical HVAC system simultaneously controls the following functions:

- **Temperature control** – ensuring thermal comfort
- **Humidity control** – through humidification and/or dehumidification
- **Air renewal** – replacing indoor air by mixing it with outdoor air, thus diluting contaminants
- **Air filtration** – improving indoor air quality by removing pollutants through filters
- **Air distribution** – providing better homogenization of indoor conditions, preventing stagnation zones (pockets of stagnant air)

Among other technical aspects that also impact overall well-being.





BRS – Building-Related Syndrome

Did you know that **BRS – Building-Related Syndrome** – is one of the factors that directly affects a space's **indoor air quality?**

Since the 1980s, the World Health Organization (WHO) has recognized "Building-Related Syndrome." BRS can be understood as a group of illnesses caused or triggered by air pollution in enclosed spaces.

Specific care with local maintenance of the building structure and its systems—such as mechanical HVAC—can help prevent illnesses among occupants, reduce absenteeism, and most importantly, contribute to the protection of everyone's health.

The Impacts of IAQ on Health

The air we breathe is essential to our health, but indoor air is not always of adequate quality.
Learn about the types of contaminants present in the air we breathe and their implications for human health—causing conditions such as COVID-19, asthma, viral infections, allergies, among others.

- **Volatile Organic Compounds (VOCs)**, including formaldehyde, which can be found in various construction and maintenance products used in indoor environments such as carpets, vinyl, paints, plastics, furniture, electronics, cleaning products, and many others.

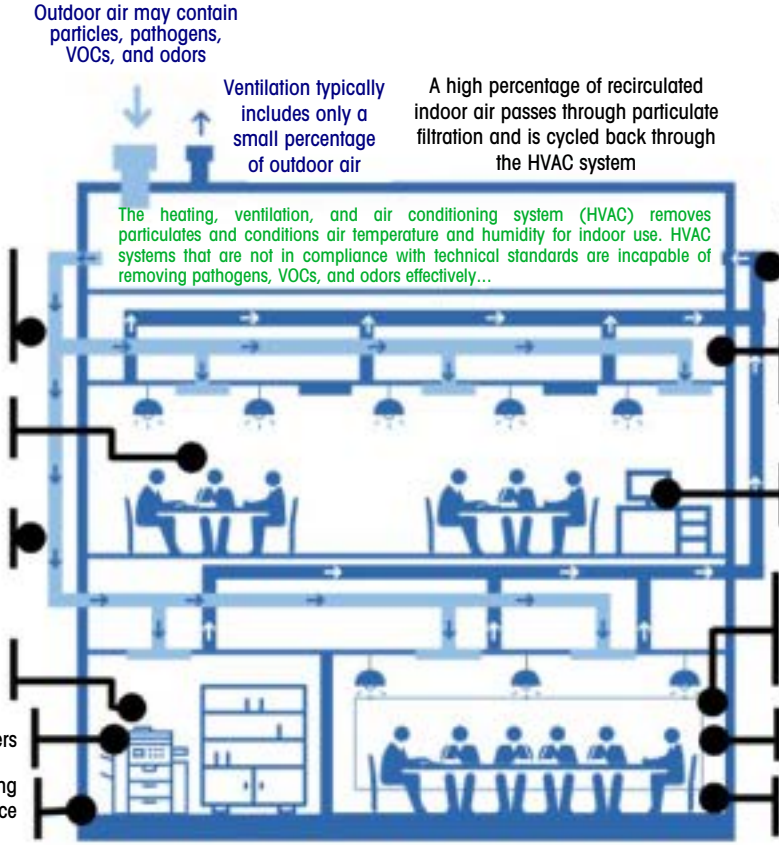
- **Particulate matter, solid or liquid, especially between 0.1 to 10 µm** (mineral fibers, synthetic fibers, spores, pollen, insect residues, aerosols, etc.)

- **Chemical contaminants** (carbon monoxide, carbon dioxide, nitrogen oxide and dioxide, sulfur dioxide, ammonia, formaldehydes, volatile organic compounds, etc.)

- **Biological contaminants** (fungi, bacteria, viruses)

IAQ in Indoor Environments

Indoor Air Quality at Work



*__Vocs__ - Volatile Organic Compounds
*__AVAC-R__ - Heating, Ventilation, Air Conditioning, and Refrigeration

IAQ in the School Environment

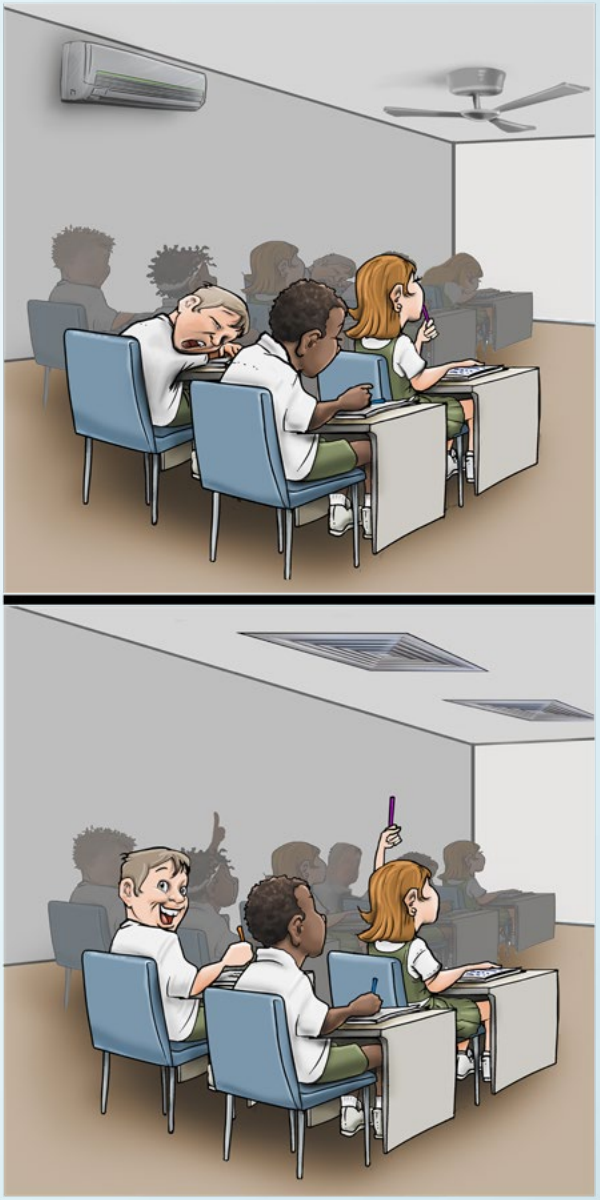
Thermal comfort should not be the only concern in a school environment!

Classrooms are spaces where indoor air quality **(IAQ)** can directly impact student performance. Therefore, the characteristics of these environments are crucial for both academic development and the healthy physical growth of students.

Standalone split-type air conditioners, as well as air circulators, are generally not recommended for schools, since most of them lack essential features like indoor air renewal. For an HVAC system to function properly, it must operate in compliance with applicable standards.

Keeping doors and windows open is not always the ideal solution, as it allows outdoor pollutants, noise, and uncomfortable temperatures to enter.

When in doubt, always consult a specialist.



Negligence is a crime!

IAC, CO_2, and Productivity

A properly air-conditioned environment that promotes well-being leads to increased productivity!

When evaluating productivity in an indoor space, one important factor to consider is the level of CO_2 (carbon dioxide) present. According to ANVISA Resolution 09, the maximum allowable concentration is 1000 ppm (parts per million), which equals just 0.1% of the air's composition.

When CO_2 levels exceed this limit, the productivity of individuals in the space tends to decrease, often due to involuntary drowsiness and impaired cognitive function.

High CO_2 concentration can negatively affect performance, causing slower thinking and reduced comprehension. It also impacts a person's health, potentially increasing absenteeism at work or school. This applies to all types of environments—cinemas, gyms, vehicles, and more.

Maintaining proper CO_2 levels is a sign of good ventilation and contributes to everyone's safety and productivity!

The Importance of Air Quality in Commercial Environments

According to public research, textile coverings such as carpets and rugs tend to function as a "filter" by retaining airborne particles on the floor, thereby contributing to improved indoor air quality.

In light of this, what should be done when deciding to use textile coverings in commercial environments to ensure better air quality and safeguard the health of occupants?

According to ANVISA's Resolution RE 09, any textile covering in your space must be cleaned regularly.

Lack of proper maintenance of textiles can indeed lead to the accumulation of dirt, negatively impacting indoor air quality. Therefore, it is essential for companies to take steps to ensure proper cleaning and maintenance of these materials.

Guidance can be found in the ABIT/ABRITAC guide available at www.abit.org.br or by scanning the QR code.

TAKE CARE OF THE AIR YOU BREATHE!!

Always hire qualified and certified professionals!

About

PNQAI

NATIONAL INDOOR AIR QUALITY PLAN

The National Indoor Air Quality Plan (PNQAI) is a civil society initiative launched in 2021 to raise public awareness about the importance of indoor air quality. It is supported by more than 40 organizations that work directly and indirectly on actions related to indoor air environments.

This initiative is led by the National Department of Indoor Air Quality – Qualindoor, part of ABRAVA. It operates in a horizontal structure through its affiliated associations and aims to mobilize society and promote measures that ensure healthy indoor air quality. The goal is to create healthier indoor environments and mitigate the harmful effects of poor air quality, which can negatively impact both health and productivity.

www.pnqai.com.br

Testimonials Regarding Indoor Air Quality

"The population has learned to take care of the water and food they consume many years ago; now it is time to start taking care of the air we breathe. We breathe approximately 10,000 liters of air per day. This air can contain contaminants, gases, particles, and microorganisms invisible to the naked eye that enter our bodies and can cause damage both in the short and long term. Knowing and caring for the air we breathe is essential for our health.

People can and should take care of the air inside their homes and demand that public places provide good quality air. Brazil has legislation published by ANVISA in 2003 that defines air quality standards for air-conditioned environments. By following these guidelines, people will be safer in enclosed spaces."

Dr. Gonçalo Vecina – Founder of Anvisa and Professor at FSP/ USP – Medical Consultant for PNQAI

"For various reasons, humans in their daily lives—whether at home, work, or even during transportation—due to their presence or the processes involved, end up contaminating the air. This contamination must be continuously removed to ensure that indoor air quality is adequate and satisfactory so as not to reduce a person's lifespan or their work capacity."

Eng. Oswaldo Bueno – Technical Consultant and Coordinator of CB 055 at ABRAVA

"We increasingly live in indoor environments. The nature of work is leading us toward indoor activities, and more and more, our leisure and social gatherings take place indoors. Air quality measures traditionally associated with industrial processes tend to extend to offices, commerce, leisure, culture, and why not, our own homes. The range of agents that can affect our health includes gases, particles, bioaerosols, volatile compounds, and more recently, infectious agents. We have entered a historic moment in which preserving indoor air quality will be a key determinant of quality of life and human health. In this context, the air quality manual developed by ABRAVA meets an immediate need of our society by providing objective indicators and pointing out ways to improve the health of Brazilians."

Dr. Paulo Saldiva – Full Professor, Department of Pathology at FMUSP – Medical Consultant for PNQAI

"For ABRALIMP, it is a great pleasure to participate in such a relevant initiative as PNQAI, a project that seeks to raise public awareness about the importance of indoor air quality and, through this, develop actions that promote health and well-being for all."

Erika Duarte – Technical Content Coordinator ABRALIMP (Brazilian Association of the Professional Cleaning Market)

Testimonials Regarding Indoor Air Quality

"THE IMPORTANCE OF INDOOR AIR QUALITY FOR PEOPLE'S LIVES

"The air inside buildings is responsible for the quality of life of the people who occupy these spaces. This quality involves healthfulness, comfort, and good outcomes in the activities carried out within these environments.

Ventilation and air conditioning systems (HVAC) play an important role in ensuring Indoor Air Quality (IAQ) and providing health and well-being for occupants. These systems, when properly designed, selected, installed, and maintained, should enable ventilation of the spaces with outside air, renewing the indoor air, diluting pollutants, filtering the air to reduce suspended particles, and helping reduce the risk of contamination by microorganisms."

Prof. Dr. Antonio Luís de Campos Mariani – Professor at the Polytechnic School of USP and Coordinator of LEQAI – Laboratory of Indoor Air Quality Studies at the Department of Mechanical Engineering

"We can make some choices when inside a public building, such as not drinking the water on site and bringing our own water, or not eating the food available there and bringing our own food. However, it is impossible to choose not to breathe the air in the place."

André Castilho – Biologist and Health Authority at COVISA

"We are experiencing the greatest health crisis of recent times where many lessons need to be learned. COVID-19 is an airborne disease, and therefore, indoor air quality must be prioritized as a non-pharmaceutical measure for controlling the pandemic. ASFIVISA is committed to collaborating and developing strategies for awareness and responsibility, in accordance with published norms and guidelines."

Dr. Nelzair Araújo Vianna – President of ASFIVISA (Association of Health Surveillance Inspectors of Salvador))

"For many decades, it was believed that textile coverings present in commercial environments harmed indoor air quality by encouraging the development of dust mites and other allergens.
However, recent research shows that contrary to expectations, these materials play a crucial role in improving air quality. Contributing to this scenario, ABIT-ABRITAC (Brazilian Association of the Textile Industry) developed a guide containing technical information on the proper maintenance of textile coverings in corporate environments."

Paulo Jubilut – Vice President of PNQAI and Coordinator of the ABIT-ABRITAC Guide (Brazilian Association of the Textile Industry) on Maintenance and Cleaning of Rugs, Carpets, and Doormats.

Testimonials Regarding Indoor Air Quality

"Indoor air quality is often neglected, and the air inside our homes and buildings can be more polluted than the air outside. This can be caused by various factors such as chemicals, mold, and even exhaled CO2. Breathing polluted air indoors can lead to health problems like allergies, asthma, and respiratory diseases. It is important to take measures to improve indoor air quality, and air conditioning is a great ally in this effort. When properly designed and maintained, it promotes adequate ventilation to dilute and filter unwanted pollutants. For this reason, ASBRAV and its members are focused on improving indoor air quality, creating healthier and safer environments for ourselves and our families."

Mario Henrique Canale – President of ASBRAV (Southern Brazilian Association of Refrigeration, Air Conditioning, Heating, and Ventilation)

"Working environment conditions are strongly related to the performance of their users. The conditions for carrying out activities within a company are very important—especially in indoor office buildings where air conditioning is present and adequate indoor air quality and thermal comfort standards are required. Facility Managers have a strong interest in indoor air quality (IAQ) due to the rational use of the system, comfort, and consequently better energy use. On the other hand, companies want comfort for employees and a reduction in absenteeism and health-related leaves. This topic gained even more attention after the pandemic, with proper health standards in office environments where people spend most of their time."

Irimar Palombo – President of ABRAFAC (Brazilian Association of Facility Management, Property & Workplace)

"Air quality is a crucial factor for the health of environments, and this issue is directly connected to the technical decisions made by designers. As architects, we have an essential role in disease prevention, especially following the pandemic, which highlighted the importance of this topic. We, as professionals, are responsible for calculating air renewal in spaces, ensuring air quality and the safety of the people who use them. To do this, we must consider various factors such as natural ventilation, the use of climate control equipment, and selecting materials that do not emit pollutants. In summary, air quality is a fundamental aspect of architecture that must be considered in every project, with the goal of promoting healthy and safe environments."

Julia Teixeira – Architect, Ph.D. – Counselor at CAU-DF (Council of Architecture and Urbanism – Federal District)

"At CFT, we emphasize the importance of air quality. We prioritize this even in our seminars, congresses, and plenary sessions, which as a rule must be held in places where air filtration and renewal comply with RE-09 and NBR 16401 standards. We know that our industrial technicians connected to the HVAC-R field continually reinforce this knowledge through our internal training seminars, also promoting awareness about air quality on our social media and other media outlets. Air quality is a tool that reduces workplace absenteeism, improves school performance, and—much more than that—saves lives. We are partners with entities, associations, and initiatives that spread this knowledge."

Solomar Rockembach – President of CFT (Federal Council of Industrial Technicians)

Technical Observations Regarding Indoor Air Quality (IAQ)

To ensure a healthy and comfortable environment for humans, it is necessary to follow some technical guidelines defined by ANVISA and ABNT, such as:

Maintain:

- **Temperature**
  Summer: 23°C to 26°C
  Winter: 20°C to 22°C

- **Relative Humidity**
  Summer: 40% to 65%
  Winter: 35% to 65%

- **Air Renewal Rate**
  Normal environments: 27 m³/hour/person
  Environments with high people turnover: 17 m³/hour/person

- **Air Filtration**
  Use appropriate filters according to recommendations.

- **Microorganisms**
  Presence of fungi below 750 CFU/m³ and internal/external air ratio less than 50%

Air Renewal, Circulation, and Ventilation
What's the Difference?

Did you know that air renewal, ventilation, and air circulation are different actions? To breathe clean and healthy air indoors, it's important to understand the difference between them:

Ventilation is the replacement of indoor air with outdoor air in order to dilute and remove pollutants. Ventilation can be natural (open windows) or mechanical (ventilation box with filter + duct system).

Air circulation is the movement of air within a closed space, without proper exchange or filtration of the air—sometimes caused by ceiling or portable fans.

Air renewal is the actual exchange of air, carried out by equipment connected to artificial climate control (HVAC) systems.

SCENARIOS FOR AIR CONDITIONING USAGE

Scenarios	Usage condition	AIR QUALITY		
		TEMPERATURE	POLLUTION	AIR RENEWAL
01	Air conditioning off, doors and windows open.	✗	✗	?
02	Air conditioning on, no air renewal, doors and windows open.	✓	✗	?
03	Air conditioning on, air renewal open, doors and windows open.	✓	✗	✓
04	Air conditioning on, air renewal closed, doors and windows closed.	✓	✓	✗
05	Air conditioning on, air renewal open.	✓	✓	✓

Notes:
– To meet the above conditions, air conditioning systems must comply with the PMOC (Plan for Maintenance, Operation, and Control) and have a valid and adequate indoor air quality report.
– These concepts also apply during the COVID-19 pandemic.
– The technical manager for the air conditioning system must be a legally certified professional responsible for verifying whether the system complies with Brazilian regulations and is suitable for operation during the COVID-19 pandemic.

ABRAVA
ASSOCIAÇÃO BRASILEIRA DE REFRIGERAÇÃO AR CONDICIONADO, VENTILAÇÃO E AQUECIMENTO
DESDE 1962

Air Filtration to Ensure IAQ

According to studies by the US EPA, indoor air can be 2 to 5 times more polluted than outdoor air. In this context, air filters in HVAC systems play a major role in ensuring proper air filtration.

Each environment requires an appropriate filtration level to ensure the safety of its occupants, as recommended by ABNT NBR 16401-3. Through mechanical ventilation and outdoor air intake, the air velocity across the filter must not be excessive to ensure effective filtration.

Air filters can be classified according to their efficiency in retaining different particle sizes, ranging from coarse (G), medium (M), fine (F), to others with ultra-low penetration (HEPA or ULPA).

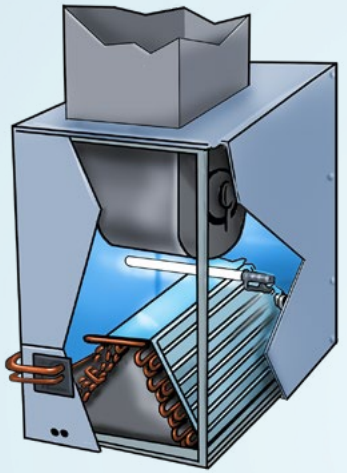
Some examples of filtration levels are listed below:

- G3 - Residential buildings
- G4 - Supermarkets, hotels, snack bars, and cafés
- M5 - Offices, call centers, libraries, restaurants
- G3 + M6 - Control towers

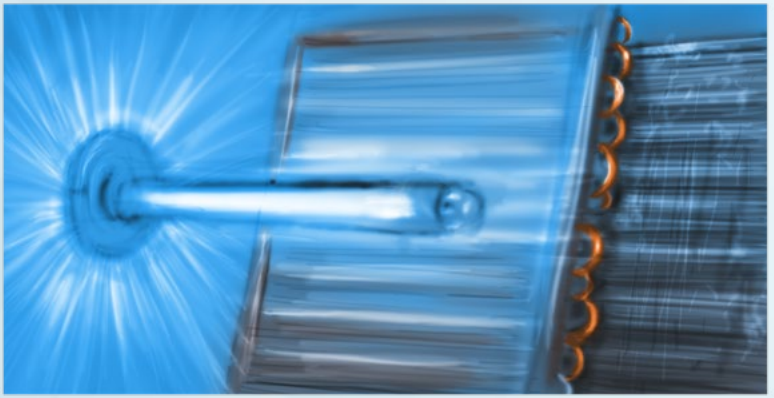
Influence of Technologies on IAQ

In the ongoing search for new technologies to improve indoor air quality, several alternatives have emerged, such as:

- **Radiant Catalytic Ionization (RCI)** – Active technologies like photocatalysis, which involve the constant injection of ionized hydrogen peroxide through the air conditioning system.



- **UV Germicidal Lamps** – A solution for inactivating fungi, viruses, and bacteria on the surfaces of air conditioning coils.



- **Ozone Generators** – Used in unoccupied spaces that previously had contaminated individuals. Ozone is an extremely effective gas for inactivating viruses, fungi, and bacteria but should only be used in unoccupied areas.

IAQ and its Relationship with PMOC

PMOC – Maintenance, Operation, and Control Plan is a set of documents containing all the data about the building, the air conditioning system, the responsible technician, as well as maintenance procedures and routines that prove their execution.

Law 13,589 of January 4, 2018, mandates that all public and collective use buildings with artificially air-conditioned indoor environments must have a PMOC for their respective air conditioning systems, aiming to eliminate or minimize potential health risks to occupants.

Article 3 – Air conditioning systems and their PMOCs must comply with parameters of ***INDOOR AIR QUALITY IN ARTIFICIALLY CONDITIONED ENVIRONMENTS***, especially regarding physical, chemical, and biological pollutants, their tolerances and control methods, as well as comply with the requirements established in their installation projects.

Importance of IAQ Analysis

The analysis of indoor air quality aims to ensure a healthy and safe environment for its occupants by evaluating the biological, chemical, and physical conditions of the location, namely:

1- Research and count of pathogenic and toxigenic fungi present in the air

2- Measurement of carbon dioxide (CO2) levels

3- Measurement of comfort parameters – temperature, relative humidity, and air velocity

4- Measurement of the amount of airborne particles (aerodispersoids)

According to ANVISA Resolution 09 of 2003, the analysis must be performed semiannually. The technical professionals responsible for the report must have backgrounds in Biology and Chemistry. Laboratories must be accredited according to ISO 17025 quality standards by Inmetro's General Accreditation Coordination.

Types of Maintenance and Qualified Workforce

Did you know that maintenance procedures for HVAC systems are divided into three categories? **Preventive, Corrective, and Predictive!**

Pay attention, as each type of maintenance is performed at different times, according to the need.

Importance of a Qualified Workforce:

There are many specialized service providers available in the market for Installation and Maintenance of HVAC, Refrigeration, and Ventilation systems.

However, it is essential to hire qualified professionals and companies. Why take unnecessary risks?

Only legally certified professionals with the proper technical responsibility should perform maintenance and installation services.

Everyone will be safer if the service is carried out by legally qualified and certified professionals registered with their respective professional boards.

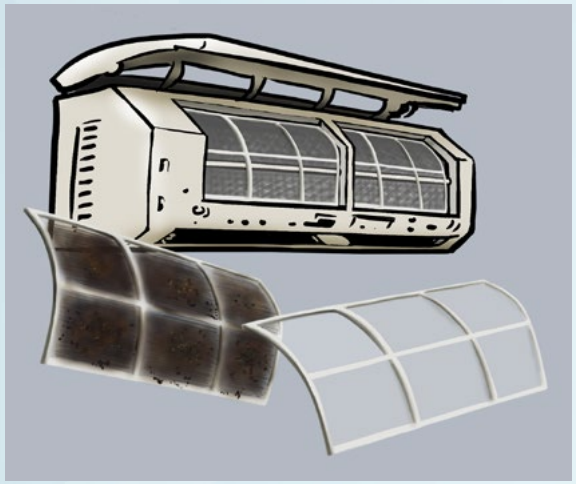
Types of Maintenance and Qualified Workforce

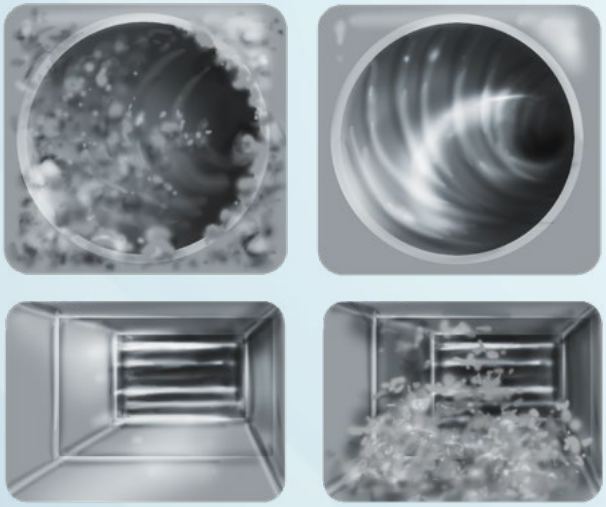
Maintenance and cleaning of HVAC systems are actions carried out to ensure the equipment's performance and the indoor air quality, keeping in mind health, well-being, and safety.

Understand the difference between maintenance and cleaning: Cleaning/Hygienization is the removal of microorganisms, dirt, and impurities from surfaces, thereby reducing health risks.

Maintenance is a set of actions aimed at repairing, maintaining, and/or preserving something to ensure its proper and correct functioning.

Keeping HVAC maintenance and cleaning up to date is vital for health!





The Importance of the Project and Retrofit

The blueprint of a construction project is the planning of the development, which must be done by engineers.

Ensuring proper indoor air quality in a space requires certain precautions, especially paying close attention to the execution of all stages of the HVAC system design, which is connected to all phases of the project's conception, including architecture, civil engineering, landscaping, electrical and plumbing systems, among others.

The company responsible for the design should be hired at the beginning of the building's architectural planning or at the time of deciding to install an artificial HVAC system.

It is worth noting that for older building structures or outdated HVAC systems, a Retrofit is recommended (a term used in engineering that refers to the modernization of equipment or systems considered obsolete or no longer compliant with standards).

Inspection and Penalties

Failure to comply with the requirements set forth in laws and regulations for the operation of an HVAC system in a building can be harmful not only to people's health but also to the financial health of the establishment.

The **inspection of an operating HVAC system** aims to verify whether it is functioning properly and whether the work has been or is being carried out by a duly qualified and certified company.

The purpose of inspection is to minimize failures caused by recklessness, incompetence, or negligence that could potentially compromise the safety of HVAC operations and impact the health of the building's occupants.

Inspection and Penalties

Regulatory Standards
These consist of obligations, rights, and duties to be fulfilled by employers and workers with the goal of ensuring safe and healthy working conditions, preventing the occurrence of occupational diseases and workplace accidents.

Article 9: Failure to comply with the Technical Regulation constitutes a health violation, subjecting the property owner, tenant, or their representative, as well as the technical supervisor (when required), to the penalties established by Law No. 6,437, without prejudice to other penalties provided by specific legislation.

In compliance with PMOC Law No. **13,589/2018** — commonly referred to as the "Air Conditioning Law" — all parties have their responsibilities: property owners, tenants, responsible executives, facilities managers, contractors, service providers, among others.

Among the penalties provided by law are fines of up to R$ 1,500,000.00, which may be doubled in the case of repeat offenses, in addition to civil sanctions.

Final Considerations

We have observed that society is increasingly attentive to healthier eating habits, the quality of the water it consumes, and the regular practice of physical activity to improve quality of life. However, it often overlooks the most essential and irreplaceable element: the air we breathe.

As outlined in this guide, we must pay close attention to the air we breathe in indoor environments to ensure acceptable levels of air quality. These levels directly impact well-being, productivity, absenteeism, and even mortality when air contaminants harmful to human health are not properly managed.

Improving indoor air quality is a major opportunity to reduce hospitalizations and promote better public health across society.

We should always strive for well-designed air conditioning systems, the installation of equipment capable of delivering satisfactory air quality levels, and proper periodic maintenance tailored to each specific environment.

Stay alert: ensure the places you frequent are equipped with appropriate systems and have qualified personnel responsible for the air you breathe. Talk to those in charge of maintaining these spaces. Caring for the air we breathe requires specialized knowledge, and having trained and certified professionals overseeing these processes will make all the difference!

Take care of the AIR you breathe!

Marcelo Munhoz – President of Qualindoor

Eng. Leonardo Cozac – Qualindoor ABRAVA and PNQAI

About ABRAVA

ABRAVA – The Brazilian Association of Refrigeration, Air Conditioning, Ventilation, and Heating is an organization that represents four interrelated sectors and encompasses the entire industry, commerce, and service chain. Based on technological development and engineering best practices, ABRAVA focuses on topics such as: Energy Efficiency, Environment, Sustainability, Air Quality, Standardization, and Professional Training, among others.

The Association is composed of 14 National Departments, each working in different areas dedicated to the development of their specific market segments. It also includes 5 Committees, such as: CB/ABNT 055, Energy Efficiency, Women in HVAC-R, Water Treatment, and Regulatory Standards. ABRAVA has an administrative and operational structure focused on delivering benefits to the represented sectors, with departments in legal, economic, export, training, and other areas.

ABRAVA plays an important role in society and is actively involved in nearly all government initiatives related to its sectors. The Association maintains various partnerships, such as with CB-55 (ABNT), the ABRAVA Export Program (in cooperation with APEX Brazil), and other national and international agreements with trade associations, academic institutions, and government bodies.

Founded in 1962, the organization's mission is to foster the technological and competitive development of the represented sectors in Brazil; promote the proper use of equipment, components, refrigerants, and other inputs; disseminate best engineering practices both nationally and internationally; and contribute to the development of standards and procedures to ensure well-being, indoor environmental quality, and environmental protection.

Headquartered in São Paulo, ABRAVA has regional offices in Bahia, Ceará, Minas Gerais, and Pernambuco, and represents over 400 member companies.

Learn more about ABRAVA's work at:
www.abrava.com.br

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