

# Why a unified IAQ approach is critical to securing public health



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Morten Schmelzer, Technical Marketing Director, Head of Public Affairs, Systemair Group, traces the rise and fall of IAQ in the public and political consciousness, the shortfalls of standards and legislation promoting good indoor air, and how addressing the lack of common language and related discussions is critical to achieving a healthier population.

## How IAQ has evolved over the years

Over the years, the market's acceptance of Indoor Air Quality (IAQ) has varied. In response to the 1973 and 1979 energy crises, the building industry focused mainly on insulation with limited attention to IAQ. As modern buildings became increasingly tighter to optimise energy usage, ventilation was (re-) discovered to bring fresh air into these tight buildings. Yet, still, there was no genuine interest in the health aspects of indoor air from ventilation. Architects and regulatory committees neglected the topic, and there was little to no concern about IAQ improving the health of occupants.

In time there was a shift in consciousness among architects and building specialists. Since the 1990s, IAQ has gathered momentum, attracting scientific interest, following the development of innovative IAQ equipment within the HVAC industry.

During the early days that IAQ was gaining traction, it was mostly considered an element of building protection, with a strong focus on mould. While it became a consideration for special applications such as operating theatres in hospitals, it remained primarily overlooked in schools, offices, and residential buildings where the only ventilation practice commonly used was opening windows.

There have been positive movements globally, with schemes such as WELL and RESET, initiated around 2010, gaining further traction. These schemes primarily aimed to qualify IAQ in major industrial cities confronted with pollution. Meanwhile, IAQ has become a criterion in LEED and BREEAM certification schemes.

The COVID-19-pandemic has given the correct attention to IAQ worldwide, as everyone had to face the fact that good ventilation is an essential element of public health. It has been at the forefront of discussions related to legislation ever since. Unfortunately, the energy crisis in Europe and rising energy prices are putting the momentum towards IAQ awareness at risk as energy optimisation is becoming a higher priority once again.

## Falling short in IAQ standards

Given these global trends, it is critical to take a closer look at the deficits in the standards and regulations that further hamper wider acceptance and adoption of better IAQ practices and the reasons behind them.

Today, there remains no clear framework for IAQ. The approaches to and uptake of IAQ have been different among the EU Member States. In many Member States, IAQ has been added or is being added to the

national transpositions of the Energy Performance of Buildings Directive (EPBD). Depending on the relative strength of local manufacturers, some see a preference for specific solutions in the EPBD transpositions.

Airflow volumes in Member States differ. Between The Netherlands and Germany, for example, the rules are different and typical standards have very high airflow volumes oriented to Scandinavian requirements. The flexibility among the Member States also varies. Some can design lower or higher, and some are more restrained or based on certain factors. In France, for instance, minimum flow is based on mould protection for residential buildings. Even during Covid, there were different interpretations among the Member States on the national level.

Regional standards and guidelines related to IAQ exist. An example is ISO 16890, a series of product standards on air filters for general ventilation. However, its acceptance among Member States deserves to be further improved. There are also standards concerning IEQ classifications available. Examples include:

- EN 16798-1 Energy performance of buildings - Ventilation for buildings - Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics - Module M1-6.
- ISO 17772-1 Energy performance of buildings — Indoor environmental quality — Part 1: Indoor environmental input parameters for the design and assessment of energy performance of buildings.

These two equivalent standards provide a classification of the IEQ and are the reference for IEQ classification in buildings. The current EPBD revision proposal references EN 16798-1 in Annex 1. This means that the EU Member States must include this information in their national Energy Performance labelling scheme.

### Gaps in legislation

Despite such efforts in standardisation and legislation, the market still falls short as there remain no minimum IAQ standards across Europe. As the IAQ industry is still very dispersed, with few major manufacturers, it has not yet managed to draw sufficient attention to IAQ at the political level to promote and push for inclusion in legislation.

Overall, EU legislation lacks an IAQ focus. The best guess is that real attention towards this issue in Europe

will occur when the new European Commission is in place, and the EPBD is reviewed anew, as it is set for recast. The proposed EPBD recast aims to translate the actions proposed in the Renovation Wave, placing more emphasis on the need for improved IAQ through well-maintained mechanical ventilation systems in new and existing buildings. In the report by the European Parliament Committee on Industry, Research and Energy (ITRE) rapporteur, there is a proposal to address Indoor Environmental Quality (IEQ), not IAQ. The proposal for a new article 11a would require Member States to set minimum IEQ standards. These IEQ standards would have to be according to a methodological framework defined by the Commission. Unfortunately, this framework is not yet available.

Part of the lack of alignment stems from the fact that the industry has not been pushing for voluntary standards at the CEN level, either as a separate Technical Committee or integrated into existing Technical Committees. This may be because many people in the industry now regard standardisation too much as only the development of mandated standards and therefore are no longer developing standards voluntarily, which could be fit for future legislation.

Some industry associations have given up their role in defining state-of-the-art rules and codes of good practice. The latter may be difficult for IAQ because it would also have to liaise with and rely on expertise from the medical and health sector. A risk is that IAQ would be developed separately in different Technical Committees, leading to confusion



and market fragmentation. Due to this complexity, ventilation rates and IAQ may likely have to be developed for specific situations, at home, in the office, and in schools.

### **An issue of market protection**

The lack of alignment in European standards and legislation can also be an offshoot of differing individual company strategies. The inconsistency of IAQ consideration between residential and non-residential provides a clue as to why.

In non-residential applications, the disparity in willingness to invest in IAQ is insignificant. There is a large European market, and products are not linked. Generally, companies and engineers across European countries have aligned principles and understand what constitutes a good solution, with range differences of between 10% more or lower air volumes.

The residential market is more fragmented, with typically smaller ventilation markets, small product ranges and a very simplified market with a wide variety of projects. Companies designed to address local needs may see specific country-wise barriers to protect their market from a larger European supplier. As a result, some companies can be more in favour of having individual specified markets because it gives an element of market protection.

However, a harmonised IAQ approach should not be considered a threat to commercial interests. Not only does this somewhat block innovation, but better IAQ is essentially technology-agnostic. A harmonised approach that will create better IAQ awareness would allow individual solutions locally marketed to grow because they will not have to fight to split a smaller market share due to rising demands.

### **The root of the problem: A lack of common understanding**

Despite the progress of standards and guidelines thus far, much remains to be done. The legal background of EPBD is energy efficiency. Therefore, we still need an IAQ regulation tackling awareness and information on buildings or, perhaps, a building certificate. Hence, the consumer is better informed or would be empowered to choose a facility with better IAQ.

Such a classification would be helpful, but we must consider that today, there is not even a commonly accepted definition of IAQ. If you read the different

standards, there are different approaches. Within the HVAC sector, there is no common understanding of what constitutes a good IAQ.

Typically, benchmarks of IAQ still relate to outdoor air quality. Initially, criteria for IAQ were developed for the elements in the outdoor Ambient Air Quality Directive sulphur dioxide, nitrogen dioxide and oxides of nitrogen, and particulate matter. IAQ was focused on Volatile Organic Compounds (VOCs) emitted from paints, furniture, and other equipment in buildings. CO<sub>2</sub> and VOC are widely accepted indicators because they are measurable and used as common reference points.

Yet, it can happen that if ventilation is weak, even if CO<sub>2</sub> is low, air quality in that building can be bad. This is logical as CO<sub>2</sub> is used as a tracer for human occupancy. If no or minimal persons are in a room, the ventilation system should still run at a level that the building emissions are removed. This factor is also addressed in EN16798-1 and should be considered when designing the ventilation system.

The perceived air quality is a commonly accepted approach in Scandinavia and also addressed in EN 16798-1. While it is a good approach, it is complex and faces challenges related to measurement. Let's not forget that bacteria and viruses are currently not included, and any definition related to IAQ would also be beneficial if this can be considered. (*For reference, we recommend reading the Systemair article on "Why we ventilate"*).

Before any regulation, the industry must work to define what it means to have a good IAQ so the industry has a common language, interpretation and understanding. Addressing this is the key to unlocking better IAQ, allowing us to be better prepared for events such as the COVID-19-pandemic. However, when doing so, we should also not get stuck in details, which tends to be common in Europe. A pragmatic approach is necessary to finally push ahead – rather tomorrow than in 10 years.

To progress, the industry must invest time and resources in people's health first. This would involve advocating IAQ as a prime objective, meaning it would have a priority in line with energy saving and decarbonisation of heating and cooling. While this may be difficult in uncertain times where energy prices are fluctuating, investing now in promoting a better understanding and application of IAQ would lead to a healthier population for the future. ■