

WHAT IS IAQ?

The Background

Pollution is said to be responsible for around **40,000 premature deaths** in the UK every year and costs the NHS over **£20bn annually**.

As awareness of outdoor air pollution has risen in recent years so indoor air quality (IAQ) has started to hit the headlines – not least with the publication of a number of hard hitting reports on its impact on human health.

It is, however, less well understood and publicised than outdoor pollution – and politicians seem particularly confused by the concept. However, clearly the two are linked with buildings standing as potential barriers between the worst of what lurks in the outdoor air and their occupants.

Unfortunately, it is not as simple as that because the indoor environment also generates its own hazards.

It is this complex equation of risk factors that confronts the building engineering profession.

Those most at risk from poor IAQ, such as the young, elderly or seriously ill, are often demographic groups that spend the longest periods of time indoors – and a growing number of urban areas are well outside World Health Organisation (WHO) limits for airborne pollutants.

Biological and chemical pollutants contribute to poor IAQ and are injurious to health.

Biological pollutants include: Bacteria, moulds, viruses, dust mites, pollen etc:

Chemical Pollutants include: Carbon Monoxide; Carbon Dioxide; tobacco smoke; perfume; body odours; VOCs from paints, varnishes, cleaning products; dust, asbestos, lead; ozone...and more

Why a Standard?

Against the backdrop of growing alarm over toxic external air pollution, the BESA Group wants to deliver practical guidance so the building engineering industry can turn buildings into **safe havens** and promote indoor spaces as **'indoor clean air zones'** to reflect the language being used by politicians seeking to tackle the outdoor problem.

'Create a clean air zone every time you close your door'

For these reasons, this standard is being written to provide guidance on how we can work to ensure our indoor air quality is to a good standard to prevent the health risks that come from breathing in poor quality air.

People spend, on average, more than 80% of their time indoors and measures to protect them from the worst effects of outdoor pollution when they are inside buildings are relatively cheap and easy to deliver being primarily linked to service and maintenance best practice. In the main, they do not require major capital cost outlay.

The UK is currently considering updating its **Clean Air legislation**, which dates back more than 60 years and BESA is part of a campaign to ensure any new Act of Parliament includes provision for Indoor Air Quality – and is not simply focussed on cleaning up emissions from transport and industrial processes, which will require decades of investment before realising any real improvement.

Creating indoor clean air zones can be done rapidly and at low cost – if everyone is clear about what is meant by IAQ and what is required to deliver it.

Sources

This Standard will draw on all the **existing guidance** and expert knowledge considered relevant by the Group with a view to making it available to BESA members and the industry at large.

The drafting process will draw on the expertise from within the Group and the first stage will be to draw up a list of members and industry contacts who should be invited to feed into the process.

It is also envisaged that the Standard could be used as the basis for a **building inspection scheme** to help owners and landlords promote their buildings as **'Safe Havens'** from external pollution. The inspection regime could lead to a **rating system** similar to EPCs with buildings graded from A-G for indoor air quality based on a range of parameters outlined in the Standard.

It could also be used as a basis for future **statutory annual** IAQ inspections– a building ‘MoT’ – as both national and local governments ramp up action over pollution in wake of various legal actions.

The Standard will be published as a series of chapters which can be released in the form of BESA **Technical Bulletins** as they become available. These can be offered for public review and amendment before being added to the complete Standard, which would be due for publication in 2019.

It will be a **‘dynamic’ document** available online and able to be regularly updated and revised. It will also reference and link to sources of more in-depth information on each section/topic.

As well as keeping it relevant, this will also avoid the need for the Standard to be overly large and unwieldy. It will also be accessible and understandable for a non-technical audience – particularly clients and end users, who can use it to set targets and as reference for their expert teams.

Ultimately, the Standard will create a **level playing field** so that the definition of IAQ becomes standardised across the sector. It will clearly set out how audits should be carried out and ensure remedial actions follow a set process with clear aims and targets for safeguarding occupant health and well-being.

Technical background

Air is full of many different types of pollutants which include carbon dioxide (CO₂), volatile organic compounds (VOC) and particulate matter (PM). These can all have an impact on our health. Particulate matter can be responsible for respiratory problems and can lead to lung cancer. Meanwhile high levels of CO₂ can cause oxygen deprivation which leads to dizziness, suffocation or even death if the levels are high enough.

Although poor outdoor air quality impacts indoor air quality, some of the internal air contains contaminants which have not been bought in from the outside, but originate indoors. There are two types of indoor air pollutants: biological and chemical.

Biological pollutants include mould which can start to grow if the levels of humidity are high within a building or if there are leaks in the plumbing or even excess condensation. This mould contains biological chemicals which can be highly dangerous or even fatal for people asthma sufferers or the elderly. Radon can also be a cause for concern as it can come from the buildings and has been responsible for over 1100 deaths from lung cancer each year in the UK.

Name of Pollutant	Source	Associated Risk
Mould	Excess humidity, plumbing leaks, condensation.	Harmful to breathing especially for asthma sufferers and the elderly
Radon	Building materials	Responsible for over 1100 deaths from lung cancer each year
Carbon Monoxide and Dioxide (CO and CO ₂)	Smoke, Faulty central heating, Space heaters	Oxygen deprivation leading to dizziness, nausea, unconsciousness
Particulate Matter (PM)	Dust, smoke, pollen	Respiratory problems leading to lung cancer
Volatile Organic Compounds (VOC)	Paint, cleaning supplies, adhesives etc.	Respiratory problems

There are certain thresholds set by the World Health Organisation (WHO) for these pollutants to highlight what is considered safe to inhale. These are:

CO ₂	VOC	PM _{2.5}	Humidity
<800ppm	<300ppb	<25µg/m ³	30%-50%

Ppm = parts per million

Ppb = parts per billion

Further negative impacts from Pollution can be found at: <https://www.cleanairday.org.uk/references>