

REVIEW INTERNATIONAL LAW ON IAQ MANAGEMENT ACROSS MULTIPLE JURISDICTIONS

Jurisdictional Comparison

(China, Japan, Singapore, USA, Hong Kong, UK, France)

Organized by
Clean Air Network

Prepared by
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1. EXECUTIVE SUMMARY

This report, prepared by Hogan Lovells on a pro bono basis at the request of CAN, provides a comparative review of indoor air quality (“IAQ”) legislation, policies and regulatory practice across China, Japan, Singapore, the USA, Hong Kong, the UK and France. Its objective is to identify the range of legislative approaches and practical models adopted in comparable jurisdictions, as well as the policy journey by which such frameworks were established. By demonstrating both the importance and feasibility of regulatory regimes that set mandatory IAQ standards and require monitoring and reporting in specific settings, the study is intended to inform policy development and stimulate discussion on the implications for Hong Kong.

A central finding of the report is that effective IAQ governance is rarely built through a single standalone statute. Instead, most jurisdictions have developed layered regulatory frameworks over time, combining public health guidance, building and ventilation controls, occupational safety obligations, product and material restrictions, and targeted enforcement mechanisms. These frameworks have generally evolved incrementally in response to health evidence, building performance concerns, environmental events, and the need to protect vulnerable populations, rather than through one comprehensive legislative reform.

The comparison also shows that mandatory IAQ regulation is typically targeted rather than universal. Jurisdictions tend to impose stricter requirements in higher-risk environments such as schools, childcare facilities, healthcare settings, workplaces, and other high-occupancy public premises. France is highlighted as the most structured example, with national guideline values supported by statutory IAQ management duties in sensitive public buildings. Japan, Singapore and California similarly embed IAQ outcomes through combinations of building codes, ventilation requirements, occupational health frameworks, and controls on pollutant-emitting materials. Monitoring is often implemented through periodic inspection, licensing, or building compliance processes rather than universal real-time reporting, with indicators such as CO₂ commonly used as a proxy for ventilation performance.

Another important theme is the role of source control and institutional coordination. Several jurisdictions do not rely solely on ventilation standards but also regulate indoor pollutants at source through restrictions on volatile organic compound-emitting materials, product standards, and labelling requirements. The report further indicates that successful IAQ governance depends on coordination across health, environment, labour, and building authorities, supported by consultation with technical experts, industry stakeholders and civil society. In this respect, IAQ regulation is shown to be both a public health and a governance issue, requiring a clear allocation of responsibilities and credible compliance pathways.

For Hong Kong, the report suggests that the existing voluntary IAQ Certification Scheme provides a useful foundation and is broadly consistent with international practice, but it also identifies important strategic gaps. These include the limited mandatory protection for vulnerable groups and sensitive premises, the weak linkage between IAQ

performance and building control or renovation triggers, and the absence of a coherent long-term governance framework. The overall lesson from the jurisdictions reviewed is that Hong Kong need not begin with a single all-encompassing IAQ law; rather, a more practical and credible path may be a phased, risk-based approach that incrementally integrates mandatory IAQ standards, monitoring and reporting obligations into existing legal and regulatory systems. This would help build a more resilient framework while allowing room for stakeholder engagement, institutional learning and policy refinement over time.

2. **BACKGROUND**

- 2.1 Hogan Lovells engaged local counsel in China, Japan, Singapore, the USA, Hong Kong, the UK and France (the “**Jurisdictions**”) to complete a questionnaire which includes the questions set out in section 2 below, with a view to supporting policy development and providing recommendations for Hong Kong on institutional setup, regulatory design and stakeholder engagement in relation to indoor air quality (“**IAQ**”), by reference to international legislative frameworks and practice in IAQ management.
- 2.2 This report sets out the consolidated summary of the relevant legislative frameworks and policies in each Jurisdiction based on the completed questionnaires returned by local counsel. For detailed jurisdiction-specific analysis, please refer to Annex 1 to Annex 7 for the full analysis of each Jurisdiction.

3. **OBJECTIVE**

The objective of the report is to identify the range of legislation and practices in various comparable jurisdictions, and the journey for establishing such frameworks. Through showcasing the importance and feasibility of regulatory frameworks which establish mandatory IAQ standards and require IAQ monitoring and reporting in specific locations, the study also aims to initiate discussion on the implications for Hong Kong.

More specifically, the report seeks to:

- identify how IAQ is regulated across comparable jurisdictions;
- examine whether regulatory measures are mandatory, voluntary or hybrid in nature;
- assess the role of institutional coordination, building controls, occupational health requirements and source-control measures
- consider how monitoring, reporting and enforcement mechanisms operate in practice; and
- draw lessons for Hong Kong in developing a credible, proportionate and phased IAQ framework.

4. **SCOPE AND MAIN QUESTIONS**

- 4.1 The questions which we have instructed local counsel in the Jurisdictions to respond to are set out below:

- 1) Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?
 - a. When were they introduced?
 - b. Are they mandatory or voluntary?
 - c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?
 - d. What is the level of participation?

- e. How closely do these policies align with international guidelines such as WHO?
- f. Have these policies evolved in response to public health crises (e.g., COVID-19)?
- g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?

2) Are there any laws and regulations in your jurisdiction to regulate indoor air quality?

- a. When were they introduced?
- b. What indoor environments and vulnerable populations are prioritized?
- c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?
- d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?
- e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?
- f. What are the objectives and parameters? Are there guidelines or mandatory measures?
- g. How do laws address ventilation requirements and standards, including minimum ventilation rates?
- h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?
- i. Are there legal provisions for moisture and humidity control to prevent microbial contamination?
- j. How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?
- k. How does the legislation integrate occupant comfort factors such as noise and airflow patterns?
- l. Are energy efficiency goals included to balance IAQ and sustainability?
- m. How are IAQ laws incorporated within occupational health and safety frameworks?
- n. What exemptions or exclusions exist, and what is their rationale?
- o. Is there a review process, and what mechanisms exist to update laws based on new scientific evidence?
- p. How are IAQ regulations enforced? What penalties or incentives apply?

- 3) Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively?
- What are the requirements for new constructions versus existing premises?
 - Are there mandatory ventilation rates, filtration standards, or design criteria specified?
 - Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?
 - How are these code requirements monitored and enforced?

5. COMPARATIVE OVERVIEW OF JURISDICTIONS

Jurisdiction	Question 1: Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Question 2: Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	Question 3: Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively?
China (Full advice in Annex 1)	Although Mainland China does not have nationwide public health policies solely focused on IAQ, it has established national standards to regulate this aspect. Mainland China does not offer independent voluntary programs at the national level; however, it operates a voluntary green building certification system that includes IAQ components.	At the national legislative level in China, there is currently no dedicated legislation specifically addressing IAQ. However, certain regulations contain general provisions regarding IAQ. Shanghai does not have any dedicated legislation specifically addressing IAQ. However, local regulations contain IAQ testing requirements for certain buildings, and lifecycle-wide hygiene obligations on central air-conditioning systems.	In addition to the matters addressed in Question 2, both Shenzhen and Shanghai are subject to mandatory and recommended national standards concerning IAQ.
Japan (Full advice in Annex 2)	Japan does not have a single, comprehensive public health policy dedicated exclusively to indoor air quality (IAQ). Instead, IAQ is primarily addressed through non-binding health guidelines and administrative standards. While such guidelines are voluntary for ordinary residences, they function as de facto mandatory standards in specific settings such as schools. In practice, voluntary building environmental performance and certification schemes are also used to supplement statutory minimum requirements.	Japan does not regulate indoor air quality through a single dedicated statute. Instead, IAQ-related matters are regulated indirectly through multiple sector-specific laws, including those governing building hygiene, occupational health and safety, school health, and building standards. These laws establish minimum standards for particular types of buildings and environments, with detailed technical criteria largely set out in subordinate regulations and non-binding guidelines. Continuous real-time IAQ	Japanese building codes include IAQ-relevant requirements, particularly in relation to ventilation, but do not establish comprehensive IAQ performance standards. For new constructions, mandatory mechanical ventilation systems and restrictions on certain building materials are imposed as part of sick-house syndrome countermeasures. Existing buildings are generally not subject to retroactive IAQ or ventilation requirements, except in limited circumstances such as major renovations or changes of use, with compliance primarily encouraged through

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		monitoring is generally not mandated, although periodic measurements are required in specific contexts.	management and operational controls rather than mandatory upgrades.
Singapore (Full advice in Annex 3)	Yes. In Singapore, indoor air quality measures arise primarily through guidance materials, industry standards, and certification schemes rather than direct legislation. Several statutory duties also indirectly regulate IAQ through requirements related to ventilation and exposure to airborne contaminants. (i) The Updated Guidance Note on Improving Ventilation and Indoor Air Quality in Buildings Amid the COVID-19 Situation provides Covid-focussed recommended measures to improve ventilation and IAQ in non-residential premises, including outdoor air provision, filtration, and maintenance practices. These measures are not legally mandatory. 5.1 The Updated Guidance on Improving Ventilation and Indoor Air Quality in Buildings for a Healthy Indoor Environment recommends using carbon dioxide (CO₂) as a proxy indicator of ventilation adequacy. 5.2 The Workplace Safety and Health Council's Management of Indoor Air Quality in Air-Conditioned Workplaces Guidelines offers a voluntary IAQ management framework for employers and occupiers. 5.3 Enterprise Singapore's Singapore Standards 554 Code of Practice for Indoor Air Quality in	While there is no single dedicated act that regulates IAQ, various legal obligations arise under different statutes and regulations. (ii) The Workplace Safety and Health Act 2006 ("WSH Act") imposes a general duty on employers and occupiers to: - provide and maintain a work environment that is safe and without risk to health, and - ensure employees are not exposed to hazards arising from the use, storage, or handling of any article, substance, or process at the workplace. This includes managing airborne contaminants and ensuring adequate ventilation. 5.5 The Workplace Safety and Health (General Provisions) Regulations further regulate airborne contaminants and require control measures to keep exposure within permissible exposure levels. This implicitly necessitates adequate ventilation and other engineering controls. 5.6 Under the Building Control framework administered by the Building and	Yes. IAQ requirements arise indirectly through the building control framework, which regulates ventilation, and through environmental sustainability rules. The requirements differ for new buildings and existing premises. 5.1 New construction (including addition and alteration works): - Building plans must comply with SS 553, which specifies minimum outdoor air supply rates, filtration requirements, and other mechanical ventilation provisions. - SS 554 is referenced in government IAQ guidance but is not legally mandatory (unless adopted contractually, which is not uncommon). 5.2 Existing buildings: - There is no general statutory requirement for routine IAQ testing in existing premises. - If existing buildings undergo major addition and alteration works, the modified areas must comply with SS 553 ventilation design requirements, similar to new projects. - Certain existing buildings must meet minimum sustainability requirements under the Building Control (Environmental Sustainability

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	Air-Conditioned Buildings (“SS 554”) sets out technical IAQ parameters and audit methodologies. It is an industry standard, typically referenced in government guidance and certification schemes (such as Green Mark), but it is not legislation. 5.4 Singapore Standard’s Code of Practice for Air-Conditioning and Mechanical Ventilation in Buildings (“SS 553”) describes provisions for the design, construction, installation, testing and commissioning, operation and maintenance of air-conditioning and mechanical ventilation (ACMV) systems in commercial, office, and institutional buildings, and retail clinics located within commercial and institutional buildings, except hospitals, polyclinics, cleanrooms and laboratories. BCA Green Mark 2021, is a green building certification scheme tailored for tropical climates. It promotes environmentally sustainable building design and operation. IAQ considerations form part of its scoring framework. However, Green Mark remains a voluntary certification, not a statute.	Construction Authority (“BCA”), ventilation design for building works must comply with SS 553, which serves as the baseline standard for ventilation rates in air-conditioned spaces.	Measures for Existing Buildings) Regulations, aligned with the BCA Green Mark Certified level. IAQ-related measures may contribute to the scoring, but there are no standalone legal IAQ limits. 5.3 All workplaces (regardless of building age): Employers and occupiers must ensure workers are not exposed to airborne contaminants and must maintain adequate ventilation under the WSH Act.
USA (Full advice in Annex 4)	California has public health policies and voluntary schemes for IAQ that complement, and go beyond, legal minimums. California Department of Public Health (CDHP) publishes policies and advisory guidance on improving ventilation and filtration for building and schools.	California has the most developed IAQ laws in the US but there is no single IAQ law. Instead, it has IAQ provisions included in the following laws for building codes, consumer products, and certain facilities (schools, workplace, healthcare facilities).	New construction requires compliance with all IAQ standards in Title 24. Existing building generally do not need to meet Title 24 IAQ standards unless certain events occur: - HVAC system replacement - Major building renovation - Building additions are constructed

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	California Air Resources Board (CARB) issues guidance on voluntary incentive or grant programs to improve indoor air, such as the wildfire smoke clean air centers, and recommends best practices. • 2021 - CDHP issued Interim Guidance for Ventilation, Filtration, and Air Quality in Indoor Environments. • 2024 – CDHP issued Improving Air Quality in Schools. • 2024 – CARB issued AB 836 Wildfire Smoke Clean Air Centers for Vulnerable Populations Incentive Pilot Program. • 2026 – California Energy Commission (CEC) issued voluntary CALGreen green building standards		
Hong Kong (Full advice in Annex 5)	Hong Kong has two main schemes concerning indoor air quality: 6. IAQ Certification Scheme for Offices and Public Places (introduced 2003, revised 2019) – This is a voluntary scheme that recognises good IAQ management practices and provides incentives for building owners/property managers to pursue optimal IAQ levels. Key features include:	Hong Kong does not have legislation specifically addressing indoor air quality, which reflects its preference for a self-regulatory approach consistent with its principle of small government. Instead, legal provisions relating to ventilation and factors affecting IAQ are scattered across multiple ordinances and regulations. These include: • Building (Planning) Regulations (Cap. 123F, Part IV): Requires natural	Hong Kong has not adopted mandatory emission standards or other IAQ-related building codes of its own. However, non-mandatory benchmarks and standards do exist through the HK-BEAM Plus Assessment Tools, which were developed by the HK-BEAM Society, a non-profit organisation. The BEAM Plus scheme provides a voluntary green building certification framework covering both new and existing buildings across residential, commercial, institutional, and industrial sectors. It includes performance benchmarks for indoor air quality and

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	• A two-level IAQ objective: "Excellent Class" and "Good Class". • Ten IAQ parameters measured, including carbon dioxide, carbon monoxide, respirable suspended particulates, nitrogen dioxide, ozone, formaldehyde, total volatile organic compounds, radon, airborne bacteria, and mould. • As at March 2026, there are 2,383 certified premises. • Aligned with WHO IAQ guidelines, with the scheme updated in 2019 to reflect the latest WHO standards. 7. Hong Kong Government's Green Procurement Policy (introduced 2000) – Requires government bureaux/departments to consider environmental factors, including formaldehyde emission limits for furniture. This is mandatory where adequate supply exists and desirable where supply is limited. Additionally, there are three voluntary labelling schemes organised by non-profit organisations: Green Council's Hong Kong Green Label Scheme, Hong Kong Green Building Council's	ventilation through openable doors and windows for offices, habitable rooms, and kitchens. Where prescribed window requirements cannot be met, mechanical ventilation at a rate of not less than five air changes per hour may be used. • Building (Ventilating Systems) Regulations (Cap. 123J): Requires ventilating systems to be kept in safe and efficient working order, with annual inspections by a registered specialist contractor. • Ventilation of Scheduled Premises Regulation (Cap. 132CE): Requires ventilating systems to be maintained in safe and efficient working order. • Places of Public Entertainment Regulations (Cap. 172A): Requires ventilating and cooling installations to be maintained in good order. • Smoking (Public Health) Ordinance (Cap. 371): Prohibits smoking in designated no-smoking areas, including indoor workplaces and public places. • Occupational Safety and Health Ordinance (Cap. 509) and Regulation (Cap. 509A): Imposes a general requirement on employers to provide safe and healthy work environments; workplaces must be adequately	ventilation, with ventilation standards referencing ANSI/ASHRAE 62.1-2013. The IAQ assessment component adopts the criteria under the "Good Class" level of the IAQ Certification Scheme. Two schemes are available: a Comprehensive Scheme providing full assessment, and a Selective Scheme allowing assessment of individual aspects with a lower threshold. Government guidance notes also provide recommendations for good IAQ practice. These include suggestions that centrally air-conditioned buildings should have supplementary outside air supply systems for high-occupancy areas, and that rooms with significant emission sources such as kitchens and bathrooms should be maintained under slight negative pressure. The guidance further recommends the selection of building materials with lower emission rates, and the Environmental Protection Department publishes advice on choosing low-VOC-emitting furniture. As there are no mandatory requirements under building codes, monitoring and enforcement in this area is not applicable.

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	Green Product Accreditation, and BEAM Plus Interiors.	ventilated and air kept free of impurities as far as reasonably practicable. Air Pollution Control (Volatile Organic Compounds) Regulation (Cap. 311W): Prohibits the import or manufacture of products exceeding prescribed VOC limits.	
UK (Full advice in Annex 6)	Yes.	The rules surrounding IAQ in the UK are not contained in any one legislation or regulation, rather the relevant rules can be found piecemeal across industry specific statutory instruments and accompanying guidance. Such instruments include: 1) Building Regulations 2010 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014) 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016) 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974) 5) Department of Education Guidance BB101	The Building Regulations 2010 (BR) cover the construction and extension of buildings. Approved Document F (ADF) is the building regulation in England for the ventilation requirements to maintain indoor air quality. This is then split into 2 separate volumes. Volume 11 applies to dwellings, and Volume 22 applies to buildings other than dwellings. The ADF provides guidance on complying with the legislation. Complying with the guidance in ADF does not guarantee that the building work complies with the legal requirements of the BRs. Building regulations are required to be signed-off by a relevant authority. Therefore, even though aspects of the ADF may not be "legal" per se, compliance could still be required to get the required sign-off. The Approved Document F (ADF) does not apply to work subject to a building notice, full plans application or initial notice submitted before 15 June 2022, provided the work for each building is started before 15 June 2023.

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		6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK 7) Building Safety Act 2022 8) Environmental Protection Act 1990 9) WHO Guidelines for Indoor Air Quality 10) EH40/2005 Workplace exposure limits 11) Indoor Air Quality Guidance 2021 12) The Control of Substances Hazardous to Health Regulations 2002¹	

¹ This legislation requires employers and the self-employed to prevent or adequately control exposure to hazardous substances (including airborne vapours, gases, fumes, dusts, mists and biological agents). Although it relates to clean air, its scope is limited to protecting workers from hazardous airborne substances rather than regulating indoor air quality for the public. It is therefore not considered in detail in this note. We can provide further advice on COSHH if needed.

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France (Full advice in Annex 7)	Yes. The Indoor Environments Quality Observatory (the “OQEI”) covers a broad range of topics related to the comfort and health of people in indoor environments. More generally, it focuses on the quality of indoor living conditions including air and dust pollution, exposure to noise, artificial light and electromagnetic fields and thermal comfort. In addition, the French Agency for Food, Environmental and Occupational Health & Safety has published Indoor Air Quality Guidelines (“IAQGs”), and the Ministries of Environment and Health has launched the Indoor Air Quality Action Plan.	Yes. France has established a legal framework regulating indoor air quality. This mainly relates to: - the definition of regulatory indoor air guide values; - a general obligation in the construction code regarding air quality (see Section 3 below); - the implementation of a mandatory monitoring of the indoor air quality in certain establishments open to the public; and the mandatory labelling of certain construction and decoration products.	Yes, article L. 153-1 and seq. of the French housing and building Code specify expressly that buildings shall be conceptualised, built and maintained by preserving the quality of indoor air. Article R.171-1 and seq of the same Code provide for a definition of the notion of “energy exemplarity”

4. CONCLUSION

Upon reviewing the indoor air quality (IAQ) frameworks across China, Japan, Singapore, the USA (California), the UK, France and Hong Kong, it is seen that effective IAQ governance rarely relies on a single, comprehensive statute. Instead, jurisdictions adopt layered regulatory models combining public-health guidance, building and ventilation controls, occupational safety obligations, source-control measures for materials and products, and targeted enforcement through existing regulatory systems such as building approvals, licensing and workplace inspections.

Across jurisdictions, mandatory IAQ obligations are typically targeted, focusing on high-risk environments and vulnerable populations (notably schools, childcare facilities, healthcare settings and high-occupancy public premises), rather than imposing universal requirements. France provides the most structured example, coupling national IAQ guideline values with statutory IAQ management duties for sensitive public buildings, including ventilation assessment (using CO₂ as a proxy), action plans and disclosure. Japan, Singapore and California similarly embed IAQ outcomes through building codes, renovation triggers and occupational health frameworks, ensuring enforceability without a standalone IAQ law.

A further consistent lesson is the importance of source control. Restrictions on VOC-emitting materials (Japan), mandatory product labelling (France), and low-VOC product standards (California and Hong Kong) reduce reliance on ventilation alone and improve IAQ outcomes in an energy-efficient manner. Enforcement is most effective where IAQ requirements are integrated into existing approval, inspection and licensing processes, rather than dependent on continuous monitoring obligations.

Against this backdrop, Hong Kong's current approach—centred on a well-established voluntary IAQ Certification Scheme, supplemented by fragmented statutory ventilation, occupational safety and product-control provisions—aligns with international practice but leaves three strategic gaps: (i) limited mandatory protection for vulnerable populations, (ii) weak linkage between IAQ performance and building control triggers, and (iii) absence of a coherent long-term governance framework. [Skeleton O...aster) (1) | Word]

International experience suggests that Hong Kong's long-term IAQ roadmap may not need a new comprehensive legislation. A phased, proportionate approach would be consistent with both global best practice and Hong Kong's regulatory culture. This would involve:

- strengthening and leveraging the existing voluntary IAQ Certification Scheme as a market benchmark;
- introducing targeted mandatory IAQ management requirements for sensitive settings such as schools, childcare and elderly care facilities; and
- progressively embedding ventilation, commissioning and source-control requirements into building approvals, major renovations and product regulation.

Overall, the comparative analysis indicates that incremental, risk-based integration of IAQ into existing regulatory systems, rather than the creation of a single IAQ statute, offers the most effective and credible pathway for Hong Kong to develop a resilient, long-term IAQ policy framework.

**INTERNATIONAL LAW ON INDOOR AIR QUALITY MANAGEMENT – JURISDICTIONAL COMPARISON
(CHINA, JAPAN, SINGAPORE, USA, HONG KONG, UK, FRANCE)**

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ANNEX 1 – CHINA

Questions	Response
1. Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Although Mainland China does not have nationwide public health policies solely focused on indoor air quality ("IAQ"), it has established national standards to regulate this aspect. Chief among these are the <i>Code for Indoor Environmental Pollution Control of Civil Building Engineering</i> (GB 50325) (民用建筑工程室内环境污染控制标准)², and <i>Indoor Air Quality Standard</i> (GB/T 18883) (室内空气质量标准)³. For a detailed discussion of these two national standards, please refer to our response to Question 3 below. Mainland China does not offer independent voluntary programs at the national level; however, it operates a voluntary green building certification system that includes IAQ components. <u>Shenzhen</u> Shenzhen currently does not have any public health policies or voluntary schemes that specifically address IAQ. However, in 2024, during the Fifth Session of the Seventh Shenzhen Municipal People's Congress, several deputies proposed a recommendation titled "Proposal on Strengthening Indoor Air Management in Public Buildings in Shenzhen" (关于全面加强深圳市公共建筑室内空气管理的建议). On December 31, 2024, the Shenzhen Housing and Construction Bureau published this proposal along with its formal written response, titled <i>Letter of the Shenzhen Housing and Construction Bureau in Reply to Proposal No. 20240714 of the Fifth Session of the Seventh Municipal People's Congress</i> (深圳市住房和城乡建设局关于市七届人大五次会议第 20240714 号建议答复的函, the "Reply Letter"), on its official website.⁴ <u>Shanghai</u> Shanghai provides various incentives for green buildings that includes IAQ components, see our response to Question 2.p below.
a. When were they introduced?	<u>Shenzhen</u> The Reply Letter was finalized on May 23, 2024, and was subsequently published on the website of the Shenzhen Housing and Construction Bureau on December 31, 2024.

² See

<https://eia543.com/documents/14%E5%BB%BA%E7%AD%91%E8%AE%BE%E8%AE%A1%26%E5%AE%A4%E5%86%85%E7%A9%BA%E6%B0%94%E6%B1%A1%E6%9F%93%E7%A0%94%E7%A9%B6/%E6%B0%91%E7%94%A8%E5%BB%BA%E7%AD%91%E5%B7%A5%E7%A8%8B%E5%AE%A4%E5%86%85%E7%8E%AF%E5%A2%83%E6%B1%A1%E6%9F%93%E6%8E%A7%E5%88%B6%E6%A0%87%E5%87%86%E5%BC%88GB%2050325-2020%E5%BC%89.pdf>

³ See <https://www.ndcpa.gov.cn/jbkzzx/c100201/1666357812062392320/ZgwODgwF.pdf>

⁴ See https://zjj.sz.gov.cn/xxgk/rd/jybl/content/post_11933674.html

		<u>Shanghai</u> Shanghai provides financial incentives to green buildings, including those pass the voluntary green building
	b. Are they mandatory or voluntary?	<u>Shenzhen</u> N/A <u>Shanghai</u> Shanghai provides financial incentives to green buildings, including those pass the voluntary green building
	c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	<u>Shenzhen</u> In the Reply Letter, with respect to the deputies' recommendation on strengthening public education regarding indoor environmental health, the Shenzhen Housing and Construction Bureau noted that the Shenzhen Municipal Health Commission, together with the Shenzhen Housing and Construction Bureau, has been organizing public education initiatives on environment and health. These efforts aim to raise public awareness of indoor air pollution and enhance understanding of the importance of IAQ. The initiatives include the following: 1. Conducting science-popularization lectures. For example, experts from the Municipal Center for Disease Control and Prevention have delivered public lectures such as "Indoor Air Pollution and Health" as part of the Civic Culture Classroom programs. 2. Producing posters related to air quality and health. These posters promote knowledge on sources of indoor air pollution, associated health risks, and preventive measures. 3. Hosting special public education activities on air quality and health. These activities involve the Municipal CDC collaborating with district-level CDCs, community organizations, and other institutions to carry out health-promotion events for the general public. <u>Shanghai</u> Shanghai provides financial incentives to green buildings, including those pass the voluntary green building
	d. What is the level of participation?	<u>Shenzhen</u>

		On December 31, 2024, the Shenzhen Housing and Construction Bureau published the deputies' proposal together with its formal response, titled Letter of the Shenzhen Housing and Construction Bureau in Reply to Proposal No. 20240714 of the Fifth Session of the Seventh Municipal People's Congress, on its official website. <u>Shanghai</u> Shanghai provides financial incentives to green buildings, including those pass the voluntary green building
	e. How closely do these policies align with international guidelines such as WHO?	<u>Shenzhen</u> The deputies' proposal referenced the idea of "drawing on advanced international standards to enhance indoor air quality requirements." However, the Reply Letter does not explicitly mention WHO guidelines or other international standards. Instead, it refers only to the national standards discussed in our response to Question 1.b.
	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	<u>Shenzhen</u> It is not addressed in the Reply Letter.
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	<u>Shenzhen</u> According to the information set out in the Reply Letter, the Shenzhen Municipal Health Commission has already been actively conducting research related to indoor air quality standards. For example, the Shenzhen Center for Disease Control and Prevention (Shenzhen CDC), as a drafting institution, participated in the development of the national standard <i>Indoor Air Quality Standard</i> (GB/T 18883-2022). In addition, the Shenzhen CDC drafted the local standard <i>Hygienic Evaluation Specification for Public Areas of Urban Rail Transit</i> (DB4403/T 44-2020) (轨道交通公共场所预防性卫生学评价规范), which provides the basis for conducting indoor air quality testing and source control during the construction of large public buildings such as metro stations in Shenzhen, within the scope permitted under national regulations. The Reply Letter also indicates that, based on future needs, the Shenzhen Housing and Construction Bureau will continue to work jointly with the Municipal Health Commission to advance the development of advanced local indoor air quality standards for public buildings in Shenzhen.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	<u>National</u> At the national legislative level in China, there is currently no dedicated legislation specifically addressing IAQ. However, the <i>Regulations on Public Place Sanitation Administration</i> (公共场所卫生管理

	条例) and its corresponding implementing measures, the <i>Implementation Rules for the Regulations on Public Place Sanitation Administration</i> (公共场所卫生管理条例实施细则), provide certain general provisions regarding IAQ.⁵ The Regulations were issued by the State Council on April 1, 1987, and the Implementation Rules by the Ministry of Health on March 10, 2011 (Order No. 80). Both have been amended several times, with their current versions effective from December 6, 2024, and December 26, 2017, respectively. Specifically, Article 11 of the Implementation Rules provides that operators of public places must maintain adequate air circulation and ensure that indoor air quality complies with national health standards and requirements. Public places that use centralized air-conditioning and ventilation systems must comply with the relevant health specifications and requirements applicable to such systems. In addition, Article 19 requires operators of public places to conduct sanitary testing of indoor air in accordance with applicable health standards and specifications. Such testing must be carried out at least once per year, and the results must be displayed in a prominent location. Non-compliance may result in administrative penalties, including warnings, monetary fines, orders for suspension pending rectification, and, where warranted, revocation of the hygiene license required for public places. Because the provisions in the Regulations and Implementation Rules that relate to indoor air quality are relatively limited, we provide only this high-level summary here and will not respond separately to each sub-question below. The relevant health standards referenced in these documents are primarily defined by the <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) (公共场所卫生指标及限值要求), which is a mandatory national standard implemented in 2019.⁶ <u>Shanghai</u> Shanghai does not have any dedicated legislation specifically addressing IAQ. However, the <i>Shanghai Green Building Regulations</i> (上海市绿色建筑条例) and its corresponding implementing measures <i>Shanghai Green Building Management Measures</i> (上海市绿色建筑管理办法) contain IAQ testing requirements exist for certain buildings.⁷ In addition, The <i>Procedures of Shanghai Municipality on Hygiene Management of Central Air-conditioning Ventilation Systems</i> (上海市集中空调通风系统卫生管理办法) impose lifecycle-wide hygiene obligations on central air-conditioning systems, from design and acceptance through daily operation, testing, emergency response, and record-keeping.
a. When were they introduced?	<u>National</u>

⁵ See <https://www.nhc.gov.cn/fzs/c100048/201808/685a2df0bfa446c5ade0b89938f1fbec.shtml> and <https://www.nhc.gov.cn/wjw/c100221/202201/5f363fcea6f24665a79fce9fd6a0991e.shtml>

⁶ See https://www.ndcpa.gov.cn/jbkzzx/c100201/common/content/content_1666355091527766016.html

⁷ See <https://www.shgbc.org/xingyezixun/202409301824197821.html> and <https://www.shanghai.gov.cn/2021122zfwi/20211122/a90e87f3349341e7bd6aab82b9b86b8a.html>

		The national standard <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) was issued on April 4, 2019 and took effect on November 1, 2019. <u>Shanghai</u> The <i>Shanghai Green Building Regulations</i> were approved by the Standing Committee of the Shanghai Municipal People's Congress on September 27, 2024 and took effect on January 1, 2025. The <i>Shanghai Green Building Management Measures</i> were issued by the Shanghai Municipal People's Government on September 30, 2021 and took effect on December 1, 2021. The <i>Procedures of Shanghai Municipality on Hygiene Management of Central Air-conditioning Ventilation Systems</i> were first issued on August 8, 2011, and most recently amended on November 5, 2024.
	b. What indoor environments and vulnerable populations are prioritized?	<u>National</u> The national standard <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) applies to public places, including but not limited to hotels, guesthouses, bathhouses, swimming pools, hair salons, beauty salons, cinemas, theatres, entertainment venues, gyms and sports venues, museums, libraries, exhibition halls, shopping malls, bookstores, hospital waiting rooms, waiting halls for public transport and public transport vehicles. Other public places may apply it by reference. <u>Shanghai</u> • Green Building regulations and implementing measures: Newly constructed buildings, and certain public buildings including kindergartens, primary and secondary schools, elderly care institutions, and medical institutions. • Procedures on Hygiene Management of Central Air-conditioning Ventilation Systems: Central air-conditioning and ventilation systems in a broad range of buildings within Shanghai, including commercial buildings (hotels, restaurants, shopping malls, bathhouses, financial institutions), office buildings (government and commercial), cultural, sports, and entertainment venues, transportation hubs (airports, railway stations, metro stations, ports), educational and medical institutions, elderly care and welfare institutions, residential buildings, and other buildings used for public or social activities.
	c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	<u>Shanghai</u> • Green Building regulations and implementing measures: Newly constructed buildings and buildings that undergo interior decoration or renovation shall undergo IAQ testing prior to use. Buildings that fail to meet the relevant standards shall not be put into use.

	Where public buildings such as kindergartens, primary and secondary schools, elderly care institutions, and medical institutions undergo interior decoration or renovation, IAQ testing shall be conducted prior to use and the test results be publicly disclosed in a prominent location within the building. Buildings that fail to meet the relevant standards shall not be put into use. Where a public building is equipped with an IAQ monitoring system, the monitoring data shall be publicly displayed in a prominent location within the building. Testing must follow national IAQ standards (e.g., GB/T 18883-2022 and GB 37488-2019).
d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?	No.
e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?	<u>National</u> The national standard <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) was promulgated by the State Administration for Market Regulation ("SAMR") and the Standardization Administration of China ("SAC"). The National Disease Control Administration serves as the competent authority responsible for the development of this standard. <u>Shanghai</u> • Green Building regulations and implementing measures: Municipal and district governments are responsible for overall coordination and supervision, with the Housing and Urban-Rural Development authorities responsible for policy development and implementation. • Procedures on Hygiene Management of Central Air-conditioning Ventilation Systems: Municipal CDC and district-level CDCs take the lead.
f. What are the objectives and parameters? Are there guidelines or mandatory measures?	<u>National</u> The national standard <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) is a mandatory standard. It sets hygiene requirements by category; those relating to IAQ are as follows: • Physical factors: main indicators include relative humidity and air velocity ○ Relative humidity (only for spaces with central AC): generally 40–65%; swimming venues: ≤ 80%

		○ Air velocity: rest/sleep areas: ≤ 0.3 m/s; other areas: ≤ 0.5 m/s • IAQ: ○ Fresh air rate: sleep/rest venues: ≥ 30 m³/h/person; other venues: ≥ 20 m³/h/person ○ CO₂ concentration: sleep/rest venues: $\leq 0.10\%$; other venues: $\leq 0.15\%$ ○ Airborne bacteria: sleep/rest venues: $\leq 1,500$ CFU/m³; other venues: $\leq 4,000$ CFU/m³ ○ Formaldehyde: ≤ 0.10 mg/m³ ○ Benzene: ≤ 0.11 mg/m³ ○ Radon: ≤ 400 Bq/m³ Central air-conditioning and ventilation systems
	g. How do laws address ventilation requirements and standards, including minimum ventilation rates?	<u>Shanghai</u> The <i>Procedures of Shanghai Municipality on Hygiene Management of Central Air-conditioning Ventilation Systems</i> do not prescribe minimum ventilation rates. Instead, they require that centralized ventilation systems operate in a way that keeps CO₂ concentration and other IAQ indicators within externally defined hygiene standards including GB 37488-2019.
	h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	<u>Shanghai</u> • Procedures on Hygiene Management of Central Air-conditioning Ventilation Systems: ○ Design: New, renovated, or expanded central AC systems must be designed by qualified entities in accordance with hygiene management standards and use compliant equipment. Hygienic evaluation reports are required at both design review and completion/acceptance stages, and must be issued by qualified hygienic evaluation institutions. ○ Operation: Owners or entrusted management units must establish systems for regular cleaning, inspection, and testing, designate responsible hygiene management personnel, provide hygiene training to relevant staff, and prepare emergency response

		plans for public health incidents. The systems must be run in a manner that prevents dust accumulation, moisture retention, and microbial growth. ○ Maintenance: Hygienic condition testing must be conducted at least once per year. Testing must be performed either by qualified third-party institutions or by management units that possess appropriate testing capability.
i.	Are there legal provisions for moisture and humidity control to prevent microbial contamination?	<u>Shanghai</u> • Procedures on Hygiene Management of Central Air-conditioning Ventilation Systems: Article 10 (Hygienic Requirements on Daily Operation of Equipment and Facilities): The operation of the central air-conditioning ventilation system shall meet the following hygienic requirements: 1. The room of the air-conditioner shall be kept clean and dry; 2. The cooling (heating) coil pipes shall have no dust and mildew; 3. The condensate water plate shall have no leakage, corrosion, dirt, dust or mildew, and the drain pipe shall be kept unobstructed; 4. The inside of the cooling tower shall be kept clean, and routine water treatment operations, such as filtration, corrosion inhibition, scale inhibition, sterilization and algae removal, shall be satisfactorily completed; 5. The ductwork shall be kept intact, with its maintenance port ready for opening and normal use, and no wastes, animal bodies and excrements shall be left therein; ○ 6. There shall be no dust, moisture, mildew in and near the vents of the fresh air ducts, the air-intake ducts, the return air ducts and the exhaust hoses, nor shall there be any dripping from the vents. The surrounding area shall be kept clean; ○ 7. And there shall be no dirt, dust and mildew in the humidifiers and dehumidifiers, and the water source shall meet the requirements set forth in the Standards for Drinking Water Quality.
j.	How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	N/A

k.	How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	N/A
l.	Are energy efficiency goals included to balance IAQ and sustainability?	N/A
m.	How are IAQ laws incorporated within occupational health and safety frameworks?	<u>Shanghai</u> IAQ obligations are absorbed into occupational health and safety frameworks, where poor IAQ is treated as a regulated workplace health hazard, enforceable through occupational disease prevention, ventilation hygiene rules, and health authority inspections.
n.	What exemptions or exclusions exist, and what is their rationale?	N/A
o.	Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	N/A
p.	How are IAQ regulations enforced? What penalties or incentives apply?	<u>Shanghai</u> • Green Building regulations and implementing measures: Planning, land, fiscal, financial, and policy-based incentives are provided to promote green buildings. ○ High-star green buildings (especially two-star and three-star) may qualify for floor area ratio bonuses or preferential treatment in planning approval. ○ Direct financial subsidies and special funds may be provided by the municipal and district governments. ○ Homebuyers purchasing green residential buildings (generally two-star or above) may receive increased housing provident fund loan limits and preferential loan conditions within permitted policy ranges. • Procedures on Hygiene Management of Central Air-conditioning Ventilation Systems: AC Systems must be registered with the district CDC within 60 days of being put into use. Failure to meet design or operation requirements will result in the following penalties: ○ Failure to conduct required hygienic evaluation: Order to correct within a specified time limit, fine imposed on the responsible unit; stricter penalties and possible liability under other laws (e.g. market regulation, criminal law) for fraudulent reports

		○ Failure to clean or test the system as required: Order to rectify; administrative fine ○ Failure to take corrective action after failed testing: Order to immediately correct; administrative fine; CDC may mandate professional cleaning and disinfection at the operator's cost ○ Refusal to suspend operation during public-health emergencies: Order to suspend system operation; administrative penalties ○ Escalation under infectious-disease control laws if disease transmission risk is involved ○ Failure to establish management systems or keep records: Order to rectify; administrative fine
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	<u>Shenzhen & Shanghai</u> As noted above, the national standards currently applicable in Shenzhen and Shanghai that relate to IAQ include the <i>Code for Indoor Environmental Pollution Control of Civil Building Engineering</i> (GB 50325) (民用建筑工程室内环境污染控制标准), <i>Indoor Air Quality Standard</i> (GB/T 18883) (室内空气质量标准), and <i>Hygienic Indicators and Limits for Public Places</i> (GB 37488-2019) (公共场所卫生指标及限值要求). We will discuss GB 50325 and GB/T 18883 in this section.
	a. What are the requirements for new constructions versus existing premises?	<i>Code for Indoor Environmental Pollution Control of Civil Building Engineering</i> (GB 50325) (民用建筑工程室内环境污染控制标准): GB 50325 expressly applies to the control of indoor environmental pollution in newly constructed, expanded, and renovated civil building projects. It provides detailed requirements across the full project lifecycle, including the selection of materials, engineering survey and design, construction, and project acceptance.
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	<i>Code for Indoor Environmental Pollution Control of Civil Building Engineering</i> (GB 50325) (民用建筑工程室内环境污染控制标准): With respect to outdoor air intake and ventilation rates, this standard requires that the ventilation design of civil buildings comply with the relevant provisions of the current national standard <i>Unified Standard for Civil Building Design</i> (GB 50352) (民用建筑设计统一标准). For civil building projects that use centralised air-conditioning systems, the required outdoor air volume must comply with the relevant provisions of the current national standard <i>Design Code for Heating, Ventilation and Air Conditioning of Civil Buildings</i> (GB 50736) (民用建筑供暖通风与空气调节设计规范).
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	<i>Code for Indoor Environmental Pollution Control of Civil Building Engineering</i> (GB 50325) (民用建筑工程室内环境污染控制标准): No.

		Indoor Air Quality Standard (GB/T 18883) (室内空气质量标准): No.
	d. How are these code requirements monitored and enforced?	Code for Indoor Environmental Pollution Control of Civil Building Engineering (GB 50325) (民用建筑工程室内环境污染控制标准): The foreword of this standard explicitly identifies the provisions that are mandatory. It also specifies that the Ministry of Housing and Urban-Rural Development is responsible for the administration of the standard and for interpreting its mandatory provisions, while the Henan Academy of Building Research Co., Ltd. is responsible for providing technical interpretations of the standard's substantive content. Indoor Air Quality Standard (GB/T 18883) (室内空气质量标准): This is a recommended national standard and is not mandatory.

ANNEX 2 – JAPAN

Questions	Response
1. Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Japan has a mixed regulatory framework for indoor air quality that combines mandatory legal requirements (such as building- and school-related regulations) and non-binding public health guidelines. In terms of voluntary guidelines, the Ministry of Health, Labour and Welfare (“MHLW”) publishes “<i>Indoor Air Chemical Substance Concentration Guidelines</i>”. This is a non-binding set of guidelines, which sets health-based reference values for chemical substances of concern for health effects as a measure against sick building syndrome.
a. When were they introduced?	The guidelines were first introduced on June 13, 1997 with the establishment of a guideline value for formaldehyde, and were subsequently expanded and refined between 1997 and 2002 to establish the foundational framework for Japan’s Indoor Air Chemical Substance Concentration Guidelines. Since then, the guideline values have been periodically reviewed and, where appropriate, revised to reflect updated scientific findings. The most recent revision was issued on January 17, 2025, including a revision of the guideline value for ethylbenzene.
b. Are they mandatory or voluntary?	Voluntary for normal houses In respect of schools, the guideline values are effectively mandatory under the <i>School Health and Safety Act</i> and the <i>School Environmental Health Standards</i>, and schools are required to manage indoor air quality in accordance with those standards.
c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	These guidelines are separate from the laws set out in 2 below. The purpose of the guidelines is to prevent sick building syndrome and health hazards caused by chemical substances in indoor air. These guidelines indicate concentration guideline values for individual substances as health-based reference levels, meaning concentration values at which these substances are determined to be safe for humans to inhale in the air throughout their lifetime without adverse health effects.
d. What is the level of participation?	voluntary / reference-based / best practice

		Local governments, public institutions, and responsible building owners often refer to the guidelines as best practice when designing, operating, or renovating buildings. There is no formal registration, certification, or reporting obligation tied to compliance.
	e. How closely do these policies align with international guidelines such as WHO?	The standards are established with reference to international assessments such as those by the WHO.
	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	No, they were not directly revised in response to COVID-19; however, the guideline values will be updated based on the latest research findings. For example, the guideline value for ethylbenzene was lowered from January 2025, based on the latest scientific findings.
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	Generally, an advisory council is established within the government or relevant ministries. Based on discussions within this council, drafts of bills, cabinet orders, and notices specifying the details of laws are presented. Public comments are then solicited on draft bills and undergo deliberation in the Diet. On the other hand, cabinet orders and notices are directly promulgated by the administration.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	1) Act on Maintenance of Sanitation in Buildings (Act No. 20 of 1970, as amended) 2) Industrial Safety and Health Act (Act No. 57 of 1972, as amended) 3) School Health and Safety Act⁸ (Act No. 56 of 1958, as amended) 4) The Building Standards Act (Act No. 201 of 1950, as amended "BS Act") 5) Noise Regulation Act (Act No. 98 of 1968, as amended)
	a. When were they introduced?	1) 13 October 1970 2) 1 October 1972 3) 1 June 1958 4) 23 November 1950

⁸ Formerly the *School Health Act*; renamed in 2008. Please note that the *School Environmental Hygiene Standards* apply to all schools. However, if the total floor area per building exceeds 8,000 m² for schools or 3,000 m² for specialized training colleges, the standards of the Building Sanitation Act apply. Where there are overlapping applicable standards, the stricter standard must be followed.

		5) 10 June 1968
	b. What indoor environments and vulnerable populations are prioritized?	In Japan, the prioritization of indoor environments and vulnerable populations is primarily addressed through the <i>Act on Maintenance of Sanitation in Buildings</i>, the <i>Industrial Safety and Health Act</i>, and the <i>School Health and Safety Act</i>. Other laws, such as the BS Act and sector-specific welfare or healthcare legislation, play a supplementary or indirect role by regulating building performance or facility standards rather than directly prioritizing indoor air quality for specific vulnerable populations. 1) <i>Act on Maintenance of Sanitation in Buildings</i> This primarily prioritizes unspecified and numerous users of buildings whose health could be affected by poor indoor environmental conditions due to prolonged or repeated exposure in shared indoor spaces. The environments include, in particular, the following that meet certain criteria: • Theatres; • Department stores; • Assembly halls; • Libraries; • Art museums; • Game centers; • Stores or offices; and • Schools or training facilities. 2) <i>Industrial Safety and Health Act</i> This primarily prioritizes workplaces (indoor occupational environments) where workers are exposed to physical, chemical, or ergonomic hazards as a result of their employment. The Act emphasizes the control of indoor work environments through measures such as ventilation, exposure control, and monitoring of hazardous substances, recognizing the workplace as a major site of preventable health risks. These environments include, in particular: • Factories, manufacturing plants, and industrial facilities; • Construction sites and indoor workspaces with heavy machinery; • Offices and service-sector workplaces; and • Indoor spaces where hazardous substances, dust, gases, vapors, or insufficient ventilation may pose health risks.

		3) School Health and Safety Act This prioritizes school indoor environments, where children and students spend extended periods of time in collective settings. These environments include: • Classrooms and lecture rooms; • School buildings and common indoor spaces; and • Indoor facilities such as gyms, libraries, and special-purpose rooms. The Act explicitly requires schools to maintain appropriate environmental hygiene, including ventilation, temperature, humidity, and air quality, through the legally established School Environmental Health Standards.
c.	What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	Certain categories of buildings are subject to periodic environmental measurements and record-keeping obligations, while reporting or comprehensive public disclosure requirements are limited. The details are as follows. 1) Act on Maintenance of Sanitation in Buildings • Monitoring: Air quality measurements must be conducted at least once every two months (for the relevant items subject to periodic measurement under the applicable standards) to verify that the air environment is being maintained as stipulated in the laws and regulations. Please note that the owners and occupants of these Specified Buildings are obliged to appoint a person who is qualified as a “Building Environmental Sanitation Management Technician”, which is a national qualification. The appointed Building Environmental Sanitation Management Technician must supervise the maintenance and management of Specified Buildings. • Reporting: No, there is no legal reporting obligation. Some municipalities may request the submission of a situation report. • Public Disclosure: No, there are no legal public disclosure requirements. 2) Industrial Safety and Health Act • Monitoring: The Act itself does not set comprehensive IAQ obligations as “IAQ” per se; detailed hazard-specific duties are prescribed in subordinate regulations. However, for

		specific occupational hazards (e.g., dust, organic solvents, and specified chemical substances), mandatory workplace measurements and related monitoring are required. Where ventilation or local exhaust systems are required as control measures, performance checks and related measurements may also be mandated. • Reporting: No, there is no general obligation to report IAQ monitoring results to authorities on a periodic basis. However, measurement records must be prepared and retained, and may be submitted or inspected upon request by labor authorities in the context of supervision or inspections. • Public Disclosure: No. The Act does not require public disclosure of workplace IAQ or work environment measurement results. 3) School Health and Safety Act • Monitoring: Schools must conduct IAQ measurements twice annually on a regular basis. For buildings classified as specified buildings that supply air using air conditioning or mechanical ventilation equipment, measurements must be taken regularly at least once every two months. • Reporting: No • Public Disclosure: No			
	d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?	Under Japanese law, periodic IAQ measurements are mandated for certain categories of buildings and facilities (e.g., specified buildings and schools). However, the use of continuous monitoring technologies, real-time sensors, or automated reporting systems is not legally required. IAQ compliance is generally verified through periodic, manual measurements conducted at prescribed intervals using specified measurement methods. 1) Act on Maintenance of Sanitation in Buildings Periodic IAQ measurements are required for specified buildings, but continuous or real-time IAQ monitoring is not mandated. During normal operating hours of the designated building, measurements must be taken on each floor at a height of 75 cm to 150 cm above the floor surface in the central area of each room, using the measuring instruments listed in the following table. <table border="1" data-bbox="900 1382 2132 1418"> <thead> <tr> <th data-bbox="900 1382 1140 1418">Target</th> <th data-bbox="1140 1382 1720 1418">Measurement Instrument</th> <th data-bbox="1720 1382 2132 1418">Measurement Frequency</th> </tr> </thead> </table>	Target	Measurement Instrument	Measurement Frequency
Target	Measurement Instrument	Measurement Frequency			

	Concentration of suspended particulate matter	An instrument that measures, by the gravimetric method, suspended particulate matter with an aerodynamic diameter of approximately 10 micrometers or less, using a glass fiber filter (limited to those having a collection efficiency of 99.9% or higher for stearic acid particles of 0.3 micrometers), or an instrument calibrated using such an instrument as a standard by a person registered with the Minister of Health, Labour and Welfare	Once every two months
	Carbon monoxide concentration	Carbon monoxide detector using the detector tube method	Once every two months
	Carbon dioxide concentration	Carbon dioxide detector using the detector tube method	Once every two months
	Temperature	Thermometer with 0.5-degree scale	Once every two months
	Relative humidity	Dry- and wet-bulb hygrometer with 0.5-degree scale	Once every two months
	Airflow	Anemometer capable of measuring air velocity of 0.2 meters per second or more	Once every two months
	Formaldehyde concentration	Instruments using the 2,4-dinitrophenylhydrazine (DNPH) collection–high-performance liquid chromatography (HPLC) method; instruments using the 4-amino-3-hydrazino-5-mercapto-1,2,4-triazole method; or measuring instruments separately designated by the Minister of Health, Labour and Welfare	Once during the period from June 1 to September 30 immediately following the start of use after completion of new construction, extension, major repair, or major renovation
2) Industrial Safety and Health Act			
No. Continuous IAQ monitoring (e.g., real-time sensors or continuous reporting) is not mandated under this Act.			
However, periodic workplace measurements are legally required for specific occupational hazards, as prescribed in hazard-specific subordinate regulations, rather than as a general IAQ obligation. These include, for example:			

- Dust (e.g., under the *Ordinance on Prevention of Hazards Due to Dust* (Ministry of Labour Ordinance No. 18 of April 25, 1979))
- Organic solvents (*Ordinance on Prevention of Organic Solvent Poisoning* (Ministry of Labour Ordinance No. 36 of September 30, 1972))
- Specified chemical substances (*Ordinance on Prevention of Hazards Due to Specified Chemical Substances* (Ministry of Labour Ordinance No. 39 of September 30, 1972))

Where engineering controls such as general ventilation or local exhaust systems are required, periodic performance inspections and measurements of those systems may also be mandated.

Accordingly, IAQ-related monitoring under this Act is targeted, hazard-specific, and periodic, rather than continuous or comprehensive across all workplaces.

3) **School Health and Safety Act**

Schools must conduct periodic IAQ measurements, while continuous or real-time monitoring technologies are not legally required.

Carbon dioxide: Measure using the detection tube method.

Temperature: Measure using a thermometer with 0.5-degree graduations.

Relative Humidity: Measure using a wet-and-dry-bulb hygrometer with 0.5-degree graduations.

Carbon monoxide: Measure using the detection tube method.

Nitrogen Dioxide: Measure using the Salzmänn method.

Inspection Item	Method
(8) Volatile Organic Compounds (VOCs)	Sampling of volatile organic compounds shall be conducted during periods when the temperature inside the classroom is relatively high. For the active sampling method, sampling shall be carried out twice for 30 minutes each; for the passive (diffusive) sampling method, sampling shall be carried out for 8 hours or longer.
A. Formaldehyde	Samples shall be collected using the solid-phase adsorption / solvent extraction method with 2,4-dinitrophenylhydrazine (DNPH) derivatives, and concentrations shall be measured by high-performance liquid chromatography (HPLC).
B. Toluene	Samples shall be collected using one of the following methods: solid-phase adsorption / solvent extraction method,

		solid-phase adsorption / thermal desorption method, or container sampling method, and shall be measured by gas chromatography–mass spectrometry (GC-MS). C. Xylene Same as above B. D. p-Dichlorobenzene Same as above B. E. Ethylbenzene Same as above B. F. Styrene Same as above B.
e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?		1) Act on Maintenance of Sanitation in Buildings MHLW 2) Industrial Safety and Health Act MHLW, Labor Standards Inspection Offices 3) School Health and Safety Act Ministry of Education, Culture, Sports, Science and Technology
f. What are the objectives and parameters? Are there guidelines or mandatory measures?		1) Act on Maintenance of Sanitation in Buildings Buildings that satisfy certain criteria (e.g., the purpose of use is for theaters, department stores, assembly halls, libraries, art museums, game centers, stores or offices, and schools or training facilities (“specific use”), and the total floor area of portions used for the specific purposes is 3,000 m² or more) are defined as “Specified Buildings.” Owners, occupants and managers of these Specified Buildings are obligated to maintain and manage them in accordance with the “Building Environmental Sanitation Management Standards”, which include air quality control measures necessary to maintain a favorable environmental hygiene condition. This is a mandatory measure and there are enforcement orders, enforcement regulations, and notifications concerning the Act on Securing Sanitary Environments in Buildings, which are legally binding regulations and related mandatory standards, supplemented by ministerial notifications used for enforcement and interpretation. Even for buildings other than Specified Buildings, those used or occupied by a large number of people must strive to maintain and manage them in accordance with the Building Environmental Hygiene Management Standards (Article 4, Paragraph 3 of the Act), imposing a duty to make efforts.

2) Industrial Safety and Health Act

Article 23 of the Industrial Safety and Health Act imposes mandatory duties on employers to take necessary measures to protect workers' health. However, the specific technical and measurement requirements are prescribed in subordinate regulations (including Enforcement Orders and ministerial ordinances) on a risk-specific basis.

For example, under the Industrial Safety and Health Regulations, in certain indoor workplaces classified as “hot, cold, or highly humid” work environments, employers must periodically measure temperature, humidity, and (where applicable) radiant heat at least once every half-month.

By contrast, for ordinary office environments, IAQ-related obligations are mainly governed by the Office Hygiene Standards Regulation, which generally requires measurements (e.g., CO/CO₂, temperature, humidity) at least once every two months, while target ranges for temperature and humidity under air-conditioning are framed as best-efforts standards.

3) School Health and Safety Act

Article 6 of the Act stipulates that schools must strive to maintain daily environmental hygiene within the school premises by ensuring proper ventilation, natural lighting, artificial lighting, and heat retention, while maintaining cleanliness, and must implement improvements as necessary. In this context, the “**School Environmental Hygiene Standards**” pertaining to classroom environments (including ventilation, humidity, dust, and insulation) are established and function as authoritative administrative standards, rather than strict statutory obligations. These are mandatory measures and a related Enforcement Order and other standards regulations exist that are all mandatory measures.

4) The Building Standards Act

The Act mandates the installation of 24-hour ventilation equipment (with a ventilation rate of at least 0.5 air changes per hour as a general rule) in habitable rooms as a measure against sick house syndrome⁹. **This is a mandatory measure.**

g. How do laws address ventilation requirements and standards, including minimum ventilation rates?

1) Act on Maintenance of Sanitation in Buildings

Please find the standards below:

Item	Standard
A. Concentration of Suspended Particulate Matter	$\leq 0.15 \text{ mg/m}^3$
B. Carbon Monoxide (CO) Concentration	$\leq 6 \text{ ppm}$
C. Carbon Dioxide (CO ₂) Concentration	$\leq 1,000 \text{ ppm}$ (1,000 parts per million)
D. Temperature	18°C to 28°C
E. Relative Humidity	40% to 70%
F. Airflow Velocity	$\leq 0.5 \text{ m/s}$
G. Formaldehyde Concentration	$\leq 0.1 \text{ mg/m}^3$ ($\leq 0.08 \text{ ppm}$)

The law does **not** prescribe a minimum ventilation rate (e.g., air changes per hour).

Instead, building owners must operate ventilation and air-conditioning systems so that indoor air quality remains within the above limits.

In practice, the CO₂ limit (1,000 ppm) functions as a de facto ventilation benchmark, since maintaining this level requires sufficient outdoor air supply.

2) Industrial Safety and Health Act

In indoor workplaces where gases, vapors, or dust are emitted, necessary measures must be taken to prevent the concentration of such gases, vapors, or dust in the air from reaching harmful levels. This includes installing equipment to enclose emission sources, local exhaust ventilation systems, or general ventilation systems (**Occupational Safety and Health Regulations, Article 577**).

The Act mandates ventilation as a control measure but does **not** set uniform minimum ventilation rates applicable to all workplaces.

Ventilation requirements are risk-based and task-specific, depending on:

- Type of substance;
- Emission level; and
- Applicable occupational exposure limits.

Compliance is evaluated by whether airborne contaminant concentrations are effectively controlled, not by air volume alone.

3) *School Health and Safety Act*

Ensuring student health and safe educational environments. Please find the standards below:

Item	Standard
(1) Ventilation	As a ventilation standard, the carbon dioxide concentration should preferably be 1,500 ppm or lower.
(2) Temperature	18°C or higher and 28°C or lower is preferable.
(3) Relative Humidity	30% or higher and 80% or lower is preferable.
(4) Suspended Particulate Matter	0.10 mg/m ³ or lower.
(5) Airflow Velocity	0.5 m/s or lower is preferable.
(6) Carbon Monoxide (CO)	6 ppm or lower.
(7) Nitrogen Dioxide (NO ₂)	0.06 ppm or lower is preferable.
(8) Volatile Organic Compounds (VOCs)	
A. Formaldehyde	100 µg/m ³ or lower.
B. Toluene	260 µg/m ³ or lower.
C. Xylene	200 µg/m ³ or lower.
D. p-Dichlorobenzene	240 µg/m ³ or lower.
E. Ethylbenzene	3,800 µg/m ³ or lower.
F. Styrene	220 µg/m ³ or lower.
(9) Mites or Mite Allergens	100 mites/m ² or lower, or an equivalent level of allergen quantity or lower.

- As with other Japanese laws, **no explicit minimum ventilation rate** is specified.
- Ventilation adequacy is assessed primarily through **CO₂ concentration**, which serves as a practical indicator of outdoor air supply.
- The standards are described as “preferable,” but schools are expected to **actively manage ventilation** (natural or mechanical) to meet them.

h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?

Japanese laws do not prescribe specific HVAC filtration standards (such as HEPA or MERV ratings). Instead, compliance is ensured indirectly through indoor air quality limits (e.g., particulate matter, formaldehyde, and VOCs), which require appropriate filter selection, maintenance, and replacement.

		In specialized settings like hospitals or cleanrooms, high-performance filtration is typically adopted based on industry standards or professional guidelines rather than general statutory requirements. 1) Act on Maintenance of Sanitation in Buildings Yes. Air conditioning equipment (which purifies air drawn in from outside using air filters, electrostatic precipitators and supplies it after regulating its temperature, humidity, and flow rate) should purify the air and supply it with its flow rate regulated to meet the standards in 2. d 1) above. Additionally, Mechanical ventilation equipment (equipment capable of purifying air drawn in from outside and supplying it after regulating its flow rate) must purify the air and supply it with its flow rate regulated to meet certain items (i.e. A, B, C, F and G) in 2. d 1) above. 2) Industrial Safety and Health Act Employers must take necessary measures, such as using substitutes, improving work methods or machinery, etc., to eliminate the causes of harmful conditions in workplaces where workers handle hazardous substances, emit gases, vapors, or dust, are exposed to harmful radiation or ultrasonic waves, generate noise or vibration, or are contaminated by pathogens. 3) School Health and Safety Act No specific filtration performance standards are prescribed; ventilation and air quality are regulated through environmental hygiene standards (e.g., CO₂ and particulate matter levels).
	i. Are there legal provisions for moisture and humidity control to prevent microbial contamination?	1) Act on Maintenance of Sanitation in Buildings Yes, See 2. d 1) above. 2) Industrial Safety and Health Act No, there is no explicit standard; however, employers have a general obligation to manage workplace conditions to prevent health hazards, including biological risks. 3) School Health and Safety Act Yes, see 2. d 3) above.

	j. How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	VOC and pollutant countermeasures in Japan feature a tiered, multi-layered regulatory structure combining: 1) The Building Standard Act This Act, together with its implementing standards, directly regulates VOCs and indoor pollutants at the materials and construction stages such as restrictions (and, in limited cases, prohibitions) on the use of formaldehyde-emitting building materials based on area of use¹⁰. 2) Act on Maintenance of Sanitation in Building While this is not a direct regulation on building materials, furnishings, and construction practices, post-occupancy environmental management regulations play an important role in limiting VOCs and pollutants. Please refer to 2.g 1) above regarding the requirements. Regular measurement and recording are required as stated in 2.d.1) above. 3) School Health and Safety Act This Act is also not a direct regulation on building materials, furnishings, or construction practices, but school environmental hygiene standards require levels to fall below the standards described in 2.d.3) above.
	k. How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	1) Noise Regulation Act The Noise Regulation Act sets maximum permissible decibel (dB) limits for the following types of noise, based on the area's designated use (residential or industrial) and time of day (daytime or nighttime): • Factory/Workplace Noise • Construction Work Noise • Vehicle Noise 2) The Building Standards Act The Act mandates the installation of 24-hour ventilation equipment (with a ventilation rate of at least 0.5 air changes per hour as a general rule) in living spaces.

¹⁰ Building Standards Act Enforcement Order Articles 20-5 to 20-7

		3) Act on Maintenance of Sanitation in Buildings As stated above, the Act regulates the Air environment (CO₂, temperature, humidity) and Ventilation rate and as a result, airflow design is required.
	l. Are there legal provisions for moisture and humidity control to prevent microbial contamination?	Yes. Japan controls moisture and humidity through indoor environmental hygiene standards, which indirectly contribute to preventing microbial contamination rather than regulating microbes directly. 1) Act on Maintenance of Sanitation in Buildings Yes. please refer to 2. g 1) above regarding the requirement. Regular measurement and recording are required as stated in 2. d. 1) above, which indirectly contribute to preventing microbial growth. 2) School Health and Safety Act Yes, School environmental hygiene standards require humidity and related environmental conditions to be maintained at appropriate levels, similar in substance to those described in 1 above. The requirements are as described in 2.g.3) above, and the measurement is described in 2.d.3) above.
	m. Are energy efficiency goals included to balance IAQ and sustainability?	No. Energy efficiency goals are not integrated into IAQ legislation in Japan, but are regulated separately under building energy efficiency laws. Sustainability requirements are not included in the Act on Maintenance of Sanitation in Buildings, which focuses on indoor environmental hygiene. By contrast, the Act on the Improvement of Energy Consumption Performance of Buildings is legislation that mandates compliance with energy efficiency standards of buildings. This Act aims to enhance building insulation performance and equipment efficiency to achieve carbon neutrality by 2050. Starting April 2025, compliance with these energy efficiency standards will be mandatory for all new construction and similar projects for all buildings (including residential buildings), in principle.
	n. How are IAQ laws incorporated within occupational health and safety frameworks?	1) Industrial Safety and Health Act As stated above, worker safety is regulated by the Industrial Safety and Health Act, which does not define air environment itself as an independent concept but positions it as a workplace environmental factor for preventing health hazards to workers.

	o. What exemptions or exclusions exist, and what is their rationale?	1) Act on Maintenance of Sanitation in Buildings Please note if buildings do not fall under the category of Specified Buildings, the obligations no longer apply although a best-efforts obligation is still imposed.
	p. Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	There is no formal mechanism for the private sector to urge amendments to the laws or regulations. While discussions regarding amendments to the law itself are possible, revisions may also be made through changes to subordinate regulations such as cabinet orders, ministerial ordinances, and notifications.
	q. How are IAQ regulations enforced? What penalties or incentives apply?	1) Act on Maintenance of Sanitation in Buildings Violations of registration obligations (i.e., newly constructed buildings that commence use as Specified Buildings must be reported to the authorities within one month of commencement of use), failure to appoint a management engineer, inadequate record-keeping, obstruction of reports or inspections, and violations of improvement orders, etc., shall be punishable by a fine of not more than 300,000 yen. 2) Industrial Safety and Health Act Enforcement of indoor air quality-related obligations under the Industrial Safety and Health Act is conducted by Labour Standards Inspection Offices. Serious or repeated violations—such as failure to implement mandatory protective measures, disregard of improvement orders, or exposure of workers to hazardous environments—may result in criminal penalties, including fines and imprisonment, depending on the nature and severity of the breach. 3) School Health and Safety Act Enforcement under the School Health and Safety Act relies mainly on administrative oversight by boards of education and the Ministry of Education, Culture, Sports, Science and Technology (MEXT). There are generally no direct criminal penalties for failing to meet environmental standards; instead, enforcement focuses on preventive management, compliance through supervision, and protection of children’s health.
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	Yes. Building codes include requirements relevant to IAQ, particularly with respect to ventilation. They do not, however, establish comprehensive IAQ performance standards.

	a. What are the requirements for new constructions versus existing premises?	New buildings are subject to clearer ventilation and design requirements, while existing buildings are generally not subject to retroactive obligations, except in limited circumstances such as major renovations or changes of use. Under the BS Act, IAQ-related requirements were introduced mainly as part of the so-called “sick house syndrome” countermeasures. These requirements are implemented through the BS Act, its Enforcement Order, and related ministerial notifications, including MLIT notifications on sick house syndrome countermeasures. For new constructions, the key requirements include: Mandatory continuous ventilation systems Residential buildings and other specified rooms must be equipped with mechanical ventilation systems capable of achieving a ventilation rate equivalent to at least 0.5 air changes per hour. Restrictions on interior finishing materials Interior materials emitting formaldehyde are regulated based on emission classifications (e.g., F☆☆☆☆, F☆☆☆☆, etc.). For example: - Materials classified as F☆☆☆☆ may generally be used without quantitative restrictions; - Materials with lower classifications are subject to strict limits on the usable surface area within a room. ※F☆☆☆☆ is a Japanese classification (Star system) indicating the lowest level of formaldehyde emissions from building materials, allowing unrestricted indoor use under the BS Act. Prohibition of certain chemicals Interior materials containing specific pesticides (such as chlorpyrifos) are effectively prohibited for use in indoor spaces. Procedural enforcement
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		Compliance with these ventilation and material requirements is reviewed at the building confirmation stage and verified again at the completion inspection stage. For existing buildings, • No general retroactive obligation Buildings constructed before the introduction of sick house syndrome regulations are not required to install new ventilation systems or replace interior materials solely to meet current IAQ standards. • Limited triggering events IAQ-related requirements may become applicable, for example, where: ○ A major renovation or extension is carried out that qualifies as construction under the BS Act; or ○ A change of use occurs (e.g., conversion of a residential unit into a nursery school or similar facility), triggering the application of current building standards to the modified portions.
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	Ventilation rates are specified at a minimum level, while filtration and detailed design criteria are largely left to guidelines and professional judgment. Japan does not have a single, comprehensive IAQ code, but building regulations impose mandatory IAQ-related requirements, mainly through ventilation and source-control measures. In particular: • Mandatory ventilation: Habitable rooms must be provided with ventilation under the BS Act, either by natural ventilation (openings) or by mechanical ventilation. • Minimum ventilation rates: Mechanical ventilation must generally supply at least 20 m³ /hour per person. For residential buildings, continuous mechanical ventilation of approximately 0.5 air changes per hour (ACH) is required.

		• 24-hour mechanical ventilation (“ sick house syndrome ” countermeasures): Since the 2003 amendments addressing sick house syndrome, mechanical ventilation is, in principle, mandatory for all buildings, even where low-emission materials are used. • Design criteria: The regulations specify technical design requirements for ventilation systems, including appropriate placement of supply and exhaust openings and measures to prevent ingress of rain, insects, and dust. • Source-control regulations: There are strict restrictions on formaldehyde- and VOC-emitting building materials, including material classification, usage limits, and additional requirements for concealed spaces (e.g., ceiling or floor cavities). By contrast, Japanese building codes generally do not prescribe specific air filtration efficiency standards (such as MERV or HEPA), except for special building types (e.g., hospitals) or under separate operational hygiene regulations.
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	Japan does not generally mandate IAQ education or training for all building managers, facility operators, or occupants. However, limited mandatory training requirements apply in specific cases, particularly for large buildings. In particular: • Specified large buildings (“Specified Buildings”): Under the Building Environmental Sanitation Law (the so-called Building Sanitation Law), owners of large buildings used by many people are required to appoint a qualified Building Environmental Health Manager. This qualification is obtained through a national examination or completion of an officially designated training course covering IAQ, ventilation, and building hygiene management. • Mandatory qualification-based training (limited scope): The required training applies only to the appointed manager of specified buildings and is not a general obligation for all facility staff or building occupants. • No general IAQ training mandate for operators or occupants: Outside the above category, Japanese law does not require routine IAQ education or

		training for ordinary building managers, maintenance staff, or occupants under the BS Act or related regulations. https://www.japaneselawtranslation.go.jp/en/laws/view/4024/en • Guidance and voluntary training: Government agencies and industry bodies provide guidelines, manuals, and voluntary training programs on ventilation and IAQ management, but participation is generally not legally mandatory.
	d. How are these code requirements monitored and enforced?	In Japan, compliance with IAQ-related code requirements is monitored and enforced through a combination of building confirmation procedures, inspections, and operational oversight, depending on the applicable law. In particular: • BS Act (design and construction stage): Compliance with ventilation and related IAQ requirements is checked through the building confirmation and inspection process conducted by local authorities or designated private confirmation bodies. Non-compliant designs may be rejected at the permit stage, and violations identified at completion may result in corrective orders or restrictions on use. • Post-construction enforcement under the BS Act: Local authorities have the power to conduct inspections and issue administrative guidance, improvement orders, or use restrictions if a building is found to violate mandatory ventilation or equipment requirements. • Building Environmental Sanitation Law (operation and maintenance stage): For large “specified buildings,” compliance with indoor air quality management standards is monitored mainly through periodic inspections and oversight by public health centers. Building owners must maintain measurement records (e.g., CO₂ levels) and operational logs, which are reviewed during inspections. • Qualified manager oversight: Specified buildings must appoint a licensed Building Environmental Health Manager, who is legally responsible for supervising IAQ maintenance and ensuring compliance with statutory standards on an ongoing basis. • Enforcement measures: Where non-compliance poses a concrete risk to human health, authorities may issue

		improvement orders, and in urgent cases may order temporary suspension or restriction of facility use. Penalties are generally administrative rather than criminal and are applied selectively. • Practical enforcement approach: In practice, enforcement relies heavily on ex post monitoring, documentation checks, and administrative guidance, rather than continuous real-time monitoring or routine penalties.
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ANNEX 3 – SINGAPORE

Questions		Response
1.	Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Yes. A key scheme is the BCA Green Mark 2021.
	a. When were they introduced?	September 2021
	1. Are they mandatory or voluntary?	The scheme is voluntary in nature.
	2. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	Voluntary programs and public awareness efforts complement mandatory IAQ regulations by translating broad legal duties into practical measures and by encouraging organisations to go beyond minimum compliance.
	3. What is the level of participation?	There is no central registry that tracks overall participation in IAQ-related schemes in Singapore. However, available data on Green Mark uptake shows that participation is substantial. Since the launch of the Green Mark scheme in 2005, more than 4,000 building projects have achieved Green Mark certification, covering over 43 percent of Singapore's total gross floor area as of end-2020.
	4. How closely do these policies align with international guidelines such as WHO?	Singapore's indoor air policies and standards are informed by international practice but are not direct adoptions of any single global guideline. The principal national documents, including Singapore Standard 554 on indoor air quality and the joint guidance issued by the National Environment Agency, the Building and Construction Authority and the Ministry of Health, reference international concepts and classifications, such as Minimum Efficiency Reporting Value 14, European filter class F8 and the International Organization for Standardization's ePM1 efficiency classes for particulate filtration.
	5. Have these policies evolved in response to public health crises (e.g., COVID-19)?	Yes. The joint guidance developed by the National Environment Agency (NEA), the Building and Construction Authority (BCA) and the Ministry of Health (MOH) originated during the COVID-19 pandemic and was subsequently updated in 2021 and 2023. These updates strengthened expectations around ventilation, filtration and maintenance practices and broadened the focus from acute disease control to longer-term improvements in indoor environmental quality.
	6. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	Formal standards such as SS 553 and SS 554 are developed and revised by committees convened by Enterprise Singapore and the Singapore Standards Council. These committees include representatives from government agencies, industry practitioners, professional bodies and academic experts. In parallel, national guidance documents are issued jointly by NEA, BCA and MOH, and workplace-specific guidance is prepared by the Workplace Safety and Health Council. This process ensures contributions from multiple sectors and incorporates both technical expertise and regulatory perspectives.

2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	Yes, the following laws and regulations regulate indoor air quality in Singapore: 1. Workplace Safety and Health Act 2006– contains a general duty to protect workers’ safety and health. 2. Workplace Safety and Health (General Provisions) Regulations 2007 – requires adequate ventilation and controls for toxic dust/fumes. 3. Building Control Act 1989 and Building Control Regulations 2003 – ventilation design for building works must comply with SS 553 under the BCA’s approval regime.
	a. When were they introduced?	1. 2006 2. 2007 3. 1989/2003
	b. What indoor environments and vulnerable populations are prioritized?	Regulation is domain specific: The Workplace Safety and Health framework applies to workplaces. Building control, including SS 553, governs building works for ventilation design and approvals. The Smoking (Prohibition in Certain Places) Act regulates indoor public places and common areas. Government guidance additionally highlights higher-risk premises for enhanced measures, for example high-occupancy residences or gyms and healthcare facilities.
	c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	There is presently no general statutory requirement to install CO₂ monitors, conduct routine IAQ testing, or publicly disclose IAQ results for public or commercial buildings. Advisory materials recommend good practice measures without creating a universal legal mandate.
	d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?	No mandate exists. While CO₂ and related sensors are recommended in joint advisories to verify outdoor air delivery and space loading, they are not legally required.
	e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?	The Building and Construction Authority administers building control and approves plans. The National Environment Agency leads public-health environmental matters and enforces smoking prohibitions. The Ministry of Health participates in joint IAQ guidance. The Ministry of Manpower, supported by the Workplace Safety and Health Council, enforces workplace safety and health. The Singapore Civil Defence Force administers the Fire Code. Technical standards are developed under Enterprise Singapore and the Singapore Standards Council.
	f. What are the objectives and parameters? Are there guidelines or mandatory measures?	The Workplace Safety and Health regime imposes a duty on occupiers to ensure adequate ventilation and to control airborne contaminants that may be injurious to health. In practice, SS 553 and SS 554

		serve as the technical benchmarks most often relied upon to evidence good practice for ventilation and IAQ parameters and audits.
g.	How do laws address ventilation requirements and standards, including minimum ventilation rates?	Minimum ventilation design requirements are set out in SS 553, which the BCA recognizes as a standard for building plan approvals. In fact, in its 10 October 2016 circular, the BCA implemented SS 553:2016 for projects whose first plans were submitted on or after 1 April 2017.
h.	What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	SS 553 covers Air-Conditioning and Mechanical Ventilation (ACMV) system design, commissioning, operation and maintenance, and filtration. BCA's 2016 circular on the implementation of SS 553 introduced updated air filtration requirements. Current guidance recommends higher-efficiency filters at air handling units (components of ACMV) where systems can accommodate them.
i.	Are there legal provisions for moisture and humidity control to prevent microbial contamination?	SS 554 specifies IAQ parameters that include relative humidity and provides annexes on mould remediation. Joint guidance further emphasises maintaining humidity within recommended ranges and rectifying water ingress as part of IAQ management.
j.	How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	The selection of low-emission building materials, finishes and furnishings is addressed in SS 554 Annex F. Where referenced in approvals, procurement specifications or contracts, these criteria operate as binding requirements for limiting pollutants.
k.	How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	SS 554 sets out comfort-related parameters, including indoor air temperature, air movement and relative humidity, and provides an audit methodology for assessment. These benchmarks apply as guidance unless incorporated by statute, an approval condition, or contract.
l.	Are energy efficiency goals included to balance IAQ and sustainability?	Energy efficiency objectives are integrated into the building control framework through the adoption of SS 530 on energy efficiency for building services and equipment together with SS 553 on air-conditioning and mechanical ventilation.
m.	How are IAQ laws incorporated within occupational health and safety frameworks?	Under the WSH Act and the WSH (General Provisions) Regulations, occupiers must ensure adequate ventilation and prevent the accumulation of toxic dust, fumes and vapours. IAQ standards and official guidance are commonly cited by duty holders to evidence compliance with these health and safety obligations.
n.	What exemptions or exclusions exist, and what is their rationale?	SS554 applies to air-conditioned premises and excludes residential premises, certain factory production areas, hospitals, polyclinics and laboratories. The rationale is that these specialised environments should be governed by sector-specific standards.
o.	Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	Singapore Standards are periodically revised but the review period is not tied to any specific criteria. In February 2026, the Government Gazette notified the revisions of SS 553:2026 and SS 554:2026.

	p. How are IAQ regulations enforced? What penalties or incentives apply?	1. Workplace Safety and Health: MOM may issue remedial and stop-work orders, and prosecute breaches under the WSH Act and Regulations. 2. Building Control: BCA enforces through plan approvals and inspections tied to SS 553 compliance and SS 553:2016.
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	Yes, requirements about IAQ are contained in the Building Control Act and Regulations for ventilation and energy efficiency: • New building work and additions and alterations: Plans must demonstrate compliance with SS 553 ventilation provisions at plan approval. • Existing premises: There is no blanket legal duty to conduct routine IAQ testing. When additions and alterations works are carried out, the upgraded spaces must comply with SS 553. WSH duties always apply.
	a. What are the requirements for new constructions versus existing premises?	New works must show SS 553 compliance at plan approval and commissioning. Existing buildings have no universal IAQ-testing mandate but must meet WSH duties and any applicable environmental sustainability requirements when carrying out prescribed works.
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	Yes. SS 553 prescribes minimum outdoor air rates and filtration and design criteria. BCA's 2016 circular implemented updated air filtration standards with the adoption of SS 553:2016 for plans submitted from 1 April 2017.
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	There is no IAQ-specific statutory training requirement. However, for completeness, we note that SS 554 contains <i>guidance</i> on competency for IAQ personnel and auditors.
	d. How are these code requirements monitored and enforced?	1. The BCA monitors compliance through plan approval and inspections referencing SS 553. 2. MOM enforces requirements under the WSH Act and Regulations.

ANNEX 4 – USA

Questions		Response
1.	Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Yes, California IAQ public health policies and voluntary schemes are led by the California Department of Public Health (CDHP) and the California Air Resources Board (CARB) and the California Energy Commission (CEC).
	a. When were they introduced?	• 2021 - CDHP issued Interim Guidance for Ventilation, Filtration, and Air Quality in Indoor Environments, and regularly updates its guidance. • 2024 – CDHP issued Improving Air Quality in Schools. • 2024 – CARB issued AB 836 Wildfire Smoke Clean Air Centers for Vulnerable Populations Incentive Pilot Program. • 2026 – CEC issued voluntary CALGreen green building standards
	b. Are they mandatory or voluntary?	• Voluntary
	c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	• CDPH guidance complements the mandatory laws by going beyond the required minimum requirements.
	d. What is the level of participation?	• Difficult to quantify as there is no listing of adoption rates by buildings or school districts.
	e. How closely do these policies align with international guidelines such as WHO?	• California IAQ policies generally align closely with WHO guidelines, although the California IAQ approach is more policy-driven, focused on reducing IAQ exposure through building design, emissions controls, and public health programs that are tailored to state-specific conditions and regulatory frameworks.
	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	• Yes, CDPH's IAQ policies are a direct product of the airborne infection control measures during COVID-19 as well as during wildfire smoke events.
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	• Typical pathways include public health guidance and interagency coordination.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	Yes, California IAQ is regulated through laws and regulations such as building ventilation codes and emission limits for indoor materials that are developed and enforced by agencies including CEC, California Division of Occupational Safety and Health (Cal/OSHA)(for IAQ in workplaces), CARB, and the California Department of Education (for IAQ in schools).

	a. When were they introduced?	Building Standards Codes (Title 24) • Title 24 is administered by CEC. • Building Energy Efficiency Standards was introduced in 1978 and is regularly updated (2019, 2022, 2026). Title 24, Part 6. • Green Building Standards or “CALGreen” was introduced in 2010. Title 24, Part 11. • Mechanical Code was introduced in 1989 and is updated triennially. Title 24, Part 4. Workplace (Title 8) • Title 8 is administered by Cal/OSHA. • General Ventilation Standards were introduced in the 1970s. Title 8 § 5142. • Wildfire Smoke Protection Standards were introduced in 2019 in an emergency measure due to proliferation of wildfires and was later made permanent. Title 8 § 5141.1. Other Authorities that regulate IAQ • Title 17 is administered by CARB. Consumer product VOC rules such as indoor air devices (air purifiers, ducts, etc) was introduced in the 1990s. Title 17 §§ 94800-94810. • Proposition 65 (Prop 65) was enacted in 1986, and requires chemical exposure disclosure. Cal. Health & Safety Code § 25249.6. • California Education Code was introduced in 2020, and mandates HVAC and ventilation improvements in schools. Cal. Educ. Code §§ 17660, 17661. • CDPH provides IAQ authority for guidance in the 1990s and expanded its guidance during COVID after 2020. CA Health & Safety Code § 105425.
	b. What indoor environments and vulnerable populations are prioritized?	Priority indoor environments • Hospitals, clinics, and laboratories are prioritized under aerosol transmissible disease protections. Title 8 § 5199. • Workplaces are prioritized with additional focus on workers exposed to airborne hazards such as wildfire smoke and poor ventilation. Title §§ 5142, 5141.1. • Residential buildings are regulated through building codes. Title 24, Part 6, § 120.1, 150.0(o). Priority vulnerable populations • Public school classroom are prioritized for ventilation and HVAC improvements due to children’s vulnerability. Cal. Educ. Code §§ 17660, 17661. • Pregnant women, children, and individuals at risk of cancer or reproductive harm are protected through exposure warning requirements. Cal. Health & Safety Code § 25249.6.
	c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	Monitoring • Building IAQ compliance is based on design and verification rather than ongoing monitoring.

	- Workplace IAQ compliance requires employers to assess exposure to airborne hazards (wildfire smoke particulate matter), typically through injury and illness prevention programs. Title 8, §§ 3203, 5141.1. Reporting - Building code compliance requires documentation such as plans and test results. Title 24, Part 6, § 10-103(a)-(b). - Workplace IAQ compliance requires employers to maintain written procedures, training and exposure control documentation where IAQ hazards are present, typically through injury and illness prevention programs.. Title 8, §§ 3203, 5141.1. Public Disclosure - Prop 65 requires a “clear and reasonable warning” before exposing individuals to listed chemicals. Cal. Health & Safety Code § 25249.6. Warnings may be posted in buildings and workplaces for indoor exposures. Title 27 § 25601. - School HVAC programs require inspection and maintenance reporting to the state. CA. Educ. Code Title 24, Part 6, § 10-103(a)-(b). §§ 17660-17661.
d. Are continuous or periodic IAQ” monitoring technologies (e.g., sensors, real-time reporting) mandated?	- No continuous IAQ monitoring is required but building codes require system certification (airflow, ventilation performance). Title 24, Part 6, § 10-103(a)-(b). - Periodic IAQ monitoring is required in workplaces when hazards exist, and in healthcare facilities which require exposure controls and infection control procedures. Title 8 § 5199.
e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?	California Air Resources Board (CARB): lead agency for statewide air quality policy was created in 1967 to regulate air pollution and protect public health.
f. What are the objectives and parameters? Are there guidelines or mandatory measures?	Objectives - Protect occupant health by ensuring adequate ventilation and limiting pollutant exposure in buildings. - Protect workers from airborne hazards, such as smoke, infectious aerosols in the workplace. - Reduce exposure to toxic chemicals, including indoors, through disclosure and source control. Parameters - Ventilation rates, system performance, filtration. Title 24, Part 6, § 120.1, 150.0(m), (o). - PM2.5 levels for wildfire smoke, infection control procedures. Title 8 § 5199. - Chemical listing and exposure warning thresholds under Prop 65. Cal. Health & Safety Code § 25249.6. Mandatory guidelines

		• Building code requirements for ventilation, systems, materials. Title 24, Part 6. • Workplace safety standards for ventilation, exposure control. Title 8 § 5142. • Chemical exposure warnings. Cal. Health & Safety Code § 25249.6. Guidance • Public health recommendations on ventilation and filtration. Cal. Health & Safety Code § 105425.
	g. How do laws address ventilation requirements and standards, including minimum ventilation rates?	California IAQ laws address ventilation by requiring minimum outdoor air rates and system performance standards to ensure adequate airflow and occupant health protection. Residential • Minimum ventilation rates are required for non-residential buildings, aligned with ASHRAE 62.1 (outdoor air per occupant and floor area). Title 24, Part 6, §§ 120.1(c), 150.0(o). • Residential buildings must include whole-building mechanical ventilation systems designed to meet minimum airflow rates, aligned with ASHRAE 62.1. Whole building ventilation minimum rates is 0.03 cfm/ft² + 7.5 cfm/person. • Local exhaust ventilation required in kitchens and bathrooms, vented directly outdoors to remove moisture and pollutants. Intermittent kitchen exhaust is ≥100 cfm and continuous kitchen exhaust is ≥5 air changes/hour. Intermittent bathroom exhaust is ≥50 cfm and continuous bathroom exhaust is ≥20 cfm. Title 24, Part 6, § 150.0(o); Title 24, Part 4, § 403. • Ventilation compliance is based on airflow rates and system performance. Title 24, Part 6, §§ 120.1. Non-residential • Employers must provide adequate ventilation to maintain safe air quality in occupied workspaces. Title 8 § 5142. • Additional requirements apply when specific hazards exist, such as wildfire smoke, requiring exposure reduction measures. Title 8 § 5141.1. • School districts must ensure HVAC systems are inspected, maintained, and operated properly to support adequate ventilation. CA. Educ. Code §§ 17660-17661.
	h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	HVAC System Design • Designed to provide required ventilation, airflow, and system performance (including duct sealing and verified airflow). Title 24, Part 6, §§ 120.1, 150.0(m), (o). HVAC System Operation and Maintenance • Installed, operated, and maintained to function as designed. Title 24, Part 6, § 10-103(a)-(b). • In the workplace, employers must ensure ventilation systems are maintained and operated to provide safe air quality. Title 8 § 5142.

		- In schools, HVAC systems must be inspected, maintained, and repaired to support proper ventilation. CA. Educ. Code §§ 17660-17661. HVAC System Filtration - HVAC systems must include air filtration (MERV-rated filters) appropriate to system design, with proper installation to ensure effective air cleaning. Title 24, Part 6, §§ 120.1, 150.0(m). - If HVAC systems or ducts are replaced, the new components must meet current design filtration, and performance standards. Title 24, Part 6, §§ 141.0(b).
i.	Are there legal provisions for moisture and humidity control to prevent microbial contamination?	There are no specific numerical humidity limits, but preventive moisture control is mandated. Building Codes - Mechanical exhaust required in moisture-generating spaces (bathrooms, kitchens) to remove humidity and prevent mold growth. Title 24, Part 6, § 150.0(o); Title 24, Part 4, § 403. - Buildings must be constructed to prevent moisture intrusion and accumulation (drainage, ventilation). Title 24, Part 11, § 4.505. Design & Construction Practices - Moisture management measures required, including proper sealing, vapor control, and material protection during construction. Title 24, Part 11, § 4.505. Operation & Maintenance - Ventilation systems must be maintained to prevent unsafe air conditions, including those caused by excess moisture. Title 8 § 5142. - School HVAC systems must be maintained and repaired, supporting control of humidity and mold risks in classrooms. CA. Educ. Code §§ 17660-17661. Public Health - Dampness and mold are recognized as substandard housing conditions requiring remediation. Cal. Health & Safety Code § 17920.3.
j.	How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	Building Materials - Mandatory use of low-VOC materials in new construction, including paints, coatings, adhesives, sealants, flooring, composite wood. Title 24, Part 11, § 4.505. - Emission limits for formaldehyde from composite wood products used in buildings and furnishings. Title 17 §§ 93120-93120.12. Furnishings - Warnings are required for exposure to listed chemicals including those emitted from building materials and furnishings. Cal. Health & Safety Code § 25249.6.

		Construction Practices - Material handling and construction practices must minimize pollutant exposure, including protection of materials from contamination and proper installation. Title 24, Part 11, §§ 4.504, 4.505. Consumer Products - VOC content limits for consumer products such as cleaning agents and aerosols that affect indoor air. Title 17, §§ 94500-94575.
k.	How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	Comfort factors such as noise and airflow are embedded within IAQ and energy requires at Title 24, Parts 6 and 11, and are not regulated as standalone comfort standards. Noise - Ventilation fans must meet maximum sound levels to ensure occupants actually use them. Continuous fans have a limit of ≤ 1.0 sone and intermittent fans have a limit of ≤ 3 sones. Title 24, Part 6, § 150.0(o)1D; ASHRAE 62.2. Airflow - Ventilation systems must be designed to distribute outdoor air effectively throughout occupied spaces. Title 24, Part 6, §§ 120.1(c), 150.0(m).
l.	Are energy efficiency goals included to balance IAQ and sustainability?	Yes, California's regulatory goals are to achieve healthy indoor air with minimum energy usage and environmental impact. - Energy efficiency standards incorporate IAQ and ventilation requirements. Title 24, Part 6, §§ 100(a), 120.1, 150.0(o). - Demand control ventilation is required in certain nonresidential spaces to reduce energy use while maintaining required outdoor air rates. Title 24, Part 6, § 120.1(c)3. - Energy recovery ventilation and economizers are encouraged in some systems to maintain IAQ with reduced energy penalties. Title 24, Part 6, §§120.1(e), 140.4. - Air sealing and envelope requirements reduce energy use while requiring controlled ventilation to maintain IAQ. Title 24, Part 6, §§ 110.7, 150.0(q). - Green building standards integrate low emitting materials and resource efficiency, linking indoor environmental quality with sustainability goals. Title 24, Part 11, §§ 4.504-4.505.
m.	How are IAQ laws incorporated within occupational health and safety frameworks?	California's indoor air quality standards are not a standalone occupational health and safety (OHS) law but instead is embedded within its general duty obligations, ventilation standards, and hazard-specific rules such as wildfire smoke and infectious aerosols.

	General Duty to Provide Safe Air - Employers are required to “furnish employment and a place of employment that is safe and healthful for the employees therein”, which includes protection from harmful air contaminants. Cal. Labor Code § 6400. Ventilation as a Core OHS Requirement - Workplaces must be ventilated to maintain safe air quality which forms the baseline IAQ requirement in OHS law. Title 8 § 5142. Hazard Specific IAQ Standards - Regarding wildfire smoke, there must be an exposure assessment for PM 2.5, engineering controls and respirators when thresholds are exceeded. Title 8 § 5141.1. - Regarding aerosol transmissible diseases, there must be infection control measures, ventilation controls, and respiratory protection in high-risk settings. Title 8 § 5199. Employer Responsibility - Employers must implement an Injury and Illness Prevention Program, including identification and control of airborne hazards. Title 8 § 3203. Enforcement - IAQ requirements are enforced through Cal/OSHA inspections, citations, and penalties that are integrated into broader workplace safety enforcement. Cal. Labor Code §§ 6423-6436.
n. What exemptions or exclusions exist, and what is their rationale?	The following exemptions are designed to limit regulatory burden by grandfathering in certain existing buildings or small projects, to focus on real risk and exposure thresholds, and to ensure feasibility and cost-effectiveness through phased or funded implementation. Exemptions for Existing Premises - Existing buildings are exempt from new IAQ requirements (and grandfathered in) except for the altered, added or modified changes in order to avoid requiring costly retrofits across the entire building. Title 24, Part 6, §§ 100.0(a), 141.0, 150.2. - Certain small alterations and repairs are exempt from full compliance requirements in order to have proportional regulation based on the scope of the project. Title 24, Part 6, §§ 100.0(a), 141.0, 150.2. Exemptions for Workplaces - Wildfire smoke standards apply only above the specified PM 2.5 threshold in order to ensure that the regulation is tied to actual exposure levels. Title 8 § 5141.1.

		- Certain indoor workplaces may be exempt if air is adequately controlled or exposures are not present in order to avoid unnecessary controls where no hazard exists. Title 8 § 5141.1, § 5142. Prop 65 Safe Harbor Exemption - No warning is required is exposure is below the safe harbor levels in order to focus the regulations on meaningful health risks. Cal. Health & Safety Code § 25249.6. - Certain businesses such as small businesses may be exempt from warning requirements in order to reduce the burden on small entities. Cal. Health & Safety Code § 25249.11. Schools and Public Buildings - IAQ requirements for schools and public buildings are generally focused on maintenance and funded programs rather than required universal upgrades in order to ensure that phased implementation is tied to available funding and feasibility. CA. Educ. Code §§ 17660-17661.
	o. Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	Yes, California provides for rulemaking updates, continuous scientific review and guidance updates. Regulatory Review - Title 24 is reviewed every 3 years and incorporates new scientific and technical evidence. Cal. Health & Safety Code §§ 18930-18935. Updates are developed through public rulemaking, technical studies and stakeholder input to ensure that building and IAQ standards reflect citizen input as well as evolving science, technology, and energy policy. Title 24, Part 1. - Occupational IAQ standards are updated through the Cal/OSHA Standards Board rulemaking process, including emergency and permanent regulations in order to respond to emerging health risks. Cal. Labor Code §§ 142.3, 144.6. - CARB periodically reviews its air quality and emissions regulations based on scientific evidence and air quality research to reflect advances in toxicology, exposure science, and pollution control technologies. Cal. Health & Safety Code § 39601. - Prop 65's chemical list is continuously updated as new evidence emerges on carcinogens and reproductive toxins. Safe harbor exposure levels are updated based on risk assessment which ensures that warnings reflect current scientific understanding of health risks. Cal. Health & Safety Code §§ 25249.8, 25249.10. Public Health Guidance - IAQ guidance is updated as scientific evidence evolves and does not require formal rulemaking, which enables a rapid and flexible response to emerging public health issues as they arise. Cal. Health & Safety Code § 105425.

	p. How are IAQ regulations enforced? What penalties or incentives apply?	Building Code IAQ Enforcement - Title 24 requirements are enforced through local building departments such as plan review, inspections, and verification before occupancy. Noncompliance results in permit denial, failed inspection, or inability to obtain certificate of occupancy. This ensures IAQ requirements are met at the design and construction stage, preventing long term exposure risks. Title 24, Part 6, § 10-103(a)-(b). Workplace IAQ Enforcement - Cal/OSHA requirements are enforced through inspections, investigations, and employer compliance obligations. Title 8, §§ 3203, 5141.1, § 5142. - Penalties include citations and monetary fines, with higher penalties for serious, wilful, or repeat violations. This protects workers through active, ongoing enforcement and deterrence of unsafe conditions. Cal. Labor Code §§ 6427-6432. Prop 65 Disclosure Enforcement - Prop 65 is enforced through civil actions by the California Attorney General, local prosecutors, and private litigants. Penalties include civil fines of up to ~ \$2,500 per violation per day and settlement agreements. This incentivizes compliance through litigation risk and public disclosure of exposure. Cal. Health & Safety Code §§ 25249.7. CARB IAQ Enforcement - CARB regulations are enforced through product certification, market restrictions, and penalties for noncompliant productions. This reduces indoor pollution by controlling emissions at the source rather than relying on building-level controls. Cal. Health & Safety Code § 39601. Schools and Public Program Incentive-Based Compliance - Compliance supported through state funding, inspection, and reporting rather than penalties. This encourages IAQ improvements in schools through financial support and phased implementation. CA. Educ. Code §§ 17660-17661. Incentives - Financial incentives and grants such as HVAC upgrades, clean air programs to support voluntary IAQ improvements. This complements enforcement by reducing cost barriers to compliance and upgrades. CA. Educ. Code §§ 17660-17661.
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	California IAQ in buildings is addressed through requirements in codes like the California Building Standards Code which set ventilation, filtration, and pollution control standards for new construction and, to a more limited extent, for alterations and existing premises.

	a. What are the requirements for new constructions versus existing premises?	New Construction • Whole building must comply with IAQ provisions in Title 24 and CALGreen at the time of permitting and construction. Title 24, Part 6, § 100.0(a); Part 11 (CALGreen) § 101.2. • Projects must demonstrated compliance through plans and documentation submitted for approval. Title 24, Part 6, § 10-103(a)-(b). • Final approval and certification of occupancy is contingent on verified compliance. Title 24, Part 6, § 10-103(a)-(b). Existing Premises • Only the alterations, additions, or HVAC system replacement or modification must comply with IQA provisions, since there is to requirement to upgrade existing buildings. Title 24, Part 6, § 141.0(b); § 100.0(a).
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	Ventilation • New construction requires whole building ventilation, based on ASHRAE 62.2/62.1, and local exhaust (kitchens, bathrooms must vent outdoors). Title 24, Part 6, § 150.0(o). • Existing premises require altered or added HVAC systems to meet current ventilation requirements. Title 24, Part 6, § 150.2(b). Filtration Standards • New construction requires HVACs to meet minimum air filtration, typically MERV 13, to be designed to filter recirculated and outdoor air. Title 24, Part 6, § 150.0(m). • Existing premises require new or replacement HVAC systems to meet current ventilation requirements. Title 24, Part 6, § 150.2(b). Design Criteria • New construction requires duct sealing, airflow verification, airtight envelope, moisture control for exhaust and humidity, low-VOC materials, and fan noise limits. altered or added HVAC systems to meet current ventilation requirements. Title 24, Part 6, § 150.(m), (o), (g); 110.7. • Existing premises require modified components (ducts, exhaust, materials) to meet current standards, with no obligation to upgrade unchanged systems. Title 24, Part 6, § 150.2(b).
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	Educational and Training Programs • New construction has no requirements to train building managers or occupants, but documentation and system operation information must be provided to ensure proper use of ventilation systems. Title 24, Part 6, § 150.0(m) 12 (operation and maintenance information); § 10-103(a). • Existing premises require system documentation and operating instructions to be provided when HVAC systems are altered or added. Title 24, Part 6, § 141.0(b) § 10-103(a).

		Workplace (occupational health and safety training) - New and existing workplaces require employers to provide employee training on air quality related hazards (e.g., wildfire smoke, ventilation, respirator use when applicable). Title 8 § 5141.1 (wildfire smoke training); § 5142 (mechanical ventilation awareness). Schools and Public Buildings: - Schools must follow HVAC maintenance and operational best practices. CA. Educ. Code §§ 17660-17661. - State agencies recommend training for facility staff on ventilation and filtration operation. Cal. Dept. of Education; Cal. Dept of Public Health.
	d. How are these code requirements monitored and enforced?	Building Code Enforcement - New construction compliance is enforced through plan review, field inspections, performance verifications (HERS testing) before occupancy approval. Title 24, Part 6, § 10-103(a) (compliance documentation); § 10-103(b) (field verification and diagnostic testing). - Existing premises require permits to be issued for alterations, and modified systems are inspected and verified for compliance. Title 24, Part 6, § 141.0(b); § 10-103(a). Performance Verification and Third-Party Testing: - New construction requires HERS rater verification and diagnostic testing for certain IAQ-related measures (duct sealing, airflow, ventilation systems). Title 24, Part 6, § 150.0(m); § 10-103(b). - Existing premises require HERS testing when HVAC systems ore ducts are altered or replaced to ensure that updated components meet current standards. Title 24, Part 6, § 150.2(b)(1E). IAQ Noncompliance - New construction IAQ noncompliance can result in failure to obtain permit approval or certificate of occupancy. Title 24, Part 6, §10-103(a). - Existing premises IAQ noncompliance can lead to correction notices, permit delays, or require rework. - Workplace IAQ noncompliance can result in citations, fines, or enforcement actions. Title 8 § 5141.1 (wildfire smoke training); § 5142 (mechanical ventilation awareness); Cal. Labor Code §§ 6427-6432 (penalties).

ANNEX 5 – HONG KONG

Questions	Response
1. Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	There are two policies/schemes which concern air quality in an indoor environment: 1) IAQ Certification Scheme for Offices and Public Places (the “Certification Scheme”) 2) Hong Kong Government’s green procurement policy, which requires government bureaux and departments to take into account environmental considerations when procuring goods and services, including the formaldehyde emission limits for furniture. For completeness, there are also three labelling schemes organized by non-profit organisations providing standards for product certification on a voluntary basis, namely (i) Green Council’s Hong Kong Green Label Scheme, (ii) Hong Kong Green Building Council’s Green Product Accreditation and Standards, and (iii) Hong Kong BEAM Society’s BEAM Plus Interiors. These are local voluntary programmes that provide guidance on indoor air pollutant emission requirements for whole furniture and related materials such as paints/coatings, adhesives, and renovation materials.
a. When were they introduced?	1) Certification Scheme: Introduced in 2003, with a revised version in 2019. 2) Hong Kong Government’s green procurement policy: Introduced in 2000.
b. Are they mandatory or voluntary?	1) Certification Scheme: Voluntary. 2) Hong Kong Government’s green procurement policy: Depends on the type of goods. • For purchase of items where there is an adequate supply in the market, green specifications are “mandatory” requirements in the tender specifications. As a rule of thumb, where there are three or more models meeting the green specifications for that product, it would be considered that there is an adequate supply of that product in the market. • For purchase of items where there is no adequate supply in the market, green specifications are “desirable” requirements in the tender specifications only.

c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	1) Certification Scheme: • Objectives: ○ To recognise good indoor air quality (“IAQ”) management practices; and ○ To provide incentives for owners of premises/buildings or property management companies to pursue the best level of IAQ • Parameters: ○ A 2-level IAQ objective (Excellent Class and Good Class) is used for assessing the IAQ of premises. “Excellent Class” represents an excellent IAQ that a high-class and comfortable building should have. “Good Class” represents the IAQ that provides protection to the public at large including the young and the elderly. ○ There are ten (10) IAQ parameters, namely: ▪ the following eight (8) chemical parameters: • 8-hour carbon dioxide (CO₂); • 8-hour carbon monoxide (CO); • 8-hour respirable suspended particulates (PM₁₀); • 1-hour and 8-hour nitrogen dioxide (NO₂); • 8-hour ozone (O₃); • 30-minute and 8-hour formaldehyde (HCHO); • 8-hour total volatile organic compounds (TVOC); and • 8-hour radon (Rn); ▪ one (1) 8-hour biological parameter; and ▪ one (1) mould parameter.
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- For further details, please refer to the tables below:

Table A

Table: IAQ Objectives for Offices & Public Places

Parameter	Unit	Averaging Time	Old Objectives (Effective since 2003)		New Objectives (Effective on 1 July 2019)	
			Excellent Class	Good Class	Excellent Class	Good Class
Room Temperature	°C	8 hours	20 to <25.5	< 25.5	---	
Relative Humidity	%	8 hours	40 to <70	<70	---	
Air Movement	m/s	8 hours	<0.2	<0.3	---	
Carbon Dioxide (CO ₂)*	ppmv	8 hours	<800	<1,000	800	1,000
Carbon Monoxide (CO)	ppmv	8 hours	<1.7	<8.7	1.7	6.1
Respirable Suspended Particulates (PM ₁₀)*	µg/m ³	8 hours	<20	<180	20	100
Nitrogen Dioxide (NO ₂)	µg/m ³	8 hours	<40	<150	40	150
		1 hour	---	---	100	200
Ozone (O ₃)	µg/m ³	8 hours	<50	<120	50	120
Formaldehyde (HCHO)	µg/m ³	8 hours	<30	<100	30	100
		30 mins	---	---	70	100
Total Volatile Organic Compounds (TVOC)	µg/m ³	8 hours	<200	<600	200	600
Radon (Rn)	Bq/m ³	8 hours	<150	<200	150	167
Airborne Bacteria	cfu/m ³	8 hours	<500	<1,000	500	1,000
Mould*	---	---	---	---	Assessment in the form of walkthrough inspection	

* Measurement for CO₂ and PM₁₀ is required for 1st to 4th annual re-certification for certificate renewal in a 5-year cycle. Assessment of mould is also required when the new IAQ objectives are adopted.

Table B**Update of the Alternative Compliance Arrangement for TVOC**

VOC Species	Averaging Time	Old Objectives (Effective since 2003) (for Good Class IAQ Only)	New Objectives (Effective on 1 July 2019) ⁽¹⁾
Benzene	8 hours	16.1 µg/m ³ (5 ppbv)	17 µg/m ³ (5.3 ppbv)
Carbon tetrachloride	8 hours	103 µg/m ³ (16 ppbv)	---
Chloroform	8 hours	163 µg/m ³ (33 ppbv)	---
1,2-Dichlorobenzene	8 hours	500 µg/m ³ (83 ppbv)	---
1,4-Dichlorobenzene	8 hours	200 µg/m ³ (33 ppbv)	---
Ethylbenzene	8 hours	1,447 µg/m ³ (333 ppbv)	---
Tetrachloroethylene	8 hours	250 µg/m ³ (37 ppbv)	250 µg/m ³ (37 ppbv)
Toluene	8 hours	1,092 µg/m ³ (290 ppbv)	---
Trichloroethylene	8 hours	770 µg/m ³ (143 ppbv)	230 µg/m ³ (43 ppbv)
Xylene (<i>o</i> -, <i>m</i> -, <i>p</i> -isomers)	8 hours	1,447 µg/m ³ (333 ppbv)	---
Naphthalene	8 hours	---	10 µg/m ³ (1.9 ppbv)
Polycyclic Aromatic Hydrocarbons (as benzo(a)pyrene)	8 hours	---	1.2 ng/m ³ (1.2 x 10 ⁻⁴ ppbv)

(1) The objectives are applicable to both Excellent and Good Classes. Compliance with the respective objective of the five individual VOC species is regarded as meeting Good Class TVOC objective. If at the same time the sum of the five individual VOC is less than or equal to 200 µg/m³ (the Excellent Class TVOC objective level), it will be regarded as complying with the Excellent Class TVOC objective.

- Compliance Requirements:

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| | <ul style="list-style-type: none"> ○ The IAQ objectives in Table A above will be used as the benchmark for assessing compliance (except for the alternative measurement of TVOC as set out below). The compliance requirements are — <ul style="list-style-type: none"> ▪ at least 80% of the sample points of each of the parameters comply with the relevant IAQ objectives; ▪ for each of the chemical and biological parameters, no sample points should exceed more than 50% of the relevant IAQ objectives; and ▪ for mould parameter, all compulsory items of the mould checklist (set out in Annex 3 of “A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places (2019)” (the “Guide”)) should comply with the requirements, whereas the supplementary inspection items are optional for inspection. ○ TVOC objective is also considered met if the measurements of 5 individual volatile organic compounds (“VOCs”) as set out in WHO’s IAQ guidelines are in compliance with the requirements set out in Table B above. Details are — <ul style="list-style-type: none"> ▪ if the level of TVOC measured exceeds the level in Table A, measurement of individual VOCs as listed in Table N may be carried out at the failed sampling points; ▪ measurements of individual VOCs should be conducted with analytical methods based on the United States Environmental Protection Agency (“USEPA”)’s organic (TO) compendium procedures or other standard or properly validated methods; ▪ a TVOC-failed sampling point complying with all the 5 individual VOCs objectives in Table B will be regarded as a passed sampling point in respect of TVOC for Good Class; and the sum of the measured levels of 5 VOCs also complying with the Excellent Class TVOC objective will be regarded as a passed sampling point in respect of TVOC for Excellent Class; and ▪ the number of passed sampling points of TVOC measurements and of individual VOC re-measurements will be added together when calculating the 80% compliance percentage. |
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		2) Hong Kong Government's green procurement policy: Government bureaux and departments are encouraged to, inter alia, purchase products which emit fewer irritating or toxic substances during installation or use. • For purchase of items subject to standard open tendering procedures ○ The Government tender assessment panel will evaluate tender offers which can meet the “mandatory” requirements. The tender assessment panel will recommend either the conforming offer with the lowest price (for a tender without a marking scheme) or the highest scoring conforming offer (for a tender with a marking scheme) for acceptance. ○ As regards the green “desirable” features, they are not taken into account in the tender assessment except where there are two or more conforming offers with the lowest price which are identical in all respects. In such case, the tender which could meet more desirable green specification(s) could be given the preference. ○ As of March 2026, the number of items on the Government green procurement list with green specifications has been expanded to 183 items in 24 product and service categories. ○ Details of the green specifications are set out here. • For small amount purchase (i.e. a single purchase order not exceeding HK\$50,000 regardless of quantity) ○ The Government has developed easy tips to facilitate procurement frontline staff to select environment-friendly products / services for small amount purchase or for urgent situations when it is not practicable to adopt standard open tendering procedures. A total of 109 items have been identified by the Government as products with small amount purchase need. ○ Details of the easy tips are set out here.
	d. What is the level of participation?	1) Certification Scheme: The IAQ objectives, which include tightening concentration levels of carbon monoxide, respirable suspended particulars and radon, was fully implemented on 1 July 2024. As at March 2026, there are 2383 certified premises under the Certification Scheme.¹¹

		2) Hong Kong Government's green procurement policy: All Government bureaux and departments need to follow the green procurement policy.
	e. How closely do these policies align with international guidelines such as WHO?	1) Certification Scheme: Yes – the Certification Scheme is designed with reference to international health-based air quality standards, including WHO's IAQ guidelines, and taking into account local circumstances and the practicability of adopting such international guidelines. Further, the Certification Scheme was updated in 2019 to reflect the latest WHO guidelines. In light of the IAQ guidelines published by WHO on dampness and mould in 2009, and selected IAQ pollutants in 2010 (namely formaldehyde (HCHO), radon, carbon monoxide (CO), nitrogen dioxide (NO₂), benzene, naphthalene, polycyclic aromatic hydrocarbons (PAHs), trichloroethylene and tetrachloroethylene), the IAQ objectives of the Certification Scheme have been revised for implementation starting from 1 July 2019. 2) Hong Kong Government's green procurement policy: Unknown because the policy does not expressly mention which international guidelines the policy was based on.
	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	1) Certification Scheme: The timing for renewing IAQ certificates with expiry dates on or after 1 October 2019 has been extended from no later than three months after the expiry date of the certificate to nine months after the expiry date of the certificate. The change was implemented because some certificate holders are experiencing difficulties to conduct IAQ assessments at their premises for the renewal of the IAQ certificates due to COVID. In practice, this is no longer relevant. 2) Hong Kong Government's green procurement policy: No.
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	Policy development generally follows a consultative pathway, rather than primary legislation. IAQ initiatives are typically led by government departments such as the Environment and Ecology Bureau, Environmental Protection Department, Department of Health, Labour Department and Buildings Departments. There are also inter-departmental working groups such as the Indoor Air Quality Management Group.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	Hong Kong does not have any legislation specifically addressing the issues of IAQ because it is considered that self-regulation can be effective and, given the complexities and uncertainties surrounding IAQ, it is not preferable to have comprehensive regulations on IAQ. The self-regulatory approach is also consistent with Hong Kong's principle of small government. Legal provisions on ventilation and certain other factors affecting IAQ in buildings are contained in the below Ordinances and Regulations. Note that only the sections relating to IAQ will be mentioned below.

		The relevant Ordinances and Regulations include: 1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation) 2) Building (Ventilating Systems) Regulations, Cap. 123J 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE 4) Places of Public Entertainment Regulations, Cap. 172A 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas) 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A In addition, the following ordinances and regulations do not target IAQs or factors affecting IAQs in buildings per se, but targets emissions from products which indirectly affects IAQ: a. Air Pollution Control (Volatile Organic Compounds) Regulation (Cap. 311W) – prohibits import into Hong Kong and manufacture in Hong Kong regulated products with Volatile Organic Compounds contents exceeding the prescribed limits set out in the Regulation. b. Pesticides Ordinance (Cap. 133) – regulates the import, manufacture, repackage, storage, labelling and sale of all pesticides.
	a. When were they introduced?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): 1 June 1956. 2) Building (Ventilating Systems) Regulations, Cap. 123J: 23 October 1964. 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: 26 November 1977. 4) Places of Public Entertainment Regulations, Cap. 172A: 3 August 1934. 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): 13 August 1982. 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: The Ordinance was introduced 23 May 1997; the Regulation was introduced 1 January 1998.

b. What indoor environments and vulnerable populations are prioritized?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): The ventilation related provisions in Part IV (Lighting and Ventilation) applies to offices, rooms for habitation, and kitchens.
c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	There are no general mandatory legal or statutory requirements for IAQ monitoring, reporting and public disclosure. However, the various Ordinances listed above have specific requirements. For example: • Building (Planning) Regulations, Cap. 123F: requires ventilating systems to be kept in safe and efficient working order at all times and to be inspected by a registered specialist contractor every year. • Ventilation of Scheduled Premises Regulation, Cap. 132CE: Similarly requires ventilating systems to be maintained in safe and efficient working order. • Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: Requires workplaces to be adequately ventilated and air to be kept free of impurities as far as reasonably practicable. Premises which have been certified under the IAQ Certification Scheme are publicly listed online here.
d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): No. 2) Building (Ventilating Systems) Regulations, Cap. 123J: No – but the ventilating system should be kept in safe and efficient working order at all times. 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: No – but the ventilating system should be kept in safe and efficient working order at all times. 4) Places of Public Entertainment Regulations, Cap. 172A: No – but the ventilating and cooling installations should be kept in in good order and condition at all times. 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): No. 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: No.
e. What government bodies are responsible for developing,	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): The Building Authority.

	implementing, and reviewing IAQ policies?	2) Building (Ventilating Systems) Regulations, Cap. 123J: The Fire Services Department. 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: The Food and Environmental Hygiene Department. 4) Places of Public Entertainment Regulations, Cap. 172A: The Fire Services Department; the Housing Authority; the Building Authority; the Electrical and Mechanical Services Department; the Marine Department; and the Home Affairs Department. 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): Department of Health. 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: Labour Department.
	f. What are the objectives and parameters? Are there guidelines or mandatory measures?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): The ventilation related provisions in Part IV (Lighting and Ventilation) require that offices, rooms for habitation and kitchens are provided with natural ventilation through openable doors and windows. Part IV (Lighting and Ventilation) of the Regulations sets out the detailed requirements regarding the windows (including the area of the window, and position of the window etc.). 2) Building (Ventilating Systems) Regulations, Cap. 123J: <u>Objectives:</u> The Regulations require the owner of a building to keep the ventilating system in safe and efficient working order at all times (for further details of the requirements, see Regulation 4 (Requirements with respect to ventilating systems)). <u>Guidelines:</u> In terms of offices, see A Simple Guide to Health Risk Assessment Office Environment Series OE 4/2004 issued by the Occupational Safety and Health Branch of the Labour Department. 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: The Regulation requires the owner of a building to keep the ventilating system in safe and efficient working order at all times. 4) Places of Public Entertainment Regulations, Cap. 172A: Regulation 7(1) (Maintenance and alterations) requires the ventilating and cooling installations be maintained at all times in good order and condition and as approved.

		5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): No person may smoke in (i) areas described in Part 1 of Schedule 2 (including but not limited to indoor workplaces and public places such as cinemas, schools, hospitals, shopping malls etc.) and (ii) a public transport carrier (section 3 (Prohibition on smoking in certain designated areas) and section 4 (Prohibition on smoking in public transport carriers)). 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: <u>Objectives</u> Generally to ensure and improve the safety and health aspects of working environments of employees (section 2 (Purposes of Ordinance) of the Ordinance) – including but not limited to ensuring that the workplace is adequately ventilated and, as far as reasonably practicable, that the air within the workplace is kept free of impurities (Regulation 12(3) (Responsible person to keep workplace clean and adequately ventilated) of the Regulation). <u>Guidelines</u> • Guidance Notes on Ventilation and Maintenance of Ventilation Systems issued by the Occupational Safety and Health Branch, Labour Department. • Guidelines for Good Occupational Hygiene Practice in a Workplace issued by the Occupational Safety and Health Branch, Labour Department - in particular, see section 2 (General ventilation). • Air Impurities in the Workplace issued by the Occupational Safety and Health Branch, Labour Department.
	g. How do laws address ventilation requirements and standards, including minimum ventilation rates?	There are no comprehensive or prescribed minimum ventilation rates. However, the Building (Planning) Regulations (Cap. 123F) states that if prescribed window requirements (under Reg 31) cannot be complied with, mechanical ventilation can be used at a rate of not less than 5 changes of air per hour. Otherwise, there are qualitative ventilation requirements set out in the relevant regulations (as mentioned below) such as ensuring ventilation systems are kept in safe and efficient working order at all times.
	h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	Hong Kong does not have comprehensive regulations specifically governing HVAC system design, operation, maintenance, and filtration. However, certain provisions exist: 1) Building (Ventilating Systems) Regulations, Cap. 123J: Regulation 4 sets out requirements for ventilating systems, including that they must be kept in safe and efficient working order at all

		times. Owners must cause ventilating systems to be inspected by a registered specialist contractor every year. 2) Places of Public Entertainment Regulations, Cap. 172A: Regulation 7(1) requires ventilating and cooling installations to be maintained at all times in good order and condition and as approved. 3) Guidance Notes: The Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places recommend that centrally air-conditioned buildings be provided with supplementary central outside air supply systems for areas with above-average occupant density (such as classrooms, conference rooms, and canteens) and supplementary central exhaust systems for handling local exhaust from areas such as kitchens, printing rooms, and toilets. The Labour Department's Guidance Notes on Ventilation and Maintenance of Ventilation Systems provides further operational guidance. 4) Code of Practice for Energy Efficiency of Building Services Installation¹²: This document prescribes certain requirements including 'cooling load calculation methods, fan power limits, and
	i. Are there legal provisions for moisture and humidity control to prevent microbial contamination?	No express statutory limits.
	j. How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	The Air Pollution Control (Volatile Organic Compounds) Regulation (Cap. 311W) prohibits the import or manufacture of high-VOC building materials. It imposes maximum VOC content limits on architectural paints, coatings, adhesives, sealants and related products, effectively mandating low-VOC formulations. There is also a requirement for emission reduction devices to be installed on devices such as lithographic heatset web printing machines. The Environmental Protection Department (EPD) enforces these rules – manufacturers and importers must comply or face prosecutions, fines and possible legal action. Moreover, the Air Pollution Control (Construction Dust) Regulation (Cap. 311R) requires contractors to implement dust suppression measures (such as water spraying, covering dusty materials, and proper waste handling) to minimise particulate pollution from construction sites.
	k. How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	In high-noise industries (construction, manufacturing, etc.), the Factories & Industrial Undertakings (Noise at Work) Regulation (Cap. 59T) requires employers to implement hearing conservation if noise exceeds 85 dB(A) (8-hour TWA), including providing ear protectors and reducing noise at source. For ordinary offices and shops, the Occupational Safety and Health Ordinance (Cap. 509) imposes a general duty to prevent excessive noise that could harm employees' health.

		The Noise Control Ordinance (Cap. 400), enforced by the Environmental Protection Department, protects occupant comfort by limiting environmental noise: it restricts construction work at night and sets maximum noise levels for equipment (like air conditioners, chillers, ventilation fans) at nearby premises. While building codes don't specify internal noise limits for comfort, the Buildings Department issues guidance – for example, a practice note recommends designing residences so that indoor background noise stays around NC-30 to NC-35 (Noise Criteria levels) in bedrooms and living areas.
	l. Are energy efficiency goals included to balance IAQ and sustainability?	The Government acknowledges that IAQ and energy efficiency can conflict, with IAQ often requiring high energy consumption.¹³ Therefore, the regulation intends to propel natural ventilation, acknowledging that this is the best form of ventilation. This is seen to be reflected in the regulations as described above. This integrated approach underpins Hong Kong's sustainable building policies, which seek to reduce energy consumption and emissions while safeguarding occupant health and comfort. Furthermore, the Buildings Energy Efficiency Ordinance (Cap. 610) requires new buildings and major retrofits to meet minimum energy performance standards for key building services (air-conditioning, ventilation, lighting, etc.). This cuts overall power use and carbon emissions in line with Hong Kong's climate targets.
	m. How are IAQ laws incorporated within occupational health and safety frameworks?	Under the Occupational Safety and Health Ordinance (Cap. 509), there is a general overarching requirement for employers to provide a safe and health work environment for all employees. In the same vein, the subsidiary regulation, Occupational Safety and Health Regulation (Cap. 509A) requires that the workplace be kept clean and adequately ventilated with fresh air. The Labour Department advises that a supply of at least 10 litres per second of fresh air per person in offices is necessary. The Labour Department's Occupational Safety and Health Branch have issued "Air Impurities in the Workplace" guide.¹⁴ This guide states that Employers have a legal obligation to assess and mitigate risks from air impurities (e.g.: VOCs). These requirements are enforced by the Commissioner for Labour, and can hold a person responsible for a workplace liable on conviction to a maximum fine of \$400,000 and 12 months' imprisonment.
	n. What exemptions or exclusions exist, and what is their rationale?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): Mechanical ventilation may be used if owing to the position, level or unsuitable surroundings of any office, the requirements for natural ventilation under the Regulations cannot be complied with (see Regulation 34 (Mechanical ventilation and artificial lighting of offices)). Also see Regulation 71 (Power of Building Authority to permit windows, etc. to face or ventilate into unenclosed verandah, etc.) which allows the Building Authority to permit a window to face or ventilate into an unenclosed verandah.

¹³ [Teaching Kit - Indoor Air Quality \(IAQ\)](#)

¹⁴ [Air Impurities in the Workplace](#)

		2) Building (Ventilating Systems) Regulations, Cap. 123J: The owner of a building may write to the Director of Fire Services to seek exemption from compliance of the Regulations (Regulation 4(2) (Requirements with respect to ventilating systems)). 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: Yes – the owner of a building may write to the Director of Food and Environmental Hygiene to seek exemption from compliance of the Regulations (Regulation 4(2) (Requirements with respect to ventilating systems)). 4) Places of Public Entertainment Regulations, Cap. 172A: No exemptions. 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): Yes – including: • the exempted areas in Part 2 of Schedule 2 (section 3(1AA)); • live performance (Schedule 5 (Exemption from Section 3(2) of this Ordinance)); and • for recording for film or television programme (Schedule 5 (Exemption from Section 3(2) of this Ordinance)). 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: If it is not practicable to keep the air within the workplace free of impurities pursuant to Regulation 12(3)(b) of the Regulation, then the person responsible for the workplace: • must take all reasonably practicable steps to protect employees from inhaling impurities and to prevent accumulation of the impurities at the workplace; and • in particular, must, if it is practicable having regard to the activity being undertaken at the workplace, ensure that effective exhaust devices are installed and used as closely as possible to the source of the impurities (Regulation 12(4) of the Regulation).
	o. Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	6) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): Whilst there is no express reference to any review procedures in the Regulations, section 44 of the Buildings Ordinance (Cap. 123) allows any person aggrieved by any decision made by the Building Authority under the said Ordinance (including any decision to issue a demolition, removal, or alteration order for any non-compliance with the Regulations - see Section 2.p.1 below for further details) to appeal from that decision. 7) Building (Ventilating Systems) Regulations, Cap. 123J: No.

		8) Ventilation of Scheduled Premises Regulation, Cap. 132CE: No. 9) Places of Public Entertainment Regulations, Cap. 172A: A person may appeal against the licensing authority's (i) refusal to grant or renew licence, (ii) cancellation of licence, or (iii) variation or addition of conditions to a licence, due to any non-compliance with the requirements regarding ventilating and cooling installations (Regulation 3(4)(b) (Licences), Regulation 3D (Appeal against refusal to grant or renew provisional licence), Regulation 162(11) (Licences), Regulation 169A(3) (Variation of licence conditions), and Regulation 173(2) (Cancellation of licence)). 10) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): No. 11) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: No.
	p. How are IAQ regulations enforced? What penalties or incentives apply?	1) Building (Planning) Regulations, Cap. 123F – in particular, see Part IV (Lighting and Ventilation): Whilst there is no express reference to the consequences for failing to comply with the ventilation related provisions in the Regulations, the Building Authority can order the owner of the premise to demolish/remove/alter the relevant building works which contravene the ventilation related provisions in the Regulations (section 24 (Order for demolition, removal, or alteration of building, building works (other than minor works commenced under simplified requirements) or street works) and section 24AA (Order for demolition, removal, or alteration of minor works commenced under simplified requirements) of the Buildings Ordinance (Cap. 123)). Any person who, without reasonable excuse, fails to comply with a demolition, removal, or alteration order served on him shall be guilty of an offence and shall be liable on conviction— • in respect of works that are not minor works ○ to a fine of \$200,000 and to imprisonment for 1 year; and ○ to a fine of \$20,000 for each day during which it is proved to the satisfaction of the court that the offence has continued. • in respect of minor works ○ to a fine at level 5 (i.e. \$50,000) and to imprisonment for 3 months; and ○ to a fine of \$5,000 for each day during which it is proved to the satisfaction of the court that the offence has continued, (sections 40(1BA) and (1BB) of the Buildings Ordinance (Cap. 123)).

		Further, if an order for demolition, removal, or alteration is not complied with within the timing set out in that order, the Building Authority may, at the cost of the owner of the premise, demolish or alter or cause to be demolished or altered the minor works (sections 24(3) and (4) and 24AA(7) and (8) of the Buildings Ordinance (Cap. 123)). 2) Building (Ventilating Systems) Regulations, Cap. 123J: Any owner of a building that fails to (i) keep the ventilating system in safe and efficient working order at all times or (ii) cause such ventilating system to be inspected by a registered specialist contractor every year, shall be guilty of an offence and shall be liable on conviction to a fine at level 1 (i.e. HK\$2,000) (Regulation 5 (Duty of owners of ventilating systems)). 3) Ventilation of Scheduled Premises Regulation, Cap. 132CE: Regulation 14 (Offences and penalties) sets out the various penalties for failing to comply with the Regulation. Any person who fails to comply with the Regulation shall be guilty of an offence and shall be liable on conviction to a fine at level 3 (i.e. HK\$10,000) and imprisonment for 3 months. 4) Places of Public Entertainment Regulations, Cap. 172A: Any person who fails to comply with any conditions of his licence granted under the Regulation (including any conditions relating to ventilating and cooling installations) shall upon summary conviction be liable to a fine at level 2 (i.e. HK \$5,000) and to imprisonment for 6 months. 5) Smoking (Public Health) Ordinance, Cap. 371 – in particular, see Part 2 (No Smoking Areas): Any person who contravenes the non-smoking provisions commits an offence and is liable on summary conviction to a fine at level 2 (i.e. HK\$5,000); and any person who fails to give his name and address or to produce proof of identity when required to do so or who then gives a false or misleading name or address commits an offence and is liable on summary conviction to a fine at level 3 (i.e. HK\$10,000). (Section 7 (Offences under Part 2)) 6) Occupational Safety & Health Ordinance, Cap. 509 and Occupational Safety and Health Regulation, Cap. 509A: A responsible person for a workplace who fails to comply with the ventilation related provisions in the Regulation commits an offence and is liable on conviction to a fine at level 5 (i.e. HK\$50,000) (Regulation 12(5) (<i>Responsible person to keep workplace clean and adequately ventilated</i>) of the Regulation).
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively a. What are the requirements for new constructions versus existing premises?	Hong Kong has not adopted or developed any mandatory emission standards or other IAQ related building codes for building of its own. Nonetheless, please see below for relevant non-mandatory benchmarks and standards. Hong Kong BEAM Society (“HK-BEAM”) (a non-profit organisation established in 2010 that became a public body since 2016) has developed the HK-BEAM Plus assessment tools which assess the sustainability performance of

buildings. Performance benchmarks include but are not limited to indoor air quality and ventilation. An assessment under HK-BEAM is voluntary. HK-BEAM covers all types of new and existing buildings: residential, commercial, institutional, and industrial.

Ventilation	(a) Measure outdoor air pollutants onsite prior to building design to understand the site conditions. (b) Demonstrate the project is in compliance with the minimum ventilation quantity with respect to its designed ventilation mode.	
Indoor Air Quality	<u>Path 1</u> 2 credits for demonstrating compliance with the prescribed limits for Carbon monoxide (CO), Nitrogen dioxide (NO₂), Ozone (O₃), Carbon dioxide (CO₂), Respirable suspended particulates (PM₁₀), Total volatile organic compounds (TVOCs), Formaldehyde (HCHO) and Radon (Rn) in the sampled occupied spaces. 1 credit for demonstrating compliance with the prescribed limits for airborne bacteria and conduct the mould assessment in the sampled occupied spaces. <u>Path 2</u> 3 credits for submitting a valid certificate for the Certification Scheme (Good Class) covering the whole building. 3 credits and 1 additional BONUS credit for submitting a valid certificate for the Certification Scheme (Excellent Class) covering the whole building	
Guidelines	“BEAM Plus New Buildings Version 2.0 (0.5.2021)”, see HWB P1 (Minimum Ventilation Performance), HWB 8 (Indoor Air Quality) “Hong Kong Building Environmental Assessment Method – New Buildings”, see sections 6.3 (Indoor Air Quality) and 6.4 (Ventilation)	
	Comprehensive Scheme	Selective Scheme
Approach	Adopts the ‘Plan-Do-Check-Act’ approach for the continual improvement of the buildings.	Embraces the ‘Better than yesterday’ principle to recognise the efforts made by the building management of the aged existing buildings to achieve better building performance.

			There are two types of comprehensive schemes: - Comprehensive Scheme A (One-step approach): All aspects under this manual are assessed in one-go and one full certificate is offered if the requirements are fulfilled. - Comprehensive Scheme B (Step-wise approach): Free combination of aspects assessment is allowed. Intermediate result(s) for the assessed aspect(s) will be issued. The applicant is required to update the necessary information of the assessed aspect(s) and submit the remaining aspect(s) within 3 years of the issuance of first intermediate result.	It is an individual aspect assessment approach, and certificate will be issued for each individual assessed aspect. Certification under Selective Scheme has a lower threshold than Comprehensive Scheme.	
		Ventilation	In most cases, refers to the minimum ventilation rate of ANSI/ASHRAE 62.1-2013 (Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc).	In most cases, refers to the recommendations from recognised authorities such as ANSI/ASHRAE 62.1-2013 (Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigerating and AirConditioning Engineers, Inc) or equivalent.	
		Indoor Air Quality	Adopts the criteria and assessment methods under “Good Class” of the Certification Scheme. Maximum 7 credits for demonstrating compliance with appropriate criteria for indoor pollutant levels, for the following parameters: i. Carbon Dioxide;	Adopts the criteria and assessment methods under “Good Class” of the Certification Scheme. Maximum 9 credits for demonstrating compliance with appropriate criteria for indoor pollutant levels, for the following parameters: i. Carbon Dioxide;	

			ii. Carbon Monoxide, Nitrogen Dioxide and Ozone; iii. Respirable Suspended Particulate; iv. Formaldehyde; v. Total Volatile Organic Compounds; vi. Radon; and vii. Bacteria. 1 Bonus credit where the whole building (i.e. including the tenant areas) is certified by the Certification Scheme (see responses to Question 1 for further details of the Certification Scheme). 1 Bonus credit for demonstrating the continuous participation in the Certification Scheme for past 3 consecutive years.	ii. Carbon Monoxide; iii. Respirable Suspended Particulate; iv. Nitrogen Dioxide; v. Ozone; vi. Formaldehyde; vii. Total Volatile Organic Compounds; viii. Radon; and ix. Bacteria. 1 credit for obtaining Excellent Class for the Certification Scheme (see responses to Question 1 for further details of the Certification Scheme). 1 credit for demonstrating the continuous participation in the Certification Scheme for past 3 consecutive years.	
		Guidelines	“BEAM Plus Existing Buildings Version 2.0 (2016.03) --- Comprehensive Scheme”, see sections 7.2 (Ventilation) and 7.5 (Indoor air quality), IEQ P1 (Minimum Ventilation Performance), IEQ 2 (Ventilation in Common Areas), IEQ 3 (Localised Ventilation), and IEQ 8 (IAQ Monitoring)	“BEAM Plus Existing Buildings Version 2.0 (2016.03) --- Selective Scheme”, see sections 7.2 (Ventilation) and 7.5 (Indoor air quality), IEQ 2 (Minimum Ventilation Performance), IEQ 3 (Localised Ventilation), and IEQ 8 (IAQ Monitoring)	
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	Some of the Hong Kong statutes and subsidiary legislations touch upon ventilation and other IAQ related aspects in buildings – for further details, please refer to our responses in Section 2 above on Building (Planning) Regulations, Cap. 123F, Building (Ventilating Systems) Regulations, Cap. 123J, Ventilation of Scheduled Premises Regulation, Cap. 132CE and Places of Public Entertainment Regulations, Cap. 172A.			

		Also see section 4.2 (Building Design and Construction) and section 4.3 (Building Uses and Layout) of the Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places issued by the Indoor Air Quality Management Group (the “Guidance Notes”). The Government sees the requirements under legislative provisions as a minimum standard, and that the guidelines set out in the said Guidance Notes should be followed as good practice. In respect of architectural design, the Guidance Notes suggests that, inter alia: 2. Buildings be tightly sealed with a continuous and durable air barrier system; 3.2.3.2. centrally air-conditioned building be provided with a supplementary central outside air supply system (for supplying additional outside air to areas with above-average occupant density such as classroom, conference room, canteen etc.) and a supplementary central exhaust system (for handling local exhaust from tenant areas such as kitchen, printing room, toilet etc.); and 3. Rooms with significant sources of emission (e.g. kitchen, bathroom, printing room etc.) should be maintained under slight negative pressure to minimize migration of the pollutants to nearby occupant which could result in contamination. In respect of building and furnishing materials, the Guidance Notes suggests that materials with lower emission rates should be selected provided that they meet all relevant statutory requirements, e.g. fire resisting properties, etc. The Environmental Protection Department published a guideline “New Furniture and Indoor Air Quality” on how to choose low volatile-organic-compound-emitting furniture and related materials.
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	None. Information leaflets and guidance are provided by government departments such as the Environment Protection Department and IAQ Management Group for individuals to review on a voluntary basis.
	d. How are these code requirements monitored and enforced?	N/A as no mandatory requirements.

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- Places of Public Entertainment Regulations, Cap. 172A <https://www.elegislation.gov.hk/hk/cap172A>
- Public Health and Municipal Services Ordinance, Cap. 132 <https://www.elegislation.gov.hk/hk/cap132>
- Smoking (Public Health) Ordinance, Cap. 371 <https://www.elegislation.gov.hk/hk/cap371>
- Ventilation of Scheduled Premises Regulation, Cap. 132CE <https://www.elegislation.gov.hk/hk/cap132CE>

ANNEX 6 – UK

Questions		Response <i>[Responses inserted below are based on advice as of March 2026]</i>
1.	Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	Yes: 1) The NICE Guideline (Indoor air quality at home) ("NICE Guideline"), a collaboration between the (i) Department of Health in England and (ii) NICE, to develop guidance on indoor air pollution; 2) Building Research Establishment Environmental Assessment (BREEAM) Method Hea 02 Indoor Air Quality; and 3) Indoor Air Quality Management (IAQM) Indoor Air Quality Guidance: Assessment, Monitoring, Modelling and Mitigation¹⁵ ("IAQM 2021 Guidance"), a guide to assist IAQM members in the assessment of indoor air quality. Details are set out in the sections below:
	a. When were they introduced?	1) NICE Guideline : These Guidelines were introduced on 8 January 2020 by the National Institute for Health and Care Excellence (NICE).
	b. Are they mandatory or voluntary?	1) NICE Guideline: Voluntary. 2) BREEAM Method: Voluntary. 3) IAQM 2021 Guidance: Voluntary
	c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	1) NICE Guideline : The NICE guidelines are a response to the growing recognition of the impact of air pollution on public health.
	d. What is the level of participation?	1) NICE Guideline : As the guidance was primarily to educate and recommend concrete actions for particular groups of people, its focus was narrowed to address.
	e. How closely do these policies align with international guidelines such as WHO?	1) NICE Guideline : while not directly derived or based on WHO guidelines, the NICE guideline was designed to complement various directives, regulations and guidelines from the WHO, the European Union on indoor air quality, and UK guidance and regulations, namely:

	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	1) NICE Guideline: No. 2) BREEAM Method: No. 3) IAQM 2021 Guidance: No
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	In the UK, indoor air quality policy is developed through multiple routes rather than a single law, spanning building regulations, housing and public health, workplace safety, product/chemical controls, and devolved nation strategies.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	The rules surrounding IAQ in the UK are not contained in any one legislation or regulation, rather the relevant rules can be found piecemeal across industry specific statutory instruments and accompanying guidance. That being said, there does seem to be increasing pressure on the UK government from lobbying groups and public health organizations to create a codified, central IAQ framework. Such instruments include: 13) Building Regulations 2010 14) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014) 15) Housing Act 2004 (as amended by the Housing and Planning Act 2016) 16) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974) 17) Department of Education Guidance BB101 18) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK 19) Building Safety Act 2022 20) Environmental Protection Act 1990 21) WHO Guidelines for Indoor Air Quality 22) EH40/2005 Workplace exposure limits 23) Indoor Air Quality Guidance 2021

		24) The Control of Substances Hazardous to Health Regulations 2002¹⁶ The relevant legal provisions are set out below. Note that only the sections relating to IAQ will be mentioned below.
	a. When were they introduced?	1) Building Regulations 2010: The current version of the Building Regulations came into force on 1 October 2010, repealing and revoking the Building Regulations 2000. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): The Clean Air Act was introduced 27 May 1993. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): The Housing Act was enacted on 18 November 2004. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): The Workplace (Health, Safety and Welfare) Regulations came into force on 1 January 1996. 5) Department of Education Guidance BB101: These Guidelines were introduced on 1 August 2018 by the Department of Education. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: These Guidelines were introduced in September 2019 by the Public Health England. 7) Building Safety Act 2022: Introduced in response to the Grenfell Tower tragedy. This Act was introduced on 28 April 2022. 8) Environmental Protection Act 1990: This Act was introduced on 1 November 1990. 9) WHO Guidelines for Indoor Air Quality: These Guidelines were introduced in 2010. 10) EH40/2005 Workplace exposure limits; These Regulations were introduced in 2018. 11) Indoor Air Quality Guidance: Introduced in September 2021.

¹⁶

This legislation requires employers and the self-employed to prevent or adequately control exposure to hazardous substances (including airborne vapours, gases, fumes, dusts, mists and biological agents). Although it relates to clean air, its scope is limited to protecting workers from hazardous airborne substances rather than regulating indoor air quality for the public. It is therefore not considered in detail in this note. We can provide further advice on COSHH if needed.

	b. What indoor environments and vulnerable populations are prioritized?	1) Building Regulations 2010: The Regulations contain functional requirements for new buildings and renovations. The Regulations themselves are drafted in broad terms, with the government issuing 'Approved Documents' as guidance for their interpretation. Schedule 1, Part F of the Regulation sets out the requirements for ventilation for dwellings and buildings other than dwellings. It requires (i) adequate means of ventilation for the people in the building and (ii) fixed systems for mechanical ventilation and any associated controls to be tested to ensure the objective in (i) is met. Excluded from the scope of Part F is (a) a building into which people do not normally go; (b) a building used solely for storage; and (c) a garage used solely in connection with a single dwelling. Schedule 1, Part C of the Regulation sets out the requirements for the building site's preparation and resistance to contaminants and moisture. It requires that reasonable precautions are taken to avoid danger to health and safety caused by contaminants on or in the ground covered or to be covered by the building. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): The Act regulates the control of smoke emissions, the height of chimneys and the content and composition of fuels. While the Act on its face does not state that its provisions intend to improve IAQ, it has been included here because chimneys and fireplaces will necessarily affect the quality of air inside the buildings. For example, Part I of the Act prohibits 'dark smoke' from chimneys and industrial or trade premises. Part II requires that all new furnaces shall be so far as practicable smokeless and sets limits on the rate of grit and dust emissions from furnaces. Part III grants local authorities the power to require adaptations to fireplaces in private dwellings and church buildings. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): The Act concerns residential premises, which are defined as: a dwelling, houses in multiple occupation (HMO), unoccupied HMO accommodation or any common parts of a building containing one or more flats. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): This Regulation was made by the Secretary of State under the powers conferred by The Health and Safety at Work etc. Act 1974, which concerns the health, safety and welfare of persons at work, protecting workers against risks to health or safety including by possession of dangerous substances and for controlling certain emissions into the atmosphere. They apply to employers, controllers of work premises or occupiers of a factory.
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		Regulation 6 of the Regulations requires that effective and suitable provision shall be made to ensure that every enclosed workspace is ventilated by a sufficient quantity of fresh or purified air. 5) Department of Education Guidance BB101: The Guidelines lay out the regulations, standards and guidance on ventilation, thermal comfort and indoor air quality for school buildings. The Guidelines are intended to supplement the Building Regulation's Approved Guidance on Part F. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: The Guidelines relate to the occurrence of VOCs in the indoor residential and public buildings (offices) in the UK. 7) Building Safety Act 2022: The Guidelines relate to the way in which high-risk and high-rise buildings are constructed and maintained. 8) Environmental Protection Act 1990: The Act provides for the improved control of air pollution arising from certain industrial and other processes. 9) WHO Guidelines for Indoor Air Quality: Any indoor building. 10) EH40/2005 Workplace exposure limits: Any indoor building. 11) IAQM 2021 Guidance: Any indoor building.
	c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	No legal IAQ monitoring, reporting or public disclosure requirements exist. 1) Building Regulations 2010: Approved Document F introduces monitoring requirements for levels of CO2. There are no reporting or public disclosure requirements. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): None. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): None. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): None 5) Department of Education Guidance BB101: None. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: None. 7) Building Safety Act 2022: None.

		8) Environmental Protection Act 1990: None. 9) WHO Guidelines for Indoor Air Quality: None. 10) EH40/2005 Workplace exposure limits: Monitoring is legally required to ensure compliance. Employers must inform employees however there are no public disclosure requirements. 11) IAQM 2021 Guidance: None.
	d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?	1) Building Regulations 2010: No. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): No. However, the local authority can issue a section 36 notice and require the occupier of any premises to provide information concerning the emission of pollutants and other substances into the air from the premises. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): No. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): No. However, the Guidance states that the condition of the buildings should be monitored. 5) Department of Education Guidance BB101: No. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: Yes, for the duration of the review. 7) Building Safety Act 2022: No. 8) Environmental Protection Act 1990: No. 9) WHO Guidelines for Indoor Air Quality: No. 10) EH40/2005 Workplace exposure limits: No. 11) IAQM 2021 Guidance: No.
	e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?	1) Building Regulations 2010: The local authority has the general duty to enforce the Regulations. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): The local authority.

		3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): Local housing authorities. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): Health and Safety Executive Inspectors, and local authorities. 5) Department of Education Guidance BB101: See response to 1) Building Regulations 2010 above. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: Public Health England. 7) Building Safety Act 2022: Building Safety Regulator. 8) Environmental Protection Act 1990: Local authorities. 9) WHO Guidelines for Indoor Air Quality: Public health professionals involved in preventing health risks of environmental exposures, as well as specialists and authorities involved in the design and use of buildings, indoor materials and products. 10) EH40/2005 Workplace exposure limits: Health and Safety Executive. 11) IAQM 2021 Guidance: None.
	f. What are the objectives and parameters? Are there guidelines or mandatory measures?	1) Building Regulations 2010: The Secretary of State has published relevant Approved Documents. The documents dealing with Part F are split into two parts, one dealing with dwellings and the other buildings other than dwellings. The guidance sets out possible ways to comply with the Regulations, however it does not guarantee that work based on the guidance will in every case be approved. It sets out the situations in which the Regulations will apply, the notification procedures to follow, the technical requirements and standards for building materials and workmanship. One such technical requirement is that the ventilation extracts indoor air pollutants from areas where they are produced in significant quantities (e.g. kitchens, utility rooms and bathrooms) before they spread through the building. The ventilation system should also (i) rapidly dilute indoor air pollutants when necessary in habitable rooms and minimise the entry of external air pollutants.
	g. How do laws address ventilation requirements and standards, including minimum ventilation rates?	1) Building Regulations 2010: Approved Document F provides statutory guidance on ventilation requirements and standards. Document F's minimum ventilation rates are contained at Item 3(a) of this table. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): None.

		3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): None. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): None. 5) Department of Education Guidance BB101: Provides guidance for minimum technical ventilation rates but not mandatory laws. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: None. 7) Building Safety Act 2022: Anticipates strengthened requirements in future but no requirements currently. 8) Environmental Protection Act 1990: None 9) WHO Guidelines for Indoor Air Quality: None 10) EH40/2005 Workplace exposure limits: None 11) IAQM 2021 Guidance: None
	h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	1) Building Regulations 2010: Approved Document F provides that ventilation design must perform for each of the following: a. Extract water vapour and indoor air pollutants from areas where they are produced in significant quantities before they are spread through the building; b. Supply a minimum level of outdoor air for occupants' health; c. Rapidly dilute indoor air pollutants and disperse water vapour where necessary in occupiable rooms and sanitary accommodation; d. Monitor the air quality in specific types of occupiable rooms; e. Minimise the entry of external pollutants; f. Achieve all of the following as far as is reasonably practicable: produce low levels of noise, offer easy access for maintenance, provide protection from rain, provide protection from cold draught and not significantly risk occupants' health.

		Operation and instruction information should contain specific information for the end user on how and when to use the ventilation system, including information on the intended uses for the available fan settings. Reasonable access should be provided for maintenance. There are no direct filtration provisions. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): None 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): None 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): Employers must ensure “effective and suitable” ventilation with fresh or purified air. Mechanical systems must be maintained in efficient working order. 5) Department of Education Guidance BB101: None. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: None 7) Building Safety Act 2022: Anticipates strengthened requirements in future but no requirements currently. 8) Environmental Protection Act 1990: None. 9) WHO Guidelines for Indoor Air Quality: None. 10) EH40/2005 Workplace exposure limits: None. 11) IAQM 2021 Guidance: None.
	i. Are there legal provisions for moisture and humidity control to prevent microbial contamination?	1) Building Regulations 2010: Approved Document C provides that floors, walls and roofs must prevent harmful effects caused by moisture. Additionally, it provides design requirements to combat condensation. Approved Document F provides statutory guidance on moisture levels. The performance criterion for moisture is that there should be no visible mould on the inner surfaces of the external walls of a properly heated dwelling with typical moisture generation.

Acceptable levels of surface water activity are a metric used to prevent microbial contamination. The current levels are as set out below.

Moving Average Period	Surface Water Activity
1 month	0.75
1 week	0.85
1 day	0.95

Indoor air relative humidity is also used as a preventative metric. The current levels are as set out below.

Moving Average Period	Indoor air relative humidity (%)
1 month	65
1 week	75
1 day	85

- 2) **Clean Air Act 1993 (as updated by the Clean Air Regulations 2014):** None
- 3) **Housing Act 2004 (as amended by the Housing and Planning Act 2016):** None
- 4) **The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974):** None
- 5) **Department of Education Guidance BB101:** None
- 6) **Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK:** None.
- 7) **Building Safety Act 2022:** None.
- 8) **Environmental Protection Act 1990:** None.
- 9) **WHO Guidelines for Indoor Air Quality:** None.

		10) EH40/2005 Workplace exposure limits: None. 11) IAQM 2021 Guidance: None.
	12) How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	1) Building Regulations 2010: None applicable.
	2) How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	1) Building Regulations 2010: Document F states mechanical ventilation systems should be designed to minimise noise. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): None applicable. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): None applicable. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): None applicable. 5) Department of Education Guidance BB101: Provides guidance on airflow patterns for comfort however these are non-binding. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: None applicable. 7) Building Safety Act 2022: None 8) Environmental Protection Act 1990: None 9) WHO Guidelines for Indoor Air Quality: None 10) EH40/2005 Workplace exposure limits: None 11) IAQM 2021 Guidance: None
	12) Are energy efficiency goals included to balance IAQ and sustainability?	1) Building Regulations 2010: No. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): No. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): No.

		4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): No. 5) Department of Education Guidance BB101: Guidance is given in relation to energy efficiency: mechanical ventilation designs should be energy efficient; MHVR systems will need to have a minimum heat recovery efficiency factor of 75% to avoid the need to use a heater battery to achieve adequate air temperatures in a 100% fresh air MHVR system. Reference is made to sustainability of design however this is not binding. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: None. 7) Building Safety Act 2022: None. 8) Environmental Protection Act 1990: None. 9) WHO Guidelines for Indoor Air Quality: None. 10) EH40/2005 Workplace exposure limits: None. 11) IAQM 2021 Guidance: None.
	12) How are IAQ laws incorporated within occupational health and safety frameworks?	1) Building Regulations 2010: IAQ laws are incorporated through Approved Document F, the provisions of which are set out throughout the table. 2) Clean Air Act 1993 (as updated by the Clean Air Regulations 2014): Not applicable. 3) Housing Act 2004 (as amended by the Housing and Planning Act 2016): Not applicable. 4) The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974): Document is directly concerned with occupational health and safety frameworks. 5) Department of Education Guidance BB101: Not applicable. 6) Indoor Air Quality Guidelines for selected Volatile Organic Compounds (VOC) in the UK: Not applicable. 7) Building Safety Act 2022: Not applicable. 8) Environmental Protection Act 1990: Not applicable.

		9) WHO Guidelines for Indoor Air Quality: Not applicable. 10) EH40/2005 Workplace exposure limits: Sets legally binding occupational exposure limits for airborne contaminants in workplaces. 11) IAQM 2021 Guidance: Explicitly is not designed to override legislation.
	12) What exemptions or exclusions exist, and what is their rationale?	1) Building Regulations 2010: The Metropolitan Police Authority is exempt from complying with the procedural requirements and the enforcement of the Regulations. See above Section 2.b.1 for a list of exempt buildings.
	13) Is there a review process, and what mechanisms exist to update laws based on new scientific evidence	1) Building Regulations 2010: Yes, under sections 16, 39 and 50 of the Building Act 1984 decisions of the local authority rejecting a building application can be appealed. An appeal of a section 36 notice (please see below penalties) which would require a change or demolition of the building work can be appealed to the Magistrates' Court under section 102 of the Building Act.
	14) How are IAQ regulations enforced? What penalties or incentives apply?	1) Building Regulations 2010: The financial penalties for non-compliance with the Regulations are found in section 35 and 35A of the Building Act which give courts the opportunity to impose an unlimited fine on the person carrying out (usually the main contractor) the contravening building works. Prosecution is possible for up to two years after completing the works.
3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	The Approved Document F (ADF) referred to in this question does not apply to work subject to a building notice, full plans application or initial notice submitted before 15 June 2022, provided the work for each building is started before 15 June 2023. The ADF, provides guidance on complying with the legislation. Therefore, this section focuses on the specific requirements for IAQ, rather than a detailed breakdown of the necessary considerations for ensuring compliance with the IAQ requirements. Complying with the guidance in ADF does not guarantee that the building work complies with the legal requirements of the BRs. Similarly, compliance with the BRs can be achieved in other ways than those described in the ADF – those seeking to achieve compliance with the BRs without following the guidance should seek to agree this with the relevant building control body at an early stage. Should an analysis of the Guidance be required, this can be explored in further detail. As a result, this section focuses on the legal requirements, whilst providing an overview of the relevant guidance. Then, this report considers the relevant levels of IAQ that are required under the Building Regulations. The Building Regulations 2010 (BR) cover the construction and extension of buildings. Approved Document F (ADF) is the building regulation in England for the ventilation requirements to maintain indoor air quality. This is then split into 2 separate volumes. Volume 11 applies to dwellings, and Volume 22

		applies to buildings other than dwellings. The ADF provides guidance on complying with the legislation. Complying with the guidance in ADF does not guarantee that the building work complies with the legal requirements of the BRs. Building regulations are required to be signed-off by a relevant authority. Therefore, even though aspects of the ADF may not be "legal" per se, compliance could still be required to get the required sign-off.
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a. What are the requirements for new constructions versus existing premises?

Guidance for New and Existing Dwelling Constructions are set out below:

Volume 1

Secretary of
State's view for
new and
existing
constructions

Requirement F1(1) is met if the dwelling has a means of ventilation that achieves the following:

- (a) Extracts water vapour and indoor pollutants from areas where they are produced in significant quantities before they spread through the building (following the guidance on extract ventilation (paras 1.17 - 1.22 of ADF));
- (b) Supplies a minimum level of outdoor air for occupants' health (following the guidance for whole dwelling ventilation (paras 1.23- 1.25 of ADF));
- (c) Rapidly dilutes indoor air pollutants and disperses water vapour when necessary in habitable rooms (following the guidance for purge ventilation (paras 1.26 - 1.31));
- (d) Minimises the entry of external air pollutants (following Guidance in Section 2)
- (e) Achieves all of the following, as far as is reasonably practicable:
 - (i) Produces low level of noise (following the guidance in paras 1.5 - 1.7);
 - (ii) Offers easy access for maintenance (following the guidance in para 1.8);
 - (iii) Provides protection from cold draughts

		Performance-based Ventilation	Appendix B of ADF sets out the levels of moisture and other pollutants that the provisions ADF are designed to control, where the outside air is of reasonable quality. Section 2 provides guidance on limiting the entry of external air pollutants.		
			Pollutant	Exposure Limit	Exposure Time
			Carbon Monoxide (CO)	100mg/m ³	15-minute average
				30mg/m ³	1-hour average
				10mg/m ³	8-hour average
			Nitrogen Dioxide (NO₂)	200 μ g/m ³	1-hour average
				40 μ g/m ³	1-year average
			Formaldehyde (CH₂O)	100 μ g/m ³	30-minute average
				10 μ g/m ³	1-year average
			Total Volatile Organic Compound (TVOC)*	300 μ g/m ³	8-hour average
			* The total volatile organic compound (TVOC) metric is representative of all airborne indoor air VOC concentrations and should not be used as a direct indicator of health.		
			The requirements also vary based on whether the dwelling is airtight. Less airtight dwellings are assumed to have an infiltration rate of 0.15 air changes per hour, whereas highly airtight dwellings are assumed to have an infiltration rate of 0 air changes per hour.		

Infiltration = the uncontrolled exchange of air between the inside and outside of a building, through gaps and cracks.

As an alternative to using TVOC, the individual VOCs may be applied where their use is supported by robust independent evidence. Public Health England's Indoor Air Quality Guidelines for Selected Volatile Organic Compounds (VOCs) in the UK should be used. Testing against these metrics is likely to be more complex than testing against TVOC. For the purposes of all dwellings (both new and existing within scope of the ADF), the moisture criteria are likely to be met if, during the colder months of the year, the moving average surface water activity of the internal surface of external walls is always less than the value in the below table, evaluated over each moving average period:

Moving average period	Surface water activity
1 month	0.75
1 week	0.85
1 day	0.95

For new dwellings (within the scope of the ADF), the moisture criteria in the above table is likely to be met if, during the colder months of the year, the moving average relative humidity in a room is always less than the value given in the below table, evaluated over each moving average period:

Moving average period	Indoor air relative humidity (%)
1 month	65
1 week	75
1 day	85

Volume 2:

		Secretary of State's view for new constructions	Requirement F1(1) is met in a new building other than a dwelling if it has a means of ventilation that achieves all of the following: (a) Extracts water vapour and indoor pollutants from areas where they are produced in significant quantities before they spread through the building, following the guidance on extract ventilation. (b) Supplies a minimum level of outdoor air for occupants' health (following guidance for whole building ventilation in Section 1 of the relevant building type) (c) Rapidly dilutes indoor air pollutants and disperses water vapour when necessary in occupiable rooms and sanitary accommodation (following the guidance for purge ventilation in Section 1 for the relevant building type) (d) Monitors air quality in specific types of occupiable rooms (following guidance in paragraphs 1.21 - 1.23) (e) Minimises the entry of external pollutants (following the guidance in Section 2): (f) Achieves all of the following, as far as is reasonably practicable: (i) Produces low levels of noise (following the guidance in paragraphs 1.5 and 1.6) (ii) Offers easy access for maintenance (following guidance in paragraph 1.7) (iii) Provides protection from rain (iv) Provides protection from cold draughts (v) Does not significantly risk occupants' health
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		Secretary of State's view of existing constructions	Requirement F1(1) is met for work on an existing building other than a dwelling by following the guidance in Section 3. When building work in an existing building includes work on ventilation: (a) Building an extension (b) Adding a wet room (c) Replacing part of the ventilation system The work should meet the relevant standard in the ADF (same as for new above). When other building work is carried out that will affect the ventilation of the existing building, for example: (a) Replacing windows or door (b) Doing energy efficiency work The ventilation of the building should either: (a) Meet the standards in the ADF (same as for new above) (b) Not be less satisfactory than before the work was carried out.
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			Performance-based ventilation	The main guidance within this approved document focuses on offices. The main performance criteria applied are as follows: (a) There should be a supply rate, in the absence of tobacco smoke or other excessive pollutants, of 10 litres per second per person. This will also satisfy the requirements of 8 litres per second per person needed to control higher levels of bio-effluents. (b) There should be no visible mould on the inner surfaces of external walls of a properly heated building with typical moisture generation. (c) Mould can grow whether the building is occupied or unoccupied, so the performance criteria for surface water activity (as given in Table B2 below) should be met at all times, regardless of whether there are occupants. The other pollutants listed in Table B1 are only of concern when the building is occupied. (d) The performance criteria for indoor air pollutants are given in Table B1:																																								
				<table><tr><th colspan="4">Table B1 (summary)</th></tr><tr><th>Pollutant</th><th>Exposure Limit</th><th>Exposure Time</th><th>Guidance</th></tr><tr><td rowspan="3">Carbon Monoxide (CO)</td><td>100mg/m³</td><td>15-minute average</td><td>WHO, 2010</td></tr><tr><td>30mg/m³</td><td>1-hour average</td><td>WHO, 2010</td></tr><tr><td>35mg/m³ (occupational exposure)</td><td>8-hour average</td><td>HSE, 2020</td></tr><tr><td rowspan="2">Nitrogen Dioxide (NO₂)</td><td>200 μ g/m³</td><td>1-hour average</td><td>WHO, 2010</td></tr><tr><td>40 μ g/m³</td><td>1-year average</td><td>WHO, 2010</td></tr><tr><td rowspan="2">Formaldehyde (CH₂O)</td><td>100iig/m³</td><td>30-minute average</td><td>WHO, 2010</td></tr><tr><td>10iig/m³</td><td>1-year average</td><td>PHE 2019</td></tr><tr><td>Total Volatile Organic Compound (TVOC)*</td><td>300iig/m³</td><td>8-hour average</td><td>ECA 1992 / WHO, 2010</td></tr><tr><td>Ozone</td><td>100iig/m³</td><td></td><td>DETR, 1994</td></tr></table>	Table B1 (summary)				Pollutant	Exposure Limit	Exposure Time	Guidance	Carbon Monoxide (CO)	100mg/m ³	15-minute average	WHO, 2010	30mg/m ³	1-hour average	WHO, 2010	35mg/m ³ (occupational exposure)	8-hour average	HSE, 2020	Nitrogen Dioxide (NO ₂)	200 μ g/m ³	1-hour average	WHO, 2010	40 μ g/m ³	1-year average	WHO, 2010	Formaldehyde (CH ₂ O)	100iig/m ³	30-minute average	WHO, 2010	10iig/m ³	1-year average	PHE 2019	Total Volatile Organic Compound (TVOC)*	300iig/m ³	8-hour average	ECA 1992 / WHO, 2010	Ozone	100iig/m ³		DETR, 1994
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	10iig/m ³	1-year average	PHE 2019																																									
Total Volatile Organic Compound (TVOC)*	300iig/m ³	8-hour average	ECA 1992 / WHO, 2010																																									
Ozone	100iig/m ³		DETR, 1994																																									

As an alternative to using TVOC, the individual VOCs may be applied where their use is supported by robust independent evidence. Public Health England's Indoor Air Quality Guidelines for Selected Volatile Organic Compounds (VOCs) in the UK should be used. Testing against these metrics is likely to be more complex than testing against TVOC.

The moisture criteria are likely to be met if, during the colder months of the year, the moving average surface water activity of the internal surfaces of external walls is always less than the value in Table B2, summarised below:

Table B2 (summary)	
Moving average period	Surface water activity
1 month	0.75
1 week	0.85
1 day	0.95

CO2 Monitoring

If there is a build-up of CO2 in an area it can indicate that ventilation needs to be improved. The most appropriate portable CO2 monitoring devices for use in the workplace are non-dispersive infrared (NDIR) CO2 monitors. CO2 measurements should be used as a broad guide to ventilation within a space, rather than treated as "safe thresholds".

Outdoor levels are around 400ppm. A consistent indoor CO2 value of less than 800ppm is likely to indicate that a space is well ventilated.

	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	Legal requirements of the ADF are as follows: <table><tr><td>Ventilation</td><td>The supply and removal of air (by natural and/or mechanical means) to and from a space or spaces in a building, it normally comprises a combination of purpose-provided ventilation and infiltration</td></tr><tr><td>Requirement F1(1)</td><td>states the legal requirement that: "There shall be adequate means of ventilation provided for people in the building."</td></tr><tr><td>Requirement F1(2)</td><td>states the legal requirement that: "<i>Fixed systems for mechanical ventilation and any associated controls must be commissioned by testing and adjusting as necessary to secure that the objective referred to in subparagraph (1) is met.</i>"</td></tr><tr><td>Requirement F1(1) & (2)</td><td>Requirement F1 does not apply to a building or space within a building: (a) Into which people do not normally go; (b) Which is used solely for storage; or (c) Which is a garage used solely in connection with a single dwelling.</td></tr><tr><td>Regulation 39</td><td>Information about ventilation: (1) This regulation applies where paragraph F1(1) of Schedule 1 imposes a requirement in relation to building work (2) The person carrying out the work shall not later than five days after the work has been completed give sufficient information to the owner about the building's ventilation system and its maintenance requirements so that the ventilation system can be operated in such a manner as to provide adequate means of ventilation.</td></tr></table>	Ventilation	The supply and removal of air (by natural and/or mechanical means) to and from a space or spaces in a building, it normally comprises a combination of purpose-provided ventilation and infiltration	Requirement F1(1)	states the legal requirement that: "There shall be adequate means of ventilation provided for people in the building."	Requirement F1(2)	states the legal requirement that: " <i>Fixed systems for mechanical ventilation and any associated controls must be commissioned by testing and adjusting as necessary to secure that the objective referred to in subparagraph (1) is met.</i> "	Requirement F1(1) & (2)	Requirement F1 does not apply to a building or space within a building: (a) Into which people do not normally go; (b) Which is used solely for storage; or (c) Which is a garage used solely in connection with a single dwelling.	Regulation 39	Information about ventilation: (1) This regulation applies where paragraph F1(1) of Schedule 1 imposes a requirement in relation to building work (2) The person carrying out the work shall not later than five days after the work has been completed give sufficient information to the owner about the building's ventilation system and its maintenance requirements so that the ventilation system can be operated in such a manner as to provide adequate means of ventilation.
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		Regulation 42	Mechanical ventilation air flow rate testing (New Dwellings only) (1) This regulation applies where paragraph F1(1) of Schedule 1 imposes a requirement in relation to the creation of a new dwelling by building work. (2) The person carrying out the work shall, for the purposes of ensuring compliance with paragraph F1(1) a. ensure that testing of the mechanical ventilation air flow rate is carried out in accordance with a procedure approved by the Secretary of State; and b. give notice of the results of the testing to the local authority (3) the notice referred to in paragraph (2)(b) shall - a. record the results and the data upon which they are base in a manner approved by the Secretary of State; and b. be given to the local authority not later than five days after the final test is carried out.	
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	There are no educational or training programs mandated for building managers, facility operators or occupants concerning IAQ maintenance.		
	d. How are these code requirements monitored and enforced?	Not applicable.		

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- The Building Regulations 2010 – Approved Document F: Volume 2: Buildings other than Dwellings <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1082450/ADF2_revised.pdf>

Legislation and Regulations:

- Building Regulations 2010
- Building Safety Act 2022
- Environmental Protection Act 1990
- EH40/2005 Workplace exposure limits
- Clean Air Act 1993 (as updated by the Clean Air Regulations 2014)
- Housing Act 2004 (as amended by the Housing and Planning Act 2016)
- The Workplace (Health, Safety and Welfare) Regulations 1992 (Implemented through section 15 of The Health and Safety at Work Act 1974)

ANNEX 7 – FRANCE

Questions		Response
1.	Are there any public health policies or voluntary schemes in your jurisdiction concerning air quality in an indoor environment?	The Observatory of Indoor Air Quality (the “Observatory”) organizes measurement campaigns for the prevention and monitoring of indoor air quality by raising the awareness of professionals and informing the general public. On 16 May 2024, the Observatory became the Indoor Environments Quality Observatory (the “OQEI”), led jointly by ANSES and the Scientific and Technical Centre for Building (the “CSTB”)¹⁷. The OQEI covers a broad range of topics related to the comfort and health of people in indoor environments. More generally, it focuses on the quality of indoor living conditions including air and dust pollution, exposure to noise, artificial light and electromagnetic fields and thermal comfort. In addition, the French Agency for Food, Environmental and Occupational Health & Safety has published Indoor Air Quality Guidelines (“IAQGs”), and the Ministries of Environment and Health has launched the Indoor Air Quality Action Plan. Details of the OQEI, the IAQGs and the Indoor Air Quality Action Plan are set out below.
	a. When were they introduced?	1) Observatory: Created in 2001 at the initiative of the Ministry of Housing¹⁸ and became the OQEI on 16 May 2024. 2) IAQGs: Started in 2004 at the initiative of the French Agency for Food, Environmental and Occupational Health & Safety (“ANSES”). Based on its work, the ANSES published in 2007 a method for developing IAQGs. This method was later updated and refined in 2011 and in 2016, in light of the expertise gained since then.¹⁹ The setting of IAQGs is detailed in a new methodological guide published in 2025²⁰, and the methodological report assessing measurement methods was also updated in 2025²¹. 3) Indoor Air Quality Action Plan: Launched in 2013 by the Ministries of Environment and Health.
	b. Are they mandatory or voluntary?	1) OQEI : N/A.

¹⁷ <https://www.cstb.fr/en-us/all-the-news/indoor-environment-quality-observatory#>

¹⁸ <https://www.oqai.fr/fr/pages/qui-sommes-nous>.

¹⁹ <https://www.anses.fr/en/content/indoor-air-quality-guidelines-iaqgs>.

²⁰ <https://www.anses.fr/system/files/VS2020-SA-0019-RA.pdf>

²¹ <https://www.anses.fr/system/files/AIR-VSR2024-MPEX-0166-RA.pdf>

		2) IAQGs: As a general matter, IAQGs are not compulsory. However, three different levels of guidelines must be distinguished: • First, IAQGs are health targets to be achieved to protect human health. They are <u>indicative</u> and based exclusively on sanitary criteria, to the exclusion of economic feasibility criteria and any metrological consideration; • Based on the IAQGs, the French High Council for Public Health (“HCPH”) is responsible for developing management benchmarks, taking into account practical, regulatory, legal, and socio-economic considerations.²² An <u>indoor air quality benchmark value</u> corresponds to a concentration level of a pollutant above which <u>specific actions must be taken</u>. When it is higher than the IAQG, it can be considered as the maximum content of the pollutant in question for a provisionally acceptable air quality in the conditions of regular occupation of a room intended for housing or reception of the public; it must then evolve over the years towards the IAQG, which implies a constant effort of improvement over the long term. To date, the HCPH has published benchmark values for formaldehyde, benzene, naphthalene, trichloroethylene, perchloroethylene and particles;²³ • Finally, based on the opinions of the HCPH, “<u>regulatory</u>” IAQGs may be included in the Environmental Code and associated with <u>enforceable management measures</u>. As of today, only two regulatory IAQGs – for formaldehyde and benzene – have been introduced in the Environment Code.²⁴ 3) Indoor Air Quality Action Plan: The plan contemplates both compulsory and voluntary actions. Among the voluntary actions, the Ministry of Ecological Transition has notably set up a tool (so-called “Good air at home”) allowing households, through a series of simple questions, to get an initial assessment of the air quality in their home and to identify solutions to improve it, whether in terms of behaviour (opening windows, use of certain products).
	c. How do voluntary programs and public awareness campaigns complement mandatory IAQ regulations?	1) OQEI: The main objective of the OQEI is to improve knowledge of pollutants in indoor air and to provide public authorities with the necessary elements for risk assessment and management. To do so, the OQEI collects and produce data on pollutants and pollutants and the exposure of populations to indoor air pollution. • The OQEI organizes measurement campaigns to provide solutions adapted to the prevention and monitoring of indoor air quality by raising the awareness of professionals

²² <https://www.anses.fr/fr/system/files/AIR2013SA0136Ra.pdf>.

²³ <https://www.hcsp.fr/Explore.cgi/AvisRapportsDomaine?clefr=87>.

²⁴ Decree No. 2011-1727 of 2 December 2011. https://www.cerema.fr/system/files/documents/2021/02/g1512_art-qai_ceremaweb_vf.pdf.

		and informing the general public. The results and analyses of these campaigns are examined in depth by high-level experts from a wide range of disciplinary skills.²⁵ • In November 2020, the Observatory notably launched a national campaign to determine the evolution of air quality in homes in France (since the campaign conducted in 2003-2005) and search more specifically for emerging pollutants, endocrine disruptors and pesticides. • This campaign combines the measurement of more than 150 pollutants (fine particles, volatile organic compounds, pesticides, etc.) that may be present in indoor air and the administration of questionnaires. It is conducted on a representative sample of French homes drawn at random from among the households that voluntarily participated in the 2019 European Health Interview Survey. • The objective is to collect data to improve the knowledge on people's daily exposure in homes, to update the health reference values and to search for the contributions of indoor pollution among the characteristics of the environment, the building, the household and their domestic activities.²⁶ • Since 16 May 2024, the OQEI has been given expanded responsibilities. Its work now covers the overall indoor environment, including air quality, noise, light, electromagnetic fields and thermal comfort, to support public policy development and protect public health. 2) IAQGs: IAQGs are defined as "concentrations in air of a chemical substance below which no health effects or nuisances with a health impact are expected for the general population based on current knowledge".²⁷ IAQGs provide a health reference to protect the exposed population in indoor environments. Their objective is to enable public authorities to set thresholds and initiate management measures for managing the health risk represented by indoor air quality. As of today, a dozen pollutants in indoor air have been studied and now have IAQGs:²⁸ • Acetaldehyde (2014) • Ammonia (2021)
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²⁵ <https://www.igas.gouv.fr/IMG/pdf/2018-085R-OQualiteAir-D.pdf>.

²⁶ <https://www.oqei.fr/fr/campagnes-et-etudes/campagne-nationale-logements-2>.

²⁷ <https://www.anses.fr/fr/system/files/AIR2010sa0307Ra.pdf>

²⁸ <https://www.anses.fr/system/files/Tableau-VGAI-2026.pdf>

		• Hydrocyanic acid (2011) • Acrolein (2013) • Benzene (updated in 2024)²⁹ • Nitrogen dioxide (2013) • Ethylbenzene (2016) • Formaldehyde (updated in 2018) • Carbon monoxide (2007) • Naphthalene (2009) • Particulate matter (2010) • Trichloroethylene (updated in 2019) • Tetrachloroethylene (updated in 2024)³⁰ and its addendum (2011) • Toluene (2018) The development of IAQGs is based primarily on: • The description and analysis of health effects related to the pollutant via exposure to air. This involves drawing up the toxicological profile of the substance; • The choice of the critical effect and the mechanism of action to consider; • The synthesis of the guide values and toxicological reference values available in the literature.³¹ IAQGs are intended to be regularly revised, as was the case for formaldehyde in 2018 and trichloroethylene in trichloroethylene in 2019.
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²⁹ <https://www.anses.fr/sites/default/files/AIR2021MPEX0006Ra.pdf>

³⁰ <https://www.anses.fr/system/files/AIR2023MPEX0043Ra.pdf>

³¹ <https://www.igas.gouv.fr/IMG/pdf/2018-085R-OQualiteAir-D.pdf>.

		3) Indoor Air Quality Action Plan: This plan provides for short, medium and long term actions to improve air quality in enclosed spaces.³² The Plan has been progressively strengthened by the 4th National Environmental Health Plan (“NEHP4”)³³ for the period 2021-2025, which complements and extends its objectives, as well as by several regulatory developments, including the monitoring of indoor air quality in buildings hosting sensitive populations.³⁴ Among the actions outlined in the plan are: • the creation of a general public application to improve air quality in homes; • the implementation of air quality monitoring in certain establishments open to the public, including schools and nurseries; • the implementation of monitoring in places with specific pollution, such as underground railways; • the reduction of exposure to the main sources of indoor air pollution (deodorizing products: incense, candles, diffusers, cleaning products and furniture...), by working in particular on the information and labelling of these products; • the progressive ban on the use of perchloroethylene in dry cleaners; • the publication of guide values for indoor air; • the support for development of the profession of indoor environment consultant; • an annual assessment of ventilation systems, now including direct-reading CO₂ measurements; • a self-assessment of indoor quality at least every four years; • continuous pollutant monitoring campaigns at key stages in the building’s lifecycle.
	d. What is the level of participation?	1) OQEI: N/A. 2) IAQGs: N/A. 3) Indoor Air Quality Action Plan: Data not available.

³² https://solidarites-sante.gouv.fr/IMG/pdf/Plan_Qualite_de_l_air_interieur_octobre_2013.pdf.

³³ <https://sante.gouv.fr/IMG/pdf/pnse4.pdf>

³⁴ Decree No. 2022-1689 of 27 December 2022. Article R. 221-30 of the French environmental code. https://www.cerema.fr/fr/system/files?file=documents/2025/02/guide_qai_revise_fevrier2025_vf.pdf

	e. How closely do these policies align with international guidelines such as WHO?	1) OQEI: The OQEI's work is not expressly based on WHO guidelines, although the OQEI has an ongoing collaboration with the World Health Organization. As a general matter, the OQEI's work on indoor air quality has been pioneering at the international level.³⁵ 2) IAQGs: The work of the WHO dedicated specifically to indoor air is taken into account in the elaboration of the IAQGs. ANSES also carries out a critical analysis of the indoor air quality guidelines proposed by the WHO. 3) Indoor Air Quality Action Plan: Not expressly based on WHO guidelines.
	f. Have these policies evolved in response to public health crises (e.g., COVID-19)?	1) OQEI: No. 2) IAQGs: Not expressly. 3) Indoor Air Quality Action Plan: No.
	g. What are the typical pathways for policy development, including stakeholder involvement (NGOs, industry, health sectors)?	Policies on air quality are generally developed through a structured process combining scientific expertise, governmental coordination and stakeholder consultation. Institutions such as the ANSES and OQEI first assess risks and provide technical recommendations. On the basis, the relevant ministries draft policies or national plans. During the process, stakeholders including NGOs, industry representatives, local authorities and health professionals are typically consulted through working groups or public consultations. The measures are then adopted through national plans, legislation or regulations, and implemented by public authorities and relevant agencies.
2.	Are there any laws and regulations in your jurisdiction to regulate indoor air quality?	Yes. France has established a legal framework regulating indoor air quality. This mainly relates to: • the definition of regulatory indoor air guide values (see Section 1.c.2 above); • a general obligation in the construction code regarding air quality (see Section 3 below); • the implementation of a mandatory monitoring of the indoor air quality in certain establishments open to the public; and • the mandatory labelling of certain construction and decoration products.

	These last two obligations were initially introduced by the Law No. 2010-788 of 12 July 2010 on the national commitment to the environment (the “2010 Law”) and were then specified by decrees and orders. They are detailed in the following sections. This legal framework was updated by Decrees No. 2022-1689 and No. 2022-1690 of 27 December 2022, which amended the previous system of periodic mandatory measurements and replaced it with a broader indoor air quality management programme in certain public buildings. This includes: • periodic evaluation of ventilation systems, • implementation of action plans to improve indoor air quality, and • measurement campaigns only when required, particularly where problems are identified. These obligations are now mainly codified in the French Environment code in Articles R.221-30 et seq.
a. When were they introduced?	1) Mandatory monitoring of indoor air quality in establishments open to the public: The obligation to monitor indoor air quality in certain establishments open to the public was introduced in the Environment Code in 2010.³⁶ To implement this obligation, a progressive timetable has been established, as follows: • Crèches, nursery schools and elementary schools: from 1 January 2018; • Colleges, secondary schools, leisure centres: from 1 January 2020; • Other establishments: from 1 January 2023. The regulatory framework was reformed by Decree No. 2022-1689 of 27 December 2022, Decree No 2022-1690 of 27 December 2022, Order of 27 December 2022 amending the Order of 1 June 2016 on the procedures for monitoring indoor air quality in certain establishments open to the public, Order of 27 December 2022 setting out the conditions for carrying out direct-reading measurements of carbon dioxide concentration in indoor air for the purposes of the annual assessment of ventilation systems and Order of 27 December 2022 amending the Order of 1 June 2016 on the format and content of the report on the assessment of ventilation systems. Since 1 January 2023, the obligations primarily include:

		• assessment of ventilation systems (the first one should be carried out not later than 2024), • implementation of preventive measures, • targeted measurement campaigns where necessary, • the technical conditions and methodology for direct-reading measurements of indoor carbon dioxide (CO₂) concentrations used to assess the effectiveness of ventilation in certain public buildings, and the requirements for the preparation and presentation of the report assessing ventilation systems, including the information that must be documented following ventilation evaluations. 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: The compulsory labelling of building and furnishing products which emit substances into the surrounding air was introduced in the Environment Code in 2010. Since 1 January 2012, construction and decoration products intended for indoor use placed on the market must bear a label indicating their level of emission of volatile pollutants.³⁷
	b. What indoor environments and vulnerable populations are prioritized?	1) Mandatory monitoring of indoor air quality in establishments open to the public: There are specific indoor environments and vulnerable groups of people prioritized under this regulation: • Collective care establishments for children under six years of age (crèches, day-care centres, kindergartens, etc.); • Leisure centres; • First and second level educational or vocational training establishments; • Social and medico-social structures attached to health establishments; • Social and medico-social establishments providing care, accommodation or support to minors and young adults, including facilities for children with disabilities or those under child protection, as listed in Article L.312-1.I 1°, 2°, 4°, 6°, 7° and 12° of the French Social Action and Families Code. • Penitentiary establishments for juveniles, juvenile wards of prisons.³⁸

³⁷ Articles R221-22 to R221-28 of the Environment Code.

³⁸ Article R. 221-30 of the Environment Code.

		2) Mandatory labelling of building and decoration products with respect to volatile organic compound: The regulation concerns all construction and decoration products that are intended for indoor use. This includes floor, wall or ceiling coverings, partitions and false ceilings, insulation products, doors and windows, paints, and products intended for the installation or preparation of these products (varnishes, glues, adhesives, etc.).³⁹
	c. What legal requirements exist for IAQ monitoring, reporting, and public disclosure?	1) Mandatory monitoring of indoor air quality in establishments open to the public: The monitoring must be carried out by the owner or operator of the establishment⁴⁰. It includes: • An annual <u>evaluation of the means of ventilation of the buildings</u>; • A self-assessment of indoor air quality must be carried out at least every four years to identify and reduce pollution sources, ensure proper maintenance of ventilation systems, and limit occupants' exposure to pollutants arising from building materials, activities, maintenance work and cleaning operations; • A measurement campaign of regulated pollutants, carried out at key stages in the life cycle of the building that may affect indoor air quality; • The preparation of an action plan based on the annual assessment of ventilation systems, the indoor air quality self-assessment and the pollutant measurement campaigns, in order to improve indoor air quality. The action plan must be established no later than four years after the entry into force of the decree and updated where necessary to include corrective measures; • The ventilation assessment, self-assessment, pollutant measurement results and the associated action plan must be kept available to the prefect of the department where the establishment is located, who may require corrective measures where necessary; • Where no building owner can be identified, the obligation to monitor indoor air quality falls on the operator of the premises. Both the evaluation of the ventilation systems and a pollutant measurement campaign must be carried out by accredited organizations⁴¹. • The owner or operator must inform the people attending the establishment of the results of these assessments and measurements, within 30 days.

³⁹ Article R221-23 of the Environnement Code.

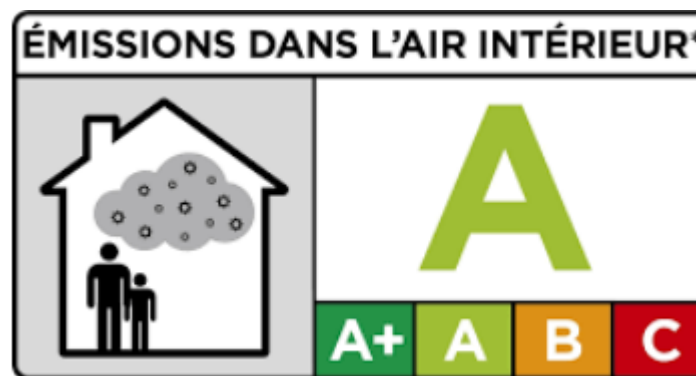
⁴⁰ Article R. 221-30 of the Environment Code.

⁴¹ Article R221-31 of the French Environnement Code

- The last two ventilation assessment reports and the analysis of pollutant measurements must be retained by the owner or operator and made available to state officials.

2) **Mandatory labelling of building and decoration products with respect to volatile organic compound**

Products must be labelled with an official label, including a pictogram accompanied by a large letter showing their emission class (A+, A, B or C) (reproduced below). This letter indicates the level of emissions of volatile pollutants in the air inside a room, ranging from A+ (very low emissions) to C (high emissions).



- a. The labelling focuses on volatile organic compound (VOC) emissions and the impact they have on indoor air quality once the product is in the room. The labelling refers to the pollutants emitted once the products are spread and dry, and not to the pollutants that may be released when the containers are opened or during application.

The labelling does not concern chemical substances classified as carcinogenic, mutagenic and toxic to reproduction as these are subject to parallel and complementary regulations, with an outright ban. This concerns trichloroethylene, benzene, dibutyl phthalate and bis (2-ethylhexyl), which were banned from use in building materials and decorative products in 2009.

d. Are continuous or periodic IAQ monitoring technologies (e.g., sensors, real-time reporting) mandated?

No. French law does not generally mandate the use of continuous indoor air quality (IAQ) monitoring technologies or real-time reporting systems.

	e. What government bodies are responsible for developing, implementing, and reviewing IAQ policies?	1) Mandatory monitoring of indoor air quality in establishments open to the public: The General Directorate for Risk Prevention, the General Directorate of Housing, Urban Planning and Landscapes, and the General Directorate of Health (all being State government departments). 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: The General Directorate of Housing, Urban Planning and Landscapes, the General Directorate for Risk Prevention, the General Directorate of Competitiveness of Industry and Services and the General Directorate of Health (all being State government departments).
	f. What are the objectives and parameters? Are there guidelines or mandatory measures?	1) Mandatory monitoring of indoor air quality in establishments open to the public: • Objectives and parameters: ○ The objective is to better manage indoor air quality in establishments open to public and reduce exposure to substances of concern. • Guidelines or mandatory measures: ○ The monitoring must be carried out every seven years by the owner or operator of the establishment. See Section 2.c.1 above for further details. 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: • Objectives and parameters: ○ The objective is to provide consumers with transparent information that can constitute a new selection criterion for the use of construction and decoration materials, by allowing them to select products that are the least harmful for their indoor environment. Project owners (especially local authorities) can also take into account indoor air quality as a criterion in their calls for tender for the construction or renovation of buildings. ○ The choice was made to oblige the manufacturer to inform the consumer and not to ban certain products. By opting for labelling, the best performing products are highlighted, with expected benefits in terms of innovation and a long-term improvement in the quality of products available on the market.⁴²

		○ The labelling of products is one of the axes of the Indoor Air Quality Action Plan. This axis provided for an extension of the labelling obligations, notably to the most common cleaning products, as well as to candles and incense, but also to furniture, especially children's furniture. To date, these obligations have however not yet been implemented.⁴³ • Mandatory measures: see Section 2.c.2 above.
	g. How do laws address ventilation requirements and standards, including minimum ventilation rates?	French law addresses ventilation requirements mainly through building regulations (see section 3 below). It also provides a framework for certain establishments open to the public under Articles R.221-30 to R.221-37 of the French Environment Code (see Section 2.a) to c) above). Operators of these establishments must carry out an annual assessment of ventilation systems, including verification of ventilation equipment and direct-reading measurements of indoor carbon dioxide (CO₂) concentrations to assess air renewal conditions. The technical conditions for CO₂ measurements used to evaluate ventilation performance are defined by the Order of 27 December 2022 setting out the conditions for direct-reading measurements of indoor carbon dioxide concentration. This Order specifies the technical characteristics of the measurement devices (e.g., non-dispersive infrared sensors with a measurement range of at least 0–5,000 ppm), the verification of device calibration prior to measurement, and the conditions under which measurements must be carried out (including a monitoring period of at least two hours under normal occupancy conditions). The order also provides indicative thresholds for interpreting ventilation performance: a CO₂ concentration below 800 ppm indicates satisfactory air renewal, while concentrations above 1,500 ppm indicate insufficient ventilation and require corrective actions to restore adequate air renewal. Although these thresholds do not establish binding minimum ventilation rates, they provide operational reference values for assessing ventilation effectiveness in occupied spaces.
	h. What regulations exist regarding HVAC system design, operation, maintenance, and filtration?	French law addresses HVAC requirements mainly through building regulations (see section 3 below), but also public health, fire safety and energy-efficiency regulations. This includes:

		• Ventilation requirements for buildings are mainly set out in the Order of 24 March 1982 on the aeration of dwellings, which requires permanent general ventilation (natural or mechanical) to ensure adequate air renewal in residential buildings. • For buildings open to the public, HVAC installation and design are also governed by the fire safety regulation for ERP, which includes technical provisions on heating, ventilation and air-conditioning systems (Order of 25 June 1980). French legislation generally does not prescribe specific filtration technologies but requires ventilation systems to ensure adequate air renewal and healthy indoor air conditions, with technical specifications typically defined through professional standards and building regulations.
i.	Are there legal provisions for moisture and humidity control to prevent microbial contamination?	French law does not contain a single regulatory framework specifically addressing moisture and humidity control to prevent microbial contamination. However, several legal provisions indirectly address this issue through housing health standards, ventilation requirements and public health regulations. This includes: • The French Public Health Code⁴⁴ requires dwellings to meet minimum sanitary conditions and not present risks to occupants' health, including risks linked to dampness and mould. Local authorities may take enforcement measures where buildings present health hazards (e.g. insalubrity). • Decree No. 2002-120 of 30 January 2002 on decent housing requires housing to ensure adequate ventilation and protection against water infiltration or excessive humidity that could affect occupants' health. • Moisture control is also addressed through ventilation rules, notably the Order of 24 March 1982 on the aeration of dwellings, which requires permanent general ventilation to remove humidity and indoor pollutants. • Under the IAQ monitoring framework introduced by the 2010 Law and subsequent implementing regulations, certain public buildings (e.g. schools and childcare facilities) must assess ventilation and implement corrective measures where indoor air quality problems, including those linked to moisture, are identified (see Section 2. a) to c)).
j.	How do laws regulate building materials, furnishings, and construction practices to limit VOCs and pollutants?	France regulates emissions of volatile organic compounds (VOCs) from building materials primarily through mandatory product labelling and product safety regulations, combined with broader IAQ policies.

		France introduced a compulsory labelling scheme for construction and decoration products that emit pollutants into indoor air under Article L.221-10 of the French Environment Code (see section 2 a) to c) above). Certain chemicals used in building products are also restricted under EU chemicals legislation (e.g. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)), which apply directly in France and limit the presence of hazardous substances that may contribute to indoor pollution. French IAQ regulations for certain public buildings (e.g. schools and childcare facilities), introduced by the 2010 Law require building managers to monitor indoor air quality and take corrective measures where pollutants such as formaldehyde or benzene are detected, which may involve replacing materials or furnishings emitting pollutants (see Section 2. a) to c)).
	k. How does the legislation integrate occupant comfort factors such as noise and airflow patterns?	Acoustic comfort is regulated through specific building acoustic requirements under the French housing and building Code and related regulations. The Order of 30 June 1999 relating to the acoustic characteristics of residential buildings for instance establishes minimum sound insulation requirements and limits noise generated by building equipment, including ventilation systems. In addition, the French Public Health Code⁴⁵ contains general provisions aimed at preventing noise nuisances that may affect occupants' health.
	l. Are energy efficiency goals included to balance IAQ and sustainability?	Yes. French legislation integrates energy efficiency objectives in building regulation, while maintaining requirements related to ventilation and indoor air quality (IAQ). This includes: • Energy efficiency in buildings is primarily governed by the Energy Performance Regulations (RE2020), which apply to new buildings and aim to reduce energy consumption and greenhouse gas emissions while maintaining adequate indoor environmental quality, including ventilation. RE2020 replaced the previous RT2012 and incorporates requirements relating to building insulation, energy systems and ventilation performance. • Energy efficiency objectives are also reflected in inspection and maintenance requirements for heating and air-conditioning systems, introduced notably by Decree No. 2020-912 of 28 July 2020, which requires periodic inspections to improve the energy performance of HVAC installations.

	m. How are IAQ laws incorporated within occupational health and safety frameworks?	In France, IAQ in workplaces is primarily regulated through the occupational health and safety framework set out in the French Labour Code. Employers have a general obligation to ensure the health and safety of workers, including risks related to air quality⁴⁶. The Labour Code includes specific provisions requiring adequate ventilation in workplaces to maintain healthy air conditions. Articles R.4222-1 et seq. require employers to ensure sufficient air renewal and limit exposure to pollutants, dust, fumes and vapours. Ventilation systems must be designed so that air quality does not pose a risk to workers' health. Where hazardous substances are present, employers must also implement collective protection measures, such as extraction or filtration systems.
	n. What exemptions or exclusions exist, and what is their rationale?	1) Mandatory monitoring of indoor air quality in establishments open to the public: The regulation excludes premises with specific pollution mentioned in article R. 4222- 3 of the Labour Code. Since Decree No 2022-1689 of 27 December 2022, indoor physical activity and sports establishments where aquatic, bathing or swimming activities are practiced are no longer included in this regulation. 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: The regulation does not apply to products composed exclusively of untreated glass or untreated metal, nor to locks, fittings or screws.
	o. Is there a review process, and what mechanisms exist to update laws based on new scientific evidence?	1) Mandatory monitoring of indoor air quality in establishments open to the public: Yes. When, for at least one pollutant measured, the results of the assessments carried out exceed the reference values, the owner or operator of the establishment is required, at his own expense and within two months, to have an expert assessment carried out in order to identify the sources of pollution and to provide the elements necessary for the choice of permanent corrective measures adapted to the pollution. If the expert assessment is not carried out, the prefect may order it to be carried out at the owner's or operator's expense.⁴⁷ 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: The system is self-declaring in order to reduce the burden on companies. It leaves the person responsible for placing the product on the market free to determine the class to which the product belongs. The manufacturer is responsible for the accuracy of the information on the label. Inspections and control measures are however carried out to ensure compliance

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Article L4121-1 et seq. of French Labour Code

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Article R221-36 of the Environment Code.

		with the regulation. ⁴⁸ The list of volatile pollutants to be taken into account to characterize the emission of the product is determined among the pollutants targeted by the World Health Organization, on the basis of their risks of toxicity by inhalation and their frequency of occurrence in buildings. ⁴⁹
	p. How are IAQ regulations enforced? What penalties or incentives apply?	1) Mandatory monitoring of indoor air quality in establishments open to the public: There are no incentives as the framework is mandatory. On the other hand, there are penalties. The Environment Code indeed imposes a fine of up to 1,500 euros to the owner or operator of the establishment⁵⁰ (or 7,500 euros if the owner or operator is a legal person⁵¹), up to 3,000 euros in case of repeat offence (or 30,000 euros if the owner or operator is a legal person⁵²) in case of: • failure to carry out the mandatory periodic monitoring or the required assessment in the event that a reference value is exceeded; • failure to submit the assessment report or failure to carry out the assessment within the required time limits; • carrying out an assessment, sampling or analysis without the required accreditation.⁵³ Specific state agents – so-called « environmental inspectors » -- are responsible for implementing the regulatory framework and investigate and record any violations of it.⁵⁴ 2) Mandatory labelling of building and decoration products with respect to volatile organic compound: Failure to affix the label is punishable, for the person responsible for making the product available on the market, by a 1,500 euros fine (or 7,500 euros if the owner or operator is a legal person⁵⁵), up to 3,000 euros in case of repeat offence (or 30,000 euros if the owner or operator is a legal person⁵⁶).⁵⁷

⁴⁸ <https://www.ecologie.gouv.fr/politiques-publiques/etiquetage-produits-construction>
⁴⁹ Article R221-27 of the Environment Code.
⁵⁰ Article R226-15 of the Environment Code and Article 131-13 of French Criminal Code
⁵¹ Article 131-38 of French Criminal Code
⁵² Article 132-15 of French Criminal Code
⁵³ Article R226-15 of the Environment Code.
⁵⁴ Article L172-1 of the Environment Code.
⁵⁵ Article 131-38 of French Criminal Code
⁵⁶ Article 132-15 of French Criminal Code
⁵⁷ Article R. 226-14 of the Environment Code.

3.	Are there any requirements about IAQ in the building codes in your jurisdiction? If yes, what are the requirements for new constructions and existing premises respectively	Yes, article L. 153-1 and seq. of the French housing and building Code specify expressly that buildings shall be conceptualised, built and maintained by preserving the quality of indoor air. Article R.171-1 and seq of the same Code provide for a definition of the notion of “energy exemplarity”
	a. What are the requirements for new constructions versus existing premises?	Since 1 July 2021, for residential premises (newly built or existing – except if expressly exempted) to permanently house a heating or domestic hot water production appliance with a power rating of 70 kilowatts or less and using solid, liquid, or gaseous fuels, the following must be provided for during construction; 1° A permanent direct or indirect air inlet if the appliance uses part of the air in the room in which it is installed for combustion; 2° A system for evacuating combustion products to the outside that meets technical and safety requirements and is suitable for the use, type of appliance, and fuel for which it is intended. This is not applicable to premises intended to house appliances with sealed combustion circuits which, by their design, incorporate the combustion air supply circuit and which discharge combustion products to the outside without any risk of leakage into the interior of the living quarters. For multi-unit residential buildings, controlled mechanical ventilation systems to which appliances using combustible gas or liquefied hydrocarbons are connected must be equipped with a collective safety device. If there is any carbon monoxide poisoning, the system of heating or hot water production causing such poisoning must be just down and restored properly. It is worth noting that the obligations to have ventilation in the residential premises has existed since the 1950s with various evolutions throughout, so the obligations implemented in 2021 are not entirely new. The codification of the obligation to take into account air quality is new and dates back only from 2021 however.
	b. Are there mandatory ventilation rates, filtration standards, or design criteria specified?	No. Technical standards are applicable, but they are not codified. They are also mostly related to environmental improvement requirements rather than directly related to IAQ.
	c. Are educational or training programs mandated for building managers, facility operators, or occupants concerning IAQ maintenance?	No. There are leaflets that have been produced by various associations.
	d. How are these code requirements monitored and enforced?	They are mostly enforced where there is a specific issue coming up, as there is no monitoring. Parties may contact the city hall, which usually have a dedicated service for this type of issue.

		The fine for noncompliance is of EUR 450 per person and EUR 2,250 per legal person
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