

# Striving for excellent indoor air quality—the Hong Kong experience<sup>1</sup>

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## ABSTRACT

To promote good indoor air quality (IAQ) and public awareness of its importance, the HKSAR Government has implemented an Indoor Air Quality Management Programme since 2000. This paper gives an overview of the programme and the progress made to date. It also gives a brief account of the voluntary Indoor Air Quality Certification Scheme for Offices and Public Places promulgated by the government in September 2003, to promote and recognize good IAQ management practices in these buildings.

## INDEX TERMS

Guidelines; IAQ assessment; Office buildings; Government buildings; Certification scheme; Public places; Public transport facilities

## INTRODUCTION

Most of us spend the majority of our time indoors--whether inside the vehicles, offices, restaurants, shopping malls or homes. Good indoor air quality (IAQ) helps us reach our full potential for good health and productivity. On the other hand, poor indoor air quality has a direct impact upon our health, workplace productivity, staff turnover and industrial relations. Like poor outdoor air quality, poor indoor air quality also weakens our competitiveness in attracting overseas investors to set up offices in Hong Kong.

The HKSAR Government has committed to implementing an Indoor Air Quality Management Programme to promote good IAQ and public awareness of its importance. A consultancy study on 'Indoor Air Quality in Offices and Public Places' was completed towards the end of 1997. Based on the findings and recommendations of the study, we drew up in late 1999 a proposed IAQ Management Programme and consulted the public on it via a consultation paper. Taking into consideration comments received during the consultation exercise, we have revised the IAQ Management Programme for improving the IAQ of our indoor environment as follows:

- (a) Launching a public education and publicity campaign to promote public awareness of IAQ.
- (b) Setting up an IAQ Information Centre to disseminate information and reference materials related to IAQ.
- (c) Adopting a set of IAQ objectives as a common benchmark for evaluating and assessing IAQ.
- (d) Publishing a set of Guidance Notes for the better management of IAQ in offices and public places.

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<sup>1</sup> The opinions in this paper represent the views of the authors and not necessarily those of the HKSAR Government

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- (e) Promulgation of a voluntary IAQ certification scheme and to invite owners and management of premises including government buildings to participate in the scheme.
- (f) Conducting a review of legislative framework for the control of IAQ in parallel with the implementation of the voluntary IAQ certification scheme.
- (g) Publishing a set of professional practice notes for air-conditioned public transport facilities.

### **PROGRESS MADE**

The subject of IAQ is complex not only from a technical point of view, but also from an administrative point of view. The many factors to be taken into consideration and strategies required to maintain good IAQ cover a variety of disciplines such as public health, occupational hygiene, employment practice, engineering standards, building management and government department responsibilities. To better coordinate the various activities and programmes related to IAQ, the HKSAR Government has set up an inter-departmental IAQ Management Group to monitor the development and implementation of the IAQ programme. The IAQ Management Group consists of Environment, Transport and Works Bureau, Education and Manpower Bureau, Health, Welfare and Food Bureau, Architectural Services Department, Buildings Department, Customs and Excise Department, Department of Health, Electrical and Mechanical Services Department, Environmental Protection Department, Fire Services Department, Food and Environmental Hygiene Department, Housing Department and Labour Department.

### **Launching a Public Education and Publicity Campaign to Promote Public Awareness of IAQ**

Public education and publicity campaign have been organized to enhance public awareness of the importance of IAQ, including a series of publicity pamphlets designed to educate the public about the adverse health effects of pollutants and offer practical advice on how to minimize exposure. Nine publicity pamphlets and two booklets on various IAQ issues have been published so far.

### **Setting up an IAQ Information Centre to Disseminate Information and Reference Materials Related to IAQ**

The IAQ Information Centre at the Hong Kong Productivity Council Building, Kowloon Tong, has been opened since January 2001. It serves to provide information to the general public and the professional on IAQ and its management as well as to display products and technologies that can help improve IAQ. It also serves as the focal point for registration of the IAQ certificates and public enquiry about the IAQ Certification Scheme. The Centre is well patronized, and more than 20 000 visitors have visited the Information Centre. A Cyber Centre (<http://www.iaq.gov.hk>) has also been set up over the web to facilitate the public to access to IAQ-related information through the Internet and over 107 000 hits were recorded since operation.

### **Adopting a Set of IAQ Objectives as a Common Benchmark for Evaluating and Assessing IAQ**

A set of two levels of IAQ objectives (i.e. 'Excellent Class' and 'Good Class') has been established to act as the common benchmark for evaluating and assessing IAQ. 'Excellent Class' represents very good IAQ that a high-class and comfortable building should have and 'Good Class' represents a good IAQ level that provides due protection to the public at large,

including the very young and the aged. The finalized IAQ objectives (see Table 1) are comparable to the international standards and allow flexibility to encourage building owners and management to go for the best IAQ.

**Table 1** IAQ Objectives for Offices and Public Places

Parameter	Unit	8-hour average	
		‘Excellent Class’	‘Good Class’
Room temperature	°C	20 to < 25.5	< 25.5
Relative humidity	%	40 to < 70	< 70
Air movement	m/s	< 0.2	< 0.3
Carbon dioxide (CO <sub>2</sub> )	ppmv	< 800	< 1000
Carbon monoxide (CO)	µg/m <sup>3</sup>	< 2000	< 10 000
Respirable suspended particulates (PM <sub>10</sub> )	ppmv	< 1.7	< 8.7
	µg/m <sup>3</sup>	< 20	< 180
Nitrogen dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	< 40	< 150
	ppbv	< 21	< 80
Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	< 50	< 120
	ppbv	< 25	< 61
Formaldehyde (HCHO)	µg/m <sup>3</sup>	< 30	< 100
	ppbv	< 24	< 81
Total volatile organic compounds (TVOC)	µg/m <sup>3</sup>	< 200	< 600
	ppbv	< 87	< 261
Radon (Rn)	Bq/m <sup>3</sup>	< 150	< 200
Airborne bacteria	cfu/m <sup>3</sup>	< 500	< 1000

### **Publishing a Set of Guidance Notes for the Better Management of IAQ in Offices and Public Places**

We published a set of draft Guidance Notes entitled ‘Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places’ in late 1999 to provide comprehensive guidelines for the total management of IAQ. It is designed to define and specify the procedures, measures and methodologies for evaluating IAQ and achieving the IAQ objectives, and enable owner/management of premises/building to prevent and manage most of the common IAQ problems encountered in buildings in Hong Kong. We have revised the Guidance Notes in the light of comments received. The final version of the Guidance Notes (Indoor Air Quality Management Group of the HKSAR Government, 2003a) was published in September 2003 and is available for downloading from the IAQ Information Centre website.

### **Promulgation of a Voluntary IAQ Certification Scheme and to Invite Owners and Management of Premises Including Government Buildings to Participate in the Scheme**

The Certification Scheme is designed for buildings or premises used as offices or public places (such as shopping malls, public libraries, cinemas, restaurants, etc.) that are served by mechanical ventilation and air-conditioning systems. An ‘Excellent Class’ or ‘Good Class’ IAQ certificate will be issued to the premises by the competent examiner employed for the certification work if the IAQ of the buildings or selected locations meets the respective IAQ objectives. The Certification Scheme aims to recognize good IAQ management practices and provide incentives for owners of premises/buildings or property management companies to

pursue the best level of IAQ.

Key features of the Certification Scheme include:

- a voluntary and self-regulatory approach is adopted;
- two-levels of IAQ objectives ('Excellent Class' and 'Good Class', see Table 1) are provided to suit the needs of different premises/buildings;
- an IAQ certificate is available for display in the premises to inform occupants and the public;
- an owner can choose to certify the entire building or selected location(s); and
- continuous efforts are required to maintain post-certification IAQ.

The followings are the steps that should be taken to participate in the Certification Scheme:

- owner/management of premises/building to engage a competent examiner;
- competent examiner to carry out a walk-through inspection to check if the premises/building have any IAQ problem;
- owner/management of the premises/building to rectify the IAQ problems with the assistance of the competent examiner, if any;
- competent examiner to conduct IAQ measurement and carry out remedial action if necessary;
- competent examiner to certify the premises/building in compliance with IAQ objectives;
- owner/management of the premises/building to send to the Indoor Air Quality Information Centre the certificate for registration and a copy of the certification report for record;
- Indoor Air Quality Information Centre to return the certificate to owner/management of the premises/building with a registration number for display in a prominent location for the public information;
- owner/management of the premises/building to manage post-certification IAQ; and
- owner/management of the premises/building to initiate annual re-certification.

The application procedures are summarized in a flowchart in Annex A.

Good IAQ in offices and public places could enhance comfort level of the occupants, increase productivity of the workers and attract more tenants or customers. By participating in the certification scheme, the efforts of the owner/management of the premises/building in achieving good IAQ will be publicly recognized. It will also help develop a partnership among all parties concerned in the premises in maintaining a pleasant indoor environment. A guidebook titled 'A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places' was published in September 2003 to set out all the administrative and technical requirements of the scheme (Indoor Air Quality Management Group of the HKSAR Government, 2003b). In addition, a video explaining the details on how to join the scheme has been produced to facilitate potential applicants to participate in the scheme (Indoor Air Quality Management Group of the HKSAR Government, 2003c).

### **Conducting a Review of Legislative Framework for the Control of IAQ in Parallel with the Implementation of the Voluntary IAQ Certification Scheme**

In parallel with the implementation of the voluntary IAQ Certification Scheme, the Government will review the need for legislative measures for the control of IAQ in the light of the experience in the operation of the Certification Scheme for offices and public places and overseas practices.

**Publishing a Set of Professional Practice Notes for Public Transport Facilities**

To improve the air quality in public transport facilities such as railways, air-conditioned buses and ferries, we have developed a set of the professional practice notes for improving IAQ in these facilities. The practice notes will provide guidelines on the practical measures that could be taken to keep the air quality inside public transport facilities, clean and pleasant. Our plan is to introduce the two practice notes for railways and buses later this year. We will further discuss with the ferry operators on the practice notes for ferries so that we can issue the practice notes for ferries by 2004.

The practice notes do not cover other air-conditioned public transport like public light buses, taxis, private school light buses and private estate buses, etc. The reason is that the practice notes are for transport facilities with large passenger capacity, and with a team of professionals taking care of the fleet. Nonetheless, to enhance the public's awareness of the air quality in these small vehicles (including private cars), an educational leaflet entitled 'In-vehicle Air Quality' was prepared in March 2002 for distribution to the public. This leaflet provides advice to vehicle owners/operators and passengers on how to improve air quality inside the vehicle compartments.

**WAY FORWARD**

We will continue to promote the importance of IAQ and review what improvements should be made with reference to the operation experience of the voluntary IAQ Certification Scheme for Offices and Public Places and overseas practices.

**REFERENCES**

- Indoor Air Quality Management Group of the HKSAR Government (2003a). *Guidance Notes for the Management of Indoor Air Quality for Offices and Public Places*.
- Indoor Air Quality Management Group of the HKSAR Government (2003b). *A Guide for Indoor Air Quality Certification Scheme for Offices and Public Places*.
- Indoor Air Quality Management Group of the HKSAR Government (2003c). *Striving for Excellent Indoor Air Quality* (in CD-ROM).

## Annex A

Flow chart for application procedure

