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TECHNICAL REFERENCE

Use of technologies and processes for safe management measures



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**Use of technologies and processes for safe
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Association of Property and Facility Managers
Building and Construction Authority
C&W Services
Housing and Development Board
JTC Corporation
National Environment Agency
National University Health System
Ngee Ann Polytechnic
Singapore International Facility Management Association
Singapore Polytechnic

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Foreword

This Technical Reference (TR) was prepared by the Working Group on Use of Technologies and Processes for Safe Management Measures set up by the Technical Committee on Building Maintenance and Management under the purview of BCSC.

This TR introduces safe management and operations measures and practices to ensure the health, wellness and safety of occupants and visitors in the work environment during a pandemic.

This TR provides a comprehensive overview on various issues relating to safe management measures and practices to enable the occupants and workers to continue to occupy and work in a safe environment.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

It is presupposed that in the course of their work, users will comply with all relevant regulatory and statutory requirements. Some examples of relevant regulations and acts are listed in the Bibliography. The Singapore Standards Council and Enterprise Singapore will not be responsible for identifying all of such legal obligations.

In preparing this TR, reference was made to the following publications:

1. Advisory for Phase 3 Re-opening of retail establishments and lifestyle-related services
2. ANSI/ASHRAE Standard 188-2018 Legionellosis: Risk management for building water systems
3. ASHRAE Exhaust re-entrainment guide
4. ASHRAE Guideline 36-2018 High-performance sequences of operation for HVAC systems
5. ASTM E2721-16 Standard practice for evaluation of effectiveness of decontamination procedures for surfaces when challenged with droplets containing human pathogenic viruses
6. ASTM E3179-18 Standard test method for determining antimicrobial efficacy of ultraviolet germicidal irradiation against influenza virus on fabric carriers with simulated soil
7. ICNIRP Guidelines on limits of exposure to ultraviolet radiation of wavelengths between 180 nm and 400 nm (incoherent optical radiation)
8. IEC 62471-6:2006 Photobiological safety of ultraviolet lamp products
9. ISO/CIE 20086:2019 Light and lighting – Energy performance of lighting in buildings
10. ISO 13482:2014 Robots and robotic devices – Safety requirements for personal care robots
11. SS 553:2016 Code of practice for air-conditioning and mechanical ventilation in buildings
12. SS 554:2016 Code of practice for indoor air quality for air-conditioned buildings
13. SS 636:2018 Code of practice for water services

Acknowledgement is made for the use of information from the above publications.

This TR is expected to be used by facility managers and owners who wish to organise their resources and manpower more effectively and ensure the safety and well-being of the employees and workers.

Attention is drawn to the possibility that some of the elements of this TR may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

- 1. Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "Mature Standards". Mature Standards will not be subject to further review, unless there are requests to review such standards.*
- 2. An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*
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Use of technologies and processes for safe management measures

0 Introduction

This Technical Reference (TR) covers the various aspects of the management of buildings and facilities to minimise adverse health impacts on occupants and visitors in that environment during a pandemic. Safe management requires a wide range of measures spanning different domains and requires the co-operation of different departments in an organisation.

This document includes specifications on the design, operation and maintenance of various mechanical and electrical (M&E) systems e.g. ventilation, air-conditioning, indoor air quality, plumbing and sanitary system(s) as well as hygiene and cleanliness. In addition, recommendations on good practices on space utilisation, design and interior layout for safe distancing, emergency preparedness, procedures for shutdown and re-occupation of buildings will also be provided. Suggestions are also given where technology can be leveraged to implement these measures.

During a pandemic, advisories from various authorities are typically issued to provide guidance on issues within the domain of the authority. This document collates and summarises information spanning across different authorities and refers to existing standards that address issues relating to safe management procedures to provide building, operations and human resource managers with a convenient and comprehensive overview. Where necessary, this TR contextualises and adapts from available literature to local conditions for different types of pandemics.

In this standard, the following verbal forms are used:

- “shall” indicates a requirement;
- “should” indicates a recommendation;
- “can” indicates a possibility or a capacity; and
- “may” indicates a permission.

1 Scope

This TR covers the following three main areas where safe management measures are to be implemented:

- a) Building design and services - focuses on buildings and facilities that house occupants working within the built environment and premises where visitors and contractors may enter for business-related activities, i.e. commercial buildings, office complexes and mixed-used developments. Residential buildings or residential sections in mixed-used developments are not within the scope of this TR; neither are buildings and facilities under construction. However, the points may be useful in guiding the planning and design of buildings so that they can be ready for pandemic-time operations without much modifications to the structure and/or facilities of such buildings. This TR describes adaptations to be made in the built environment(s) in order to facilitate safe management measures.
- b) Cleaning, management and operations - provides suggestions that can be applicable to pandemics caused by viruses or bacteria, air-borne or water-borne. The hygiene and cleanliness of premises are also important elements in preventing the spread of pathogens. Best practices for cleaning and cleaning management procedures are recommended. This includes guidelines on the frequency of cleaning and the appropriate use of disinfectants.

There are a number of benefits in the use of cleaning robots and other cleaning technologies in times of a pandemic. Such use is not currently covered in published standards. Hence, recommendations are made on how these technologies should be applied and the precautions to be taken prior to their deployment.

The management and operational aspects of introducing safe management measures are also discussed and good practices recommended. In order to reduce physical contact and deployment of manpower, the TR also recommends ways of applying technologies that can help, such as types of access control, motion sensors and contactless devices.

- c) Emergency preparedness and re-occupation - touches on how organisations and entities can prepare for such emergencies in order to minimise disruption to business operations. It also looks into the preparations required to re-open and occupy the building and facilities after a period of non-occupation or partial occupation.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13482	Robots and robotic devices—Safety requirements for personal care robots
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