

SS 548: 2009

(ICS 13.340.30)

## **SINGAPORE STANDARD**

# Code of practice for selection, use and maintenance of respiratory protective devices

(Formerly CP 74)



Published by



**SS 548 : 2009** (ICS 13.340.30)

#### SINGAPORE STANDARD

# Code of practice for selection, use and maintenance of respiratory protective devices

All rights reserved. Unless otherwise specified, no part of this Singapore Standard may be reproduced or utilised in any form or by any means, electronic or mechanical, including photocopying and microfilming, without permission in writing from Enterprise Singapore. Request for permission can be sent to: standards@enterprisesg.gov.sg.

This Singapore Standard was approved by the General Engineering and Safety Standards Committee on behalf of the Standards Council of Singapore on 6 August 2009.

First published as CP 74, 1998

First revision and re-numbered as SS 548, 2009

The General Engineering and Safety Standards Committee appointed by the Standards Council consists of the following members:

		Name	Capacity	
Chairman	:	Mr Chan Yew Kwong	Member, Standards Council	
Secretary	:	Ms Shareen Chan	SPRING Singapore	
Members	:	Mr Joseph Ang Dr Kenneth Choy Mr Fang Koh Look Assoc Prof Foo Swee Cheng Assoc Prof Hoon Kay Hiang Mr Lim Meng Ann Mr Lim Poo Yam Mr Lim Tee Yoke Mr Ng Chun Tat Mr P K Raveendran Mr Seet Choh San Mr Jacob Soh	Association of Small and Medium Enterprise Ministry of Manpower Institution of Engineers Singapore National University of Singapore Nanyang Technological University Workplace Safety and Health Council Land Transport Authority Building and Construction Authority Housing & Development Board Association of Singapore Marine Industries Singapore Institution of Safety Officers Society of Loss Prevention In the Process Industries	
		Mr Wong Choon Kin Mr Eugene Yong Kon Yoon	Singapore Manufacturers' Federation Singapore Contractors Association Limited	

The Technical Committee on Personal Safety and Health appointed by the General Engineering and Safety Standards Committee and responsible for the preparation of this standard consists of representatives from the following organisations:

		Name	Capacity	
Chairman	:	Assoc Prof Foo Swee Cheng	Member, General Engineering and Safety Standards Committee	
Secretary	:	Ms Barbara Bok	SPRING Singapore	
Members	:	Mr Chan Chee Cheong	Singapore Manufacturers' Federation	
	Assoc Prof Chew Chye Heng National University of Singapore		National University of Singapore	
		Ms Veronica Chow	Ministry of Manpower	
		Mr Patrick Ker	Singapore Association of Occupational Therapists	
		Mr Frederick Khoo	Singapore Contractors Association Limited	
		Mr Seah Chong An	TÜV SÜD PSB Pte Ltd	
		Mr Seah Liang Bing	Singapore Institution of Safety Officers	
		Mr Derek Sim	Association for Singapore Marine Industries	
		Mr Bhupendra Singh Baliyan	Institution of Engineers Singapore	
		Mr Sundara Vadivel	Ergonomics Society of Singapore	
		Mr Yusoof Aynuddin	SETSCO Services Pte Ltd	

SS 548: 2009

The Working Group appointed by the Technical Committee to assist in the preparation of this standard comprises the following experts who contributed in their *individual capacity*:

#### Name

Convenor : Dr Lee Lay Tin

Members : Mr Raymond Boh Siw Yong

Dr Chia Sin Eng Mr Chow Choy Wah Ms Khaw Xinhui Mr Albert Khoo Dr Ling Moi Lin Ms Esther Low Ms Tan Chor Khim

The organisations in which the experts of the Working Group are involved are:

3M Technologies (S) Pte Ltd Draeger Safety Asia Pte Ltd Health Promotion Board Ministry of Manpower National University of Singapore Shell Chemicals Seraya Pte Ltd Shell Eastern Petroleum Pte Ltd Singapore Civil Defence Force Singapore General Hospital

## Contents

		Page
Fore	word	7
CLA	USES	
1	General	
2	Normative references	
3	Definitions	_
4	Hazard identification, evaluation and control	
5	Respiratory protection requirements	15
6	Respiratory protection programme	16
7	Types of respirators	18
8	Selection, use and limitation of respirators	27
9	Medical examinations	33
10	Respirator fit testing	33
11	Training	34
12	Supervision of proper usage	35
13	Maintenance, inspection and storage of respirators	35
14	Regular monitoring of user exposure	38
15	Periodic evaluation and audit	38
ANN	EXES	
Α	Requirements for air quality (compressors or cylinders) for supplied-air respirators	40
В	Protection factors	42
С	Medical fitness to use respirators	46
D	User seal check	48
Е	Respirator fit test methods	50
F	Checklist for inspection	53
G	Checklist for review of respiratory protection programme	55
TABI	LES	
1	Task-related factors and recommendations	30
2	Limitations related to operator's facial characteristics	32
B.1	Assigned protection factors used in USA	43
B.2	Assigned protection factors used in UK	43

## SS 548: 2009

		Page	
FIGURES			
1	Relative sizes of common airborne particles	14	
2	Respiratory protection signage		
3	Types of respirators		
4	Types of air purifying respirators	19	
5	Types of supplied-air respirators		
6	Types of respirator inlet coverings	26	
7	Facial characteristics affecting the use of a respirator	32	
B.1	Protection factor of respirator	42	
D.1	Negative-pressure user seal check	48	
D.2	Positive-pressure user seal check	49	
E.1	Respirator fit test (Qualitative)	51	

SS 548 : 2009

#### **Foreword**

This Singapore Standard was prepared by a Working Group appointed by the Technical Committee for Personal Safety and Health under the purview of the General Engineering and Safety Standards Committee. It is a revision of the code of practice, CP 74 which was first prepared in 1998. CP 74 has been re-numbered as SS 548.

The revisions made were mainly to widen the scope of the Code to cover the use of the respiratory devices against biological and radioactive hazards. Other changes include updating the standard to ensure relevance to the latest regulations and good practices. The standard also includes additional information on selection, usage and maintenance of respirators, and medical examination for fitness to wear respirators.

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

- 1. AS/NZS 1715 : 2009 Selection, use and maintenance of respiratory protective equipment
- 2. AS/NZS 2243.3 : 2002 Safety in laboratories Part 3 : Microbiological aspects and containment facilities
- 3. BS EN 529 : 2005 Respiratory protective devices Recommendations for selection, use, care and maintenance
- 4. Biological Agents and Toxins Act 2005
- 5 OSHA 1910.134 on Respiratory Protection
- 6. Practical Radiation Technical Manual, Personal Protective Equipment International Atomic Energy Agency 2004
- Radiation Protection Act 2008
- 8. The Workplace Safety and Health Act (Chapter 354A) 2006
- 9. The Workplace Safety and Health (General Provisions) Regulations 2006
- 10. WHO Laboratory Biosafety Manual Third Ed 2004

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

Attention is drawn to the possibility that some of the elements of this Singapore Standard 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.
- 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 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.
- Compliance with a SS or TR does not exempt users from any legal obligations.

# Code of practice for selection, use and maintenance of respiratory protective devices

#### 1 General

#### 1.1 Scope

This code sets forth accepted practices for respirator users. It provides information and guidance on the selection, use, and maintenance of respirators and contains recommendations for establishing respiratory protection programme. The code covers the use of respirators to protect persons against the inhalation of contaminants and oxygen-deficient atmospheres in the workplace.

The code does not cover the following:

- use of respirators under military combat conditions;
- life support ventilators for medical or resuscitation purposes;
- masks (including surgical masks);
- respirators used in a non-occupational setting (e.g. public health emergencies).

A mask is not a respiratory protective device. It has neither adequate filtering nor fitting attributes to provide respiratory protection for the wearer. It is designed to minimise contamination of the work environment or sterile field from large particles generated by the wearer (e.g. spit, mucous). It is not necessarily designed to eliminate air leakage around the edges.

#### 1.2 Purpose

The purpose of this code is to provide information and guidance on the selection, use and maintenance of respirators that will help safeguard the life and health of users. It also provides guidance on the planning and implementation of a respiratory protection programme.

#### 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.

AS/NZS 1715 Selection, use and maintenance of respiratory protective equipment

CP 12 The filling, inspection, testing and maintenance of containers for the storage and transport of compressed gases

CP 84 Entry into and safe working in confined space