SS 651 : 2019
ISO 45001 : 2018, MOD
(ICS 13.100; 71.020)

SINGAPORE STANDARD

Safety and health management system for the chemical industry — Requirements with guidance for use

Singapore Standards Council

SS 651 : 2019
ISO 45001 : 2018, MOD
(ICS 13.100; 71.020)

SINGAPORE STANDARD

Safety and health management system for the chemical industry — Requirements with guidance for use

Published by Enterprise Singapore

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.

© Enterprise Singapore 2019

ISBN 978-981-48-9453-1

The content of this Singapore Standard was approved on 12 November 2019 by the Chemical Standards Committee (CSC) under the purview of the Singapore Standards Council.

First published, 2020

CSC consists of the following members:

		Name	Representation
Chairman	:	Dr Keith Carpenter	*Individual Capacity*
Deputy Chairman	:	Er. Lucas Ng Hong Kiang	*Individual Capacity*
Secretary 1	:	Ms Elane Ng	*Standards Development Organisation@Singapore Chemical Industry Council*
Secretary 2	:	Ms Rosmalinda Tay	*Standards Development Organisation@Singapore Chemical Industry Council*
Members	:	Mr Goh Tiak Boon	*Individual Capacity*
		Prof Alfred Huan	*Individual Capacity*
		Er. Khong Beng Wee	*Individual Capacity*
		Mr Terence Koh	*Singapore Chemical Industry Council Limited*
		Dr Leong Kwai Yin	*Individual Capacity*
		Dr Thomas Liew	*National Metrology Centre*
		Mr Lim Eng Kiat	*Individual Capacity*
		Mdm Jaime Lim	*Ministry of Manpower*
		Mr Lim Kian Chye / Mr Ng Eng Fu	*Housing & Development Board*
		Prof Loh Kian Ping	*National University of Singapore*
		Dr Loh Wah Sing	*Individual Capacity*
		Ms Pamela Phua	*Singapore Paint Industry Association*
		Mr Seah Khen Hee	*Individual Capacity*
		A/Prof Timothy Tan	*Nanyang Technological University*
		Dr Teo Tang Lin	*Chemical Metrology Division, Health Sciences Authority*
		Mr Yao Yikai	*Maritime and Port Authority of Singapore*
		Ms Suzanna Yap	*National Environment Agency*
Co-opted Members	:	Ms Christina Loh	*Individual Capacity*
		Mr Pitt Kuan Wah	*Individual Capacity*

COPYRIGHT

CSC sets up the Technical Committee on Petroleum Processes and Products to oversee the preparation of this standard. The Technical Committee consists of the following members:

		Name	Representation
Chairman	:	Er. Khong Beng Wee	*Individual Capacity*
Secretary	:	Mr Teo Wen Liang	*Standards Development Organisation@Singapore Chemical Industry Council*
Members	:	Mr Chung Tying Chun	*Setsco Services Pte Ltd*
		A/Prof Hong Liang	*National University of Singapore*
		Mr Kho Ho Meng	*Singapore Chemical Industry Council Limited*
		Ms Caphine Lee	*Association of Process Industry*
		Er. Jacqueline Liew	*Ministry of Manpower*
		LTC Ng Geok Meng	*Singapore Civil Defence Force*
		Mr Poon Chiew Tuck	*National Environment Agency*
		Dr Sin Siang Meng Ivan / Mr Koh Soon Chuang	*Institution of Fire Engineers, Singapore*
		Mr Soh Hong Chow	*SGS Testing & Control Services Pte Ltd*
		Mr Sundar Rajaraman	*ExxonMobil Chemical Operations Private Limited (Engineering Services)*
		Mr Tan Kian Hwee	*Sembcorp Industries Ltd (SUT Div)*

The Technical Committee sets up the Working Group on Restructuring of SS 506 : Part 3 to prepare this standard. The Working Group consists of the following experts who contribute in their *individual capacity*:

		Name
Convenor	:	Dr Peck Thian Guan
Members	:	Mr Abdul Halil Bin Abdul Hamid
		Er. Randy Cha
		Ms Katherine Goh (served until Sep 2018)
		Dr Han Meng Siew
		Mr Vincent Koh Meng Xuan
		Mr Andrew Lee
		Ms Lee Ham Eng
		Mr Edison Joseph Loh
		Ms Lye Wai Ping
		Dr Ng Chee Mang
		Mr Ong Kar Jin
		Ms Sabine Visser E/V Ramaker
		LTA Jeffery Tan
		CPT Teo Soon Chye (served until Sep 2018)
		Mr Caleb Yip

COPYRIGHT

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

Asahi Kasei Synthetic Rubber Singapore Pte Ltd
Association of Process Industry/ Ensure Engineering Pte Ltd
EnviroSolutions & Consulting Pte Ltd
ExxonMobil Asia Pacific Pte Ltd
Ministry of Manpower
National Environmental Agency
National University of Singapore
Shell Chemicals Seraya Pte Ltd
Singapore Accreditation Council
Singapore Civil Defence Force
Singapore Pharmaceutical Manufacturing Council
Singapore Refining Company Pte Ltd
Singapore Semiconductor Industry Association
Workplace Safety & Health Council

COPYRIGHT

Contents

COPYRIGHT

National Foreword

This Singapore Standard was prepared by the Working Group on SS 506 Part 3 Restructuring set up by the Technical Committee on Petroleum Processes Products under the purview of CSC.

SS 506 : Part 3 : 2013 was based on the OHSAS 18001 standard (SS 506 : Part 1). However, with the publication of ISO 45001 (Occupational health and safety management systems – Requirements) in 2018, OHSAS 18001 was withdrawn.

SS 651 : 2019, Safety and Health Management System for the Chemical Industry, is specifically developed for the chemical industry to address both occupational safety and health management system requirements and process safety management system requirements.

SS 651 : 2019 is a modified adoption of ISO 45001 “Occupational health and safety management systems – Requirements with guidance for use”. In this standard, certain modifications due to national requirements and the particular needs of the local industry have been made. These technical deviations and additional information have been added directly to the clauses to which they refer, and are marked by a margin on the left of the standard. A complete list of modifications, together with their justifications, is given in Annex ZA.

Organisations that are certified to SS 651 : 2019 would meet the requirements of ISO 45001.

The changes to the standard with respect to SS 506 : Part 3 include the following:

- Addition of SS 506 : Part 3 elements into ISO 45001 without bringing in new requirements.
- Moved all the recommendations, examples and explanatory text into the Annex A
- Additional terms and definitions relevant to Process Safety Management have been included.

This standard is expected to be used by the chemical industry, which includes organisations and their service providers in the chemical, petrochemical, oil refining, pharmaceutical companies, wafer fabrication plants and bulk storage terminals.

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. 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.*

3. *Compliance with a SS or TR does not exempt users from any legal obligations*

COPYRIGHT

Foreword

ISO (the International Organisation for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organisations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organisation (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Project Committee ISO/PC 283, *Occupational health and safety management systems*.

COPYRIGHT

Safety and health management system for the chemical industry — Requirements with guidance for use

0 Introduction

0.1 Background

An organisation is responsible for the safety and health (S&H) of workers and others who can be affected by its activities. This responsibility includes promoting and protecting their physical and mental health, and effective management of processes involving hazardous materials, equipment and facilities.

The adoption of an S&H management system is intended to enable an organisation to provide safe and healthy workplaces, prevent work-related injury and ill health, and continually improve its S&H performance.

0.2 Aim of an S&H management system

The purpose of an S&H management system is to provide a framework for managing S&H risks and opportunities. The aim and intended outcomes of the S&H management system are to prevent work-related injury and ill health to workers and to provide safe and healthy workplaces; consequently, it is critically important for the organisation to eliminate hazards and minimise S&H risks by taking effective preventive and protective measures.

When these measures are applied by the organisation through its S&H management system, they improve its S&H performance. A S&H management system can be more effective and efficient when taking early action to address opportunities for improvement of S&H performance.

Implementing an S&H management system conforming to this document enables an organisation to manage its S&H risks and improve its S&H performance. An S&H management system can assist an organisation to fulfil its legal requirements and other requirements.

0.3 Success factors

The implementation of an S&H management system is a strategic and operational decision for an organisation. The success of the S&H management system depends on leadership, commitment and participation from all levels and functions of the organisation.

The implementation and maintenance of an S&H management system, its effectiveness and its ability to achieve its intended outcomes are dependent on a number of key factors, which can include:

a) top management leadership, commitment, responsibilities and accountability;
b) top management developing, leading and promoting a culture in the organisation that supports the intended outcomes of the S&H management system;
c) communication;
d) consultation and participation of workers, and where they exist, workers' representatives;
e) allocation of the necessary resources to maintain it;
f) S&H policies, which are compatible with the overall strategic objectives and direction of the organisation;
g) effective process(es) for identifying hazards, controlling of the S&H risks and taking advantage of S&H opportunities;
h) continual performance evaluation and monitoring of the S&H management system to improve S&H performance;

COPYRIGHT

i) integration of the S&H management system into the organisation's business processes;
j) S&H objectives that align with the S&H policy and take into account the organisation's hazards, S&H risks and S&H opportunities;
k) compliance with its legal requirements and other requirements.

Demonstration of successful implementation of this document can be used by an organisation to give assurance to workers and other interested parties that an effective S&H management system is in place. Adoption of this document, however, will not in itself guarantee prevention of work-related injury and ill health to workers, provision of safe and healthy workplaces and improved S&H performance.

The level of detail, the complexity, the extent of documented information and the resources needed to ensure the success of an organisation's S&H management system will depend on a number of factors, such as:

— the organisation’s context (e.g. number of workers, size, geography, culture, legal requirements and other requirements);
— the scope of the organisation’s S&H management system;
— the nature of the organisation’s activities and the related S&H risks.

0.4 Plan-Do-Check-Act cycle

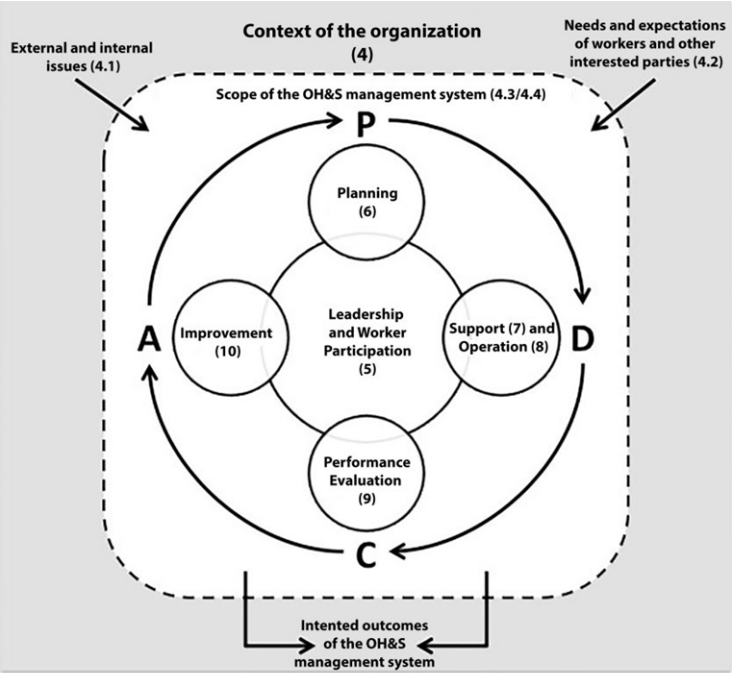
The S&H management system approach applied in this document is founded on the concept of Plan-Do-Check-Act (PDCA).

The PDCA concept is an iterative process used by organisations to achieve continual improvement. It can be applied to a management system and to each of its individual elements, as follows:

— Plan: determine and assess S&H risks, S&H opportunities and other risks and other opportunities, establish S&H objectives and processes necessary to deliver results in accordance with the organisation’s S&H policy;
— Do: implement the processes as planned;
— Check: monitor and measure activities and processes with regard to the S&H policy and S&H objectives, and report the results;
— Act: take actions to continually improve the S&H performance to achieve the intended outcomes.

This document incorporates the PDCA concept into a new framework, as shown in Figure 1.

COPYRIGHT



NOTE The numbers given in brackets refer to the clause numbers in this document

Figure 1 — Relationship between PDCA and the framework in this document

0.5 Contents of this document

This document conforms to ISO's requirements for management system standards. These requirements include a high level structure, identical core text, and common terms with core definitions, designed to benefit users implementing multiple ISO management system standards.

This document does not include requirements specific to other subjects, such as those for quality, social responsibility, environmental, security, or financial management, though its elements can be aligned or integrated with those of other management systems.

This document contains requirements that can be used by an organisation to implement an S&H management system and to assess conformity. An organisation that wishes to demonstrate conformity with this document can do so by:

— making a self-determination and self-declaration, or
— seeking confirmation of its conformity by parties having an interest in the organisation, such as customers, or
— seeking confirmation of its self-declaration by a party external to the organisation, or
— seeking certification/registration of its S&H management system by an external organisation.

Clauses 1 to 3 in this document set out the scope, normative references and terms and definitions which apply to the use of this document, while Clauses 4 to 10 contain the requirements to be used to assess conformity to this document. Annex A provides informative explanations to these requirements. The terms and definitions in Clause 3 are arranged in conceptual order with an alphabetical index provided at the end of this document.

COPYRIGHT

In this document, the following verbal forms are used:

a) “shall” indicates a requirement;
b) “should” indicates a recommendation;
c) “may” indicates a permission;
d) “can” indicates a possibility or a capability.

Information marked as "NOTE" is for guidance in understanding or clarifying the associated requirement. “Notes to entry” used in Clause 3 provide additional information that supplements the terminological data and can contain provisions relating to the use of a term.

COPYRIGHT

1 Scope

This document specifies requirements for a safety and health (S&H) management system for the chemical industry, and gives guidance for its use, to enable organisations to provide safe and healthy workplaces, by preventing work-related injury and ill health, process safety incidents as well as by proactively improving its S&H performance.

This document is applicable to any organisation in the chemical industry that wishes to establish, implement and maintain an S&H management system to improve safety and health, eliminate hazards and minimise S&H risks (including system deficiencies), take advantage of S&H opportunities, and address S&H management system nonconformities associated with its activities.

This document helps an organisation achieve the intended outcomes of its S&H management system. Consistent with the organisation's S&H policy, the intended outcomes of an S&H management system include:

a) continual improvement of S&H performance;
b) fulfilment of legal requirements and other requirements;
c) achievement of S&H objectives.

This document is applicable to the S&H risks under the organisation's control, taking into account factors such as the context in which the organisation operates and the needs and expectations of its workers and other interested parties.

This document does not state specific criteria for S&H performance, nor is it prescriptive about the design of an S&H management system.

This document enables an organisation, through its S&H management system, to integrate other aspects of health and safety, such as worker wellness/wellbeing.

This document does not address issues such as product safety beyond the risk to workers.

This document can be used in whole or in part to systematically improve safety and health management. However, claims of conformity to this document are not acceptable unless all its requirements are incorporated into an organisation's S&H management system and fulfilled without exclusion.

2 Normative references

There are no normative references in this standard.

COPYRIGHT