

SINGAPORE STANDARD

# CP 24 : 1999

(ICS 91.040)

CODE OF PRACTICE FOR

## Energy efficiency standard for building services and equipment

---

---

Published by  
Singapore Productivity and Standards Board  
1 Science Park Drive  
Singapore 118221



SINGAPORE STANDARD

# CP 24 : 1999

(ICS 91.040)

CODE OF PRACTICE FOR

## Energy efficiency standard for building services and equipment

---

---

*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 the Singapore Productivity and Standards Board at the address below:*

Director  
Centre for Standardisation  
Singapore Productivity and Standards Board  
1 Science Park Drive  
Singapore 118221  
Telephone: 2786666    Telefax: 2786665  
Email: [cfs@psb.gov.sg](mailto:cfs@psb.gov.sg)

ISBN 9971-67-674-5

## Contents

	Page
Foreword _____	6

## CODE OF PRACTICE

---

1	Scope _____	7
2	Definitions, abbreviations and acronyms _____	7
3	Air-conditioning equipment _____	13
4	Water heaters _____	16
5	Electric motors _____	19
6	Lighting power budget _____	19

## TABLES

---

1	Unitary air conditioners and condensing units, electrically operated - Minimum efficiency requirements _____	14
2	Water chilling packages - Minimum efficiency requirements _____	15
3	Packaged terminal air conditioners and room air conditioners, electrically operated - Minimum efficiency requirements _____	16
4	Gas and oil-fired boilers - Minimum efficiency requirements _____	17
5	Water heating equipment - Performance requirements _____	18
6	General purpose design a and design b motors - Minimum nominal efficiency _____	21
7	Maximum lighting power budget (including ballast loss) _____	22

## Foreword

This Singapore Standard Code of Practice was prepared by the Technical Committee on Building Services under the direction of the Construction Industry Practice Committee. It is a revision of CP 24: Part 1:1982, Part 2: 1983 and Part 3: 1982.

The concept of providing energy efficiency standards for equipment, embodied in Part 1 of the replaced code, is now expanded from air-conditioning equipment to include other building equipment such as water heaters, motor drives and lighting. It establishes a total approach towards energy conservation in building services.

It will serve as a reference for the Building Control Division's proposed building energy performance standard as well as providing a basis for measuring energy efficiency for equipment to be granted accelerated depreciation.

Tables 1 to 6 in this code are produced by permission from ASHRAE/IES Standard 90.1-1989R, a proposed revision of ASHRAE/IES Standard 90.1-1989 published by American Society of Heating, Refrigeration and Air-conditioning Engineers, Inc. ([www.ashrae.org](http://www.ashrae.org)). Acknowledgement is made for the use of information from the above publication.

### NOTE

1. *Singapore Standards are subject to periodic review to keep abreast of technological changes and new technical developments. The revisions of Singapore Standards are announced through the issue of either amendment slips or revised editions.*
2. *Compliance with a Singapore Standard does not exempt users from legal obligations.*

---

---

# Code of practice for energy efficiency standard for building services and equipment

## 1 Scope

1.1 This code provides:

- (a) minimum energy-efficiency requirements for:
- (i) new installation of systems in buildings;
  - (ii) replacement of systems in buildings; and
  - (iii) replacement of components of systems in buildings.
- (b) criteria for determining compliance with these requirements.

1.2 The provisions of this code apply to the following systems and equipment used in conjunction with buildings:

- (i) air-conditioning equipment ;<sup>1</sup>
- (ii) water heaters;
- (iii) motor drives, and;
- (iv) high efficiency lighting.<sup>2</sup>

1.3 This code shall not be used to circumvent any safety, health or environmental requirements.

NOTE 1 – For related matters on energy conservation in air-conditioning systems, reference is to be made to Singapore Standard Code of Practice CP 13.

NOTE 2 – For guidance on the illuminances recommended for different applications, reference is to be made to Singapore Standard Code of Practice CP38.

## 2 Definitions, abbreviations and acronyms

### 2.1 General

Certain terms, abbreviations and acronyms are defined in this section for the purpose of this code. These definitions are applicable to all sections of this code. Terms that are not defined shall have their ordinarily accepted meanings within the context in which they are used.

### 2.2 Definitions, abbreviations and acronyms

#### 2.2.1 Air conditioning

The process of treating air to control simultaneously its temperature, humidity, cleanliness and distribution to meet the comfort requirements of the occupants of the conditioned space.

#### 2.2.2 Annual fuel utilization efficiency (AFUE)

The ratio of annual output energy to annual input energy, which includes any off-cycle pilot input loss and cycling effects.