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Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation

Part 1: Non-residential buildings

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National foreword

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INTERNATIONAL STANDARD

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Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation —

Part 1: Non-residential buildings

Performance énergétique des bâtiments — Plan et conditions d'utilisation des espaces, zones et bâtiments pour le calcul d'énergie —

Partie 1: Bâtiments non résidentiels

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Foreword

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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).

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

The committee responsible for this document is ISO/TC 163, *Thermal Performance and energy use in the built environment*.

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Introduction

There is a strong need to improve the environment to make the evaluation of energy performance of buildings more reliable and practical, so that energy efficiency of buildings is improved by referring to the evaluation results. To realize such environment, one important standard on how to prescribe the ways of using buildings has been missed, even though many assumptions on the building usage have appeared in standards relevant to the energy calculation.

This document prescribes the indispensable information on the formats to express the usage of building, zone and space in energy calculation for non-residential buildings.

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INTERNATIONAL STANDARD ISO 18523-1:2016(E)

Energy performance of buildings — Schedule and condition of building, zone and space usage for energy calculation —

Part 1:
Non-residential buildings

1 Scope

This document specifies the formats to present schedule and condition of building, zone and space usage, which is to be referred to as input data of energy calculations for non-residential buildings.

The schedule and condition include schedules of occupancy, operation of technical building systems, ventilation rate, hot water usage and internal heat gains due to occupancy, lighting and equipment.

This document also gives categories of building, zone and space according to differentiating schedule and condition.

Depending on necessary minuteness of the energy calculation, different levels of schedule and condition from the view point of time and space averaging are specified.

The values and categories for the schedule and condition are given in annexes for more information for the application when the users of this document do not have detailed information on the values and categories for the schedule and condition.

The schedule and condition in this document is basically different from assumptions in order to determine the size of technical building systems in the process of design, where possible largest values are to be assumed. Instead, most usual and average values, which are assumed for the building energy calculation, are dealt with in this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Space

3.1.1
space
part of a room, a room or group of adjacent rooms with assumed uniform properties for all considered types of *zones* (3.1.2)

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3.1.2
zone
part of a *building* (3.1.3) consisting of (part of) one or more spaces with assumed uniform properties related to a specific service or service component, or (in absence of a service) assumed uniform indoor environmental conditions

3.1.3
building
construction as a whole, including its envelope and all *technical building systems* (3.3.5), where energy is used to condition the indoor thermal environment and to provide domestic hot water, lighting according to visual tasks and other services related to the use of the building

3.1.4
thermally conditioned space
thermally conditioned zone
heated and/or cooled *space* (3.1.1) or *zone* (3.1.2)

3.1.5
thermally unconditioned space
thermally unconditioned zone
space (3.1.1) or *zone* (3.1.2) that is not heated nor cooled

3.2 Schedule

3.2.1
schedule
information on condition(s) of usage of *building* (3.1.3), *zone* (3.1.2) or *space* (3.1.1) throughout a cycle of period, such as day, week, month, season and year

3.2.2
daily schedule
conditions (3.3.1) of *occupancy* (3.3.2), service system operations, requirement for the functions of the service systems and internal heat gains in each time of a day

3.2.3
daily schedule with hourly conditions
set of hourly *conditions* (3.3.1) of *occupancy* (3.3.2), service system operations, requirement for the functions of the service systems and internal heat gains in a day

3.2.4
set of daily schedules
complete set of daily schedules representing usage of a category of *building* (3.1.3), *zone* (3.1.2) or *space* (3.1.1) in one year

3.2.5
daily operating hours
hours when service system is operated or the length of the hours

3.2.6
annual operating hours
total length of hours in the *standard year* (3.2.15) when *technical building system* (3.3.5) is operated

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3.2.7
annual schedule
allocation of *daily schedule(s)* (3.2.2) for one year

Note 1 to entry: Division of the year can be selected from 365 days, 53 weeks, 12 months, seasons or no division [a *set of daily schedules* (3.2.4) is uniformly applied throughout the year].

3.2.8
seasonal schedule
allocation of *daily schedule(s)* (3.2.2) to each season of the year

3.2.9
monthly schedule
allocation of *daily schedule(s)* (3.2.2) to each month of the year

3.2.10
weekly schedule
allocation of *daily schedule(s)* (3.2.2) to each week of the year

3.2.11
whole set of annual schedules
complete set of *annual schedules* (3.2.7) representing usage of all types of *building* (3.1.3), *zone* (3.1.2) and *space* (3.1.1), as objects of *energy calculation* (3.3.20)

3.2.12
whole set of seasonal schedules
complete set of *seasonal schedules* (3.2.8) representing usage of all types of *building* (3.1.3), *zone* (3.1.2) and *space* (3.1.1), as objects of *energy calculation* (3.3.20)

3.2.13
whole set of monthly schedules
complete set of *monthly schedules* (3.2.9) representing usage of all types of *building* (3.1.3), *zone* (3.1.2) and *space* (3.1.1), as objects of *energy calculation* (3.3.20)

3.2.14
number of days in one year
total number of days, which shall be 365

3.2.15
standard year
selected year, of which number of day has to be 365 and arrangement of weekdays, weekends and holidays are referred in weekly, monthly, seasonal and *annual schedules* (3.2.7)

3.3 Parameters for conditions of building, zone and space usage

3.3.1
condition
status of *occupancy* (3.3.2), operation of service systems, requirement for the functions of the *technical building systems* (3.3.5) and internal heat gains

3.3.2
occupancy
presence of users in *building* (3.1.3), *zone* (3.1.2) or *space* (3.1.1)

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3.3.3
occupancy density
number of present user in *building* (3.1.3), *zone* (3.1.2) or space per unit floor area of the *space* (3.1.1)

Note 1 to entry: Occupancy density is used mainly for the calculations for space heating/cooling and ventilation.

3.3.4
simultaneous usage ratio (of a set of spaces)
ratio of the number of *zones* (3.1.2) or *spaces* (3.1.1), which belong to a group of zones and spaces and are occupied or used at the time, to the total number of zones or spaces in the group

Note 1 to entry: This concept is applied to a group of zones or spaces of the same category, such as a group of guest rooms in hotels, a series of personal office rooms in office buildings, etc.

3.3.5
technical building system
all energy-using or energy-distributing components in a *building* (3.1.3) that are operated to support the occupant or process functions housed therein

Note 1 to entry: These include HVAC, domestic hot water, illumination, transportation, laundering or similar functions.

3.3.6
luminaire
apparatus which distributes, filters or transforms the light transmitted from one or more lamps

Note 1 to entry: Except for the lamps themselves, all the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

[SOURCE: CIE S 017/E: 2011, 17–707]

3.3.7
in operation
status of a *technical building system* (3.3.5), in which the technical building system can function to satisfy the requirement for the technical building system, such as the set-point temperature and the *maintained average illuminance* (3.3.9)

Note 1 to entry: When the requirement is satisfied without its functioning, the technical building system stands by.

3.3.8
out of operation
status of a *technical building system* (3.3.5) in which the technical building system cannot function regardless of the relevant requirement or due to inexistence of any requirement for the technical building system

3.3.9
maintained average illuminance
value below which the average illuminance over the specified surface is not allowed to fall, lux

[SOURCE: CIE S 017/E: 2011, 17–750]

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3.3.10
height of the working plane
height of the plane, on which the assumed visual task is done, from the floor

Note 1 to entry: It is expressed in metres (m).

3.3.11
demand control ventilation
ventilation, of which rate is controlled according to the necessity of the ventilation, such as to the emission rate of target pollutant

3.3.12
energy need for space heating and cooling
heat to be delivered to or extracted from a conditioned *space* (3.1.1) to maintain the intended temperature and/or humidity conditions during a given period of time

3.3.13
energy use for space heating and cooling
energy input to the heating and cooling system to satisfy the *energy need for space heating and cooling* (3.3.12)

3.3.14
energy need for ventilation for outdoor air supply
work by electric motors to convey outdoor air to satisfy ventilation requirement

3.3.15
energy use for ventilation for outdoor air supply
energy input to the ventilation system to satisfy the *energy need for ventilation for outdoor air supply* (3.3.14)

3.3.16
energy need for domestic hot water
heat to be delivered to the needed amount of domestic hot water to raise its temperature from the cold network temperature to the prefixed delivery temperature at the delivery point

3.3.17
energy use for domestic hot water
energy input to the domestic hot water system to satisfy the *energy need for domestic hot water* (3.3.16)

3.3.18
energy use for lighting
energy consumed by *luminaires* (3.3.6) and lamps

3.3.19
energy use for transportation
energy consumed by equipment for transportation, such as elevators

3.3.20
energy calculation
calculation of energy uses for *technical building systems* (3.3.5)

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3.4 Descriptions for daily schedule

3.4.1
reference ventilation requirement
most probable estimation of outdoor air supply (in volume flow rate per unit floor area or in air change per hour) to the *space* (3.1.1) or *zone* (3.1.2) in compliance with relevant regulation

3.4.2
reference domestic hot water usage
maximum hourly service hot water usage by users of the *space* (3.1.1) or *zone* (3.1.2) in volume flow rate per person, in volume flow rate per unit floor area or in volume flow rate per bed

Note 1 entry: The volume flow rate is calculated with the assumption on hot water temperature.

3.4.3
total daily usage of domestic hot water
total volume of service hot water usage in one day in volume per person, in volume per unit floor area or in volume per bed

Note 1 entry: The volume flow rate is calculated with the assumption on hot water temperature.

3.4.4
reference occupancy density
maximum hourly *occupancy density* (3.3.3) of the *space* (3.1.1) or *zone* (3.1.2) in person per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), occupancy density at the time can be calculated.

3.4.5
reference heat gain due to person
maximum hourly total (sensitive and latent) heat gain due to person inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), heat gain due to person at the time can be calculated.

3.4.6
reference sensible heat gain due to person
maximum hourly sensible heat gain due to person inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), sensible heat gain due to person at the time can be calculated.

3.4.7
reference latent heat gain due to person
maximum hourly latent heat gain due to person inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), latent heat gain due to person at the time can be calculated.

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3.4.8
reference heat gain due to lighting
maximum hourly sensible heat gain due to lighting inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by hourly ratios, heat gain due to lighting at the time can be calculated.

3.4.9
reference heat gain due to appliances
maximum hourly total (sensible and latent) heat gain due to appliances inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), heat gain due to appliances at the time can be calculated.

3.4.10
reference sensible heat gain due to appliances
maximum hourly sensible heat gain due to appliances inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), sensible heat gain due to appliances at the time can be calculated.

3.4.11
reference latent heat gain due to appliances
maximum hourly latent heat gain due to appliances inside the room or *zone* (3.1.2) in watt per unit floor area

Note 1 to entry: To be multiplied by *hourly ratios* (3.4.12), latent heat gain due to appliances at the time can be calculated.

3.4.12
hourly ratio
ratio of hourly value of parameters to their reference value

Note 1 to entry: Multiplying hourly ratios by the reference value, hourly values of the parameter can be calculated.

4 Framework of the schedule and condition for building energy calculation

4.1 Indispensable schedules

The building energy calculations are characterized by the division number of the year, the calculation period or the calculation interval. Each calculation method has its appropriate calculation interval according to characteristics of the target physical phenomenon (for example, unsteadiness) and minuteness of the calculation responding to changes of climatic condition, occupants' behaviour, behaviour of service systems and so on.

Due to the variety of calculation method, there is a variety of form of the schedule and condition of building, zone and space usage. Nevertheless, there is a fundamental unit of form, daily schedule, which shall be included in forms for the schedule and condition. The daily schedule corresponds to the minimum cycle of building, zone and space usage, and also of climatic and solar condition.

Some nations adopt so called "monthly calculation" for space heating and cooling energy needs and uses, taking monthly variation of outdoor temperature and solar irradiance into consideration. One daily schedule for business day and the number of the business days is given to each month for each type of building, zone and space. Monthly means of outdoor air condition (for example, temperature)

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and solar irradiance for different orientations and inclinations are given for the calculation. The expression of the daily schedule varies from detailed expression with hourly values to simplified expression such as daily mean values and the like. Additional schedule for closing day can be given in a simplified way such as only with daily mean values.

Similarly, in so called "seasonal calculation", one daily schedule for business day and the number of the business days for each season are given to each season for each type of building, zone and space, and the calculation is done with seasonal mean values for climatic condition.

For the calculation of more steady phenomena, so called "annual calculation" can work if seasonal change of solar condition is integrated throughout the year and condensed in specific coefficients. Nevertheless, one daily schedule for business day and the number of annual business days are necessary. Additional daily schedule for closing day can be given.

For the calculation of lighting, monthly or yearly calculation is mainly used, but unsteady aspects of lighting still can be dealt with. In the calculation for lighting, when input parameters such as operating hours with and without daylight are prescribed, daily schedule as described in the column (2) of Table 1 and annual schedule by monthly allocation of daily schedules (Table 5) or annual schedule without division of the year (Table 7) should be explicitly given, so that the operating hours for light is well harmonized with those for other technical systems.

Therefore, for each category of building, zone and space, necessary number of daily schedules (e.g. two daily schedules for business day and closing day), and one of annual, seasonal, monthly and weekly schedules shall be given in order that the daily schedules are allocated for the year.

4.2 Daily schedule

The daily schedule shall contain hourly values of condition for one day or shall contain condensed or simplified information on conditions for the day. With some assumptions, the hourly detailed values can be generated from condensed or simplified information and used even for detailed calculation. If necessary, multiple daily schedules representing different daily patterns of usage should be given such as for weekdays, weekends and holidays. The number of daily schedules depends on minuteness of the schedule and condition, as well as on the category of building, zone and space under consideration.

The conditions described in the daily schedule are grouped into the following three categories:

a) general information on occupancy and usage of building, zone and space;

b) operation of technical building systems and requirement for their services;

c) internal heat gains.

The basic structure of daily schedule is shown in Table 1.

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Table 1 — Framework of daily schedule for building, zone or space

Parameters and their categories		(1) description by hourly values for 0 h to 24 h	(2) condensed or simplified description
a) General information on occupancy and usage	Occupancy density	Hourly occupancy density	Times of start and end of occupancy or total hours of occupancy, and average occupancy density during usage
	Simultaneous usage ratio of a set of rooms	Hourly simultaneous usage ratio	Mean simultaneous usage ratio during usage
b) Operation of technical building systems and requirement for their building services	Space heating and/or cooling	Hourly status of space heating and/or cooling system (in or out of operation)	Times of start and end of operation, or total hours of operation
		Hourly set-points of room temperature and/or humidity	Set-point temperature and/or humidity during operation, and/or information on set-back operation
	Ventilation for thermally conditioned zone or space	Hourly status of ventilation system (in or out of operation)	Times of start and end of operation, or total hours of operation
		Hourly ventilation requirement	Ventilation requirement during operation
	Lighting	Hourly status of lighting system (in or out of operation)	Times of start and end of operation, or total hours of operation
		Maintained average illuminance and height of working plane	Maintained average illuminance and height of working plane
	Domestic hot water	Hourly status of domestic hot water system	Times of start and end of operation, or total hours of operation
		Hourly service hot water usage	Daily total hot water usage
	Ventilation for thermally unconditioned zone or space	Hourly ventilation requirement	Ventilation requirement
		Set-point of room temperature (upper limit)	Set-point of room temperature (upper limit)
c) Internal heat gains (sensitive and/or latent)	Person (watt per unit floor area)	Hourly heat gains	Times of start and end of occupancy or total hours of occupancy
			Average heat gains during occupancy
	Lighting (watt per unit floor area)	Hourly heat gains	Times of start and end of lighting or total hours of lighting
			Average heat gain during operation
	Appliances (watt per unit floor area)	Hourly heat gains	Times of start and end of use of appliances or total hours of the usage
			Average heat gain during usage

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4.2.1 General information on occupancy and usage

The principal parameter for the general information on occupancy and usage is the occupancy density. It can be given hourly in the day if detailed daily schedule is necessary. In such case, as shown in examples of the daily schedules in Annex D, the reference occupancy density and hourly ratios can be used to give hourly occupancy densities.

4.2.2 Operation of technical building systems and requirement for their building services

Daily schedules of operation of technical building systems and of requirement for those (e.g. room temperature and/or humidity, ventilation requirement, lighting requirements) shall be given hourly in the day if detailed daily schedule is necessary. The combination of reference ventilation requirement or reference domestic hot water and hourly ratios can be used to give hourly schedules.

The operational status of technical building systems can be described as “in operation” or “out of operation”. “In operation” is defined as the status in which the technical building system can function to satisfy the requirement for the system. When the requirement is satisfied without its functioning, the technical building system stands by. On the contrary, “out of operation” is defined as the status in which the technical building system cannot function regardless of the relevant requirement. Instead of giving the status hourly, the times of start and end can be given or the total hours of daily operation can be given as condensed or simplified description.

4.2.3 Internal heat gains

Daily schedules of internal heat gains shall be given hourly in the day if detailed daily schedule is necessary. The combination of reference heat gains such as reference heat gain due to person and hourly ratios can be used to give hourly schedules.

4.3 Division of year and daily, weekly, monthly, seasonal and annual allocations of daily schedules

The standard year shall be the year 2015, which has 365 days. Since national holidays and working days for buildings differs in nations and states, annual schedules can be determined on a national basis, even though there is a need for any common annual schedule patterns for research purposes. The annual schedule given in Annex B can be used as such a common annual schedule with daily 365 divisions. The basic structures of the annual schedule are shown in Table 2.

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Table 2 — Annual schedules with different divisions of the year

(1) Daily 365 divisions																
The standard year																
1	2	3	4	5	6	7	8	…	358	359	360	361	362	363	364	365
(2) Weekly 53 divisions																
The standard year																
1	2	3	4	…	50	51	52	53								
(3) Monthly 12 divisions																
The standard year																
January	February	March	…	October	November	December										
(4) Seasonal 3 divisions																
The standard year																
Winter	Medium	Summer	Medium	Winter												
(5) No division of the year																
The standard year																
Common set of daily schedules throughout the year																

The annual schedule shall be made by allocating one of daily schedules to each day or a set of daily schedules to each week, month or season. Each week, month and season can contain different daily schedules such as for weekdays and the rest. If there is no need to divide the year, a set of daily schedules shall be allocated to the whole year without division. For example, for an indoor parking garage, a set of daily schedules of ventilation and lighting for each of business day and closing day is specified with numbers of the days as the annual schedule. Structures of the annual schedules by daily, weekly, monthly, seasonal and yearly allocation are prescribed in Table 3, Table 4, Table 5, Table 6 and Table 7, respectively.

Table 3 — Annual schedule by daily allocation of daily schedules (daily schedule allocation is exemplified)

Date	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**#14**	…
	January														
	1st Th.	2nd Fr.	3rd Sa.	4th Su.	5th Mo.	6th Tu.	7th We.	8th Th.	9th Fr.	10th Sa.	11th Su.	12th Mo.	13th Tu.	14th We.	…
Daily schedule	*c*	*c*	*c*	*c*	*a*	*a*	*a*	*a*	*a*	*b*	*c*	*a*	*a*	*a*	…
The daily schedules *a*, *b* and *c* are allocated to weekdays except for Saturdays and Sundays/holidays, respectively.															

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Table 4 — Annual schedule by weekly allocation of daily schedules (daily schedule allocation is exemplified)

Week / Daily schedule	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	…
	Jan. 1st to 4th	5th to 11th	12th to 18th	19th to 25th	26th to Feb. 1st	2nd to 8th	9th to 15th	16th to 22nd	23rd to Mar. 1st	2nd to 8th	9th to 15th	16th to 22nd	…
a	0	5	4	5	5	5	4	5	5	5	5	5	…
b	0	1	1	1	1	1	1	1	1	1	1	0	…
c	4	1	2	1	1	1	2	1	1	1	1	2	…
Total number of days	4	7	7	7	7	7	7	7	7	7	7	7	…
The daily schedules *a*, *b* and *c* are allocated to weekdays except for Saturdays, Saturdays and Sundays/holidays, respectively.													

Table 5 — Annual schedule by monthly allocation of daily schedules (daily schedule allocation is exemplified)

Month / Daily schedule	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
a	19	19	22	21	19	22	22	21	19	21	20	19	244
b	4	4	3	4	4	4	4	5	4	5	4	4	49
c	8	5	6	5	8	4	5	5	7	5	6	8	72
Total number of days	31	28	31	30	31	30	31	31	30	31	30	31	365
The daily schedules *a*, *b* and *c* are allocated to weekdays except for Saturdays, Saturdays and Sundays/holidays, respectively.													

Table 6 — Annual schedule by seasonal allocation of daily schedules (daily schedule allocation is exemplified)

Season / Daily schedule	Winter	Intermediate	Summer	Total
a	n_{W1}	n_{M1}	n_{S1}	244 ($=n_{W1} + n_{M1} + n_{S1}$)
b	n_{W2}	n_{M2}	n_{S2}	49 ($=n_{W2} + n_{M2} + n_{S2}$)
c	n_{W3}	n_{M3}	n_{S3}	72 ($=n_{W2} + n_{M2} + n_{S2}$)
Total number of days	$n_{W1} + n_{W2} + n_{W3}$	$n_{M1} + n_{M2} + n_{M3}$	$n_{S1} + n_{S2} + n_{S3}$	365
The daily schedules *a*, *b* and *c* are allocated to weekdays except for Saturdays, Saturdays and Sundays/holidays, respectively.				

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Table 7 — Annual schedule without division of the year (daily schedule allocation is exemplified)

Daily schedule	Total
a	244
b	49
c	72
Total number of days	365
The daily schedules *a*, *b* and *c* are allocated to weekdays except for Saturdays, Saturdays and Sundays/holidays, respectively.	

5 Conditions for energy calculation included in the schedule and condition of building, zone and space usage

5.1 Energy needs and uses

In this document, input parameters for the calculation of the following energy needs and uses are dealt with.

a) Energy need and use for space heating and cooling.

b) Energy need and use for ventilation for outdoor air supply for conditioned and unconditioned zone or space.

c) Energy use for lighting.

d) Energy need and use for domestic hot water.

e) Energy use for transportation (i.e. elevators).

5.2 Condition

5.2.1 General information on occupancy and usage

5.2.1.1 Occupancy density

The occupancy density is directly or indirectly related to energy uses of technical building systems, such as of space heating and cooling, ventilation, lighting, domestic hot water and transportation in the building. It also represents unused status of the space by zero occupancy density. Total number of occupants can be calculated by multiplying the occupancy density by the floor area of the space, of which prescription should be dealt with by calculation methods standardized by other standards.

The occupancy density shall be assumed and given by taking the correlation with relevant conditions such as hourly status or hours of space heating and cooling, ventilation, lighting and domestic hot water, as well as with hourly status or hours of internal heat gains.

For lighting, other parameters for occupancy such as the absence factor may be added, but such parameters relevant to the occupancy should be well coordinated without contradiction.

NOTE The occupancy-relevant parameter for lighting is given in ISO 20086.

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5.2.1.2 Simultaneous usage ratio of a set of zones or spaces

This parameter is not always necessary, but is useful when there is a group of zones or spaces of the same category and characteristics and the utilization rate of the group is not always full. Demands for technical building systems are to be reduced by the simultaneous usage ratio.

5.2.2 Operation of technical building systems and requirement for their services

5.2.2.1 Space heating and cooling

As operational conditions for space heating and cooling, status of the space heating and/or cooling system (in or out of operation) and indoor environmental set-points (temperature and/or humidity) shall be given.

There can be different indoor environmental set-points for a building, zone and space. They differentiate due to seasons (heating, cooling, intermediate and so on), daily usage (business day, closing day and so on) and set-back operation such as for during night. The condition for the set-point shall be given in a schedule by referring to the table for the set-point patterns, as shown in Table 8. If the set-point pattern can be allocated to any part of the year without calculations, periods shall be determined and be specified in the table for each of set-point patterns. If the set-point patterns depend on climatic condition in each day, week and month, determination of the set-point patterns shall be done as a part of the energy calculation.

Table 8 — Set-point patterns (symbols, values and notes are exemplified)

Symbol of set-point pattern	During normal operation		During set-back operation		Note for set-back operation
	Indoor set-point temperature	Indoor set-point relative humidity	Indoor set-point temperature	Indoor set-point relative humidity	
*w*1	22 °C	40 %	—	—	—
*w*2	22 °C	—	—	—	—
*s*1	26 °C	50 %	—	—	—
*m*1	24 °C	50 %	—	—	—

5.2.2.2 Ventilation for thermally conditioned zone or space

The ventilation (outdoor air supply) for thermally conditioned zones or spaces has an influence on the energy needs for space heating and cooling, as well as the energy use for mechanical ventilation. Status of the ventilation system (in or out of service) shall be given in the schedule or it shall be assumed to be the same as space heating and/or cooling system operation. As for ventilation rate during the operation, there are two ways how to estimate the amount of outdoor air supply, as follows.

a) Estimation by regulated ventilation requirement of the building, zone and space, which can be defined as per unit floor area or per occupant. The requirement can also be described by acceptable concentration of target gas. If the requirement per occupant or by the acceptable concentration of the target gas is adopted, capacity of occupants of the zone or space, which has to be equal to or larger than the reference occupancy density, shall be assumed. This way is possible even before fixing detailed specifications of the ventilation system of the space.

b) Estimation by designed air flow rate of the target building, zone and space, which is to be confirmed by design calculation based on the specifications of adopted ventilation components. The design value of the ventilation rate can be used, if the value shall be confirmed later in more detailed design stage of the building and technical building system.

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In the energy calculation, when demand control ventilation or any other techniques to control ventilation rate is considered, the above-mentioned estimated amount of outdoor air can be adjusted by taking relevant parameters (e.g. schedule of occupancy density, outdoor temperature and/or humidity) into consideration.

In the calculation of energy use of the ventilation system, electric power of the designed system is used, or assumptions on the efficiency of the system, such as a specific fan power, are used with the ventilation rate.

5.2.2.3 Lighting

The status of the lighting system (in or out of operation) shall be given in the schedule. The status shall be coordinated with the occupancy of the zone or space, but they are not necessarily the same.

If the effect of dimming control for daylight utilization or any other lighting control methods are considered, the operation and electric power is adjusted by taking the specification of the control system and space configuration into consideration.

The energy use for lighting can be estimated by using the duration of the operation and the electric power for luminaires and lamps, which can be determined by the following ways.

a) In the simplified utilization factor method, the installed lighting power density can be calculated by using maintained average illuminance, luminaire and lamp performance, and utilization factor as a function of the luminaire, space reflectance and room index. More detailed method can also be used for the calculation of the installed lighting power.

b) Total assumed electric power of designed luminaires and lamps for the zone or space, or the target installed electric power for lighting.

NOTE Calculation methods for lighting are standardized in relevant standards such as ISO 20086.

When internal heat gain due to lighting is generated interactively by using results of energy use calculation for lighting, more realistic and accurate estimation of the internal heat gain due to lighting become possible. Such interactive calculation method should be applied in case the visual task and lighting schemes in spaces and zones are known.

5.2.2.4 Domestic hot water

The amount of service hot water usage shall be given as hourly volume or as total volume used during the specified period. In addition, assumed hot water temperature and type of faucet or shower nozzle shall be specified for the calculation of energy need. The saving of service hot water usage by energy-saving faucets or shower nozzles shall be evaluated by comparing with the performance of the assumed type of those in the schedule and condition. Supplied water temperature shall be given in the calculation methods.

5.2.2.5 Ventilation for thermally unconditioned zone or space

As thermally unconditioned zones or spaces, indoor parking garage, machine room, electric room, etc. are dealt with. The ventilation (outdoor air supply) for the thermally unconditioned zone or space has an influence on the energy use for mechanical ventilation. Status of ventilation system (in or out of service) shall be given in the schedule. As for ventilation rate in the operation, there are two ways in order to estimate the amount of outdoor air supply, as follows.

a) Estimation by regulated ventilation requirement of the unconditioned zone or space, which can be defined as per unit floor area or air change rate. The requirement can also be described by allowable concentration of target gas such as CO for indoor parking garage or allowable temperature for machine and electric room with assumptions on internal heat gain in those spaces. This way is possible even before fixing detailed specifications of the ventilation system of the space,

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but the schedule of ventilation target such as pollutant gas by cars and heat from contained equipment is necessary.

b) Estimation by designed air flow rate of the target zone and space, which is to be confirmed by design calculation based on the specifications of adopted ventilation components. The design value of the ventilation rate can be used, if the value shall be confirmed later in more detailed design stage of the building and technical building system.

In the energy calculation, when demand control ventilation or any other techniques to control ventilation rate is considered, the above-mentioned estimated amount of outdoor air can be adjusted by taking relevant parameters (e.g. schedule of pollutant source, outdoor temperature) into consideration.

In the calculation of energy use of the ventilation system, electric power of the designed system is used, or assumptions on the efficiency of the system, such as a specific fan power, are used with the ventilation rate.

5.2.3 Internal heat gains

Internal heat gains due to persons, lighting and other appliances used in building, zone and space also affect energy needs for space heating and cooling. The schedule of the heat gains shall be given.

5.2.3.1 Person

The amount of internal heat gain due to person per unit floor area is the product of heat dissipation per person and occupancy density.

5.2.3.1.1 Heat gains per person

Heat gains per person (occupant) in watt per person depends on his/her activity level and other physiological conditions. Therefore, they shall be given, taking human activity in the zone or space into consideration. Values for the heat dissipation can be found in references such as Reference [19]. The heat dissipation from human body consists of sensitive and latent heats, but it is possible to assume only the sensitive heat, such as when calculating only energy need for sensitive heat.

5.2.3.1.2 Occupancy density

The occupancy density is described as general information in 5.2.1.1.

5.2.3.2 Lighting

For the energy calculation of lighting, conditions other than the status of the lighting system (in or out of operation) and the lighting requirement (e.g. maintained average illuminance on height of working plane and further criteria according to ISO 8995-1) can be determined by the lighting design and shall be used in the calculation methods as input data for target building, zone and space. The result of such energy calculation of lighting can be used as the basis of heat gain due to lighting.

When rough estimation on the heat gain due to lighting is needed before the lighting design and energy calculation of lighting, the target installed power for lighting can be used.

5.2.3.3 Appliances

The appliances include electric appliances and other machines or instruments dissipating heat, which can consist of sensible and latent heats. The electric appliances, such as computer, television, copy machine, refrigerator and special decorative illumination irrelevant with the lighting requirement for visual tasks, use energy and shall be taken into consideration when determining internal heat gain due to appliances.

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6 Category of building, zone and space

6.1 General

Buildings are characterized basically by their principal function. However, there are not only complex buildings with different principal functions, but also buildings naturally having mutually related plural principal functions, such as hospitals containing functions for outpatient consultation and inpatient healthcare. Even among buildings of the same category, there is possibly considerable difference in factors influencing energy use due to composition of multiple functions. Therefore, from the view point of energy calculation, the schedule and condition shall be prescribed not by building category, but by the category of zone and space. Another reason why the zone and space shall be focused is that zones and spaces, which have secondary functions to support the principal ones, still have impacts on overall energy use of the building.

6.2 Category of building

This document is focused upon the categories of non-residential building as shown in Table 9. However, the categorization of the building for the energy calculation may be dependent on existing categorizations of any national building regulations and should not be defined exclusively in an International Standard.

The definitions for the building categories, which are given in ISO/TR 16344 and coordinated with Table 9, should be referred.

Table 9 — Categories of non-residential buildings for schedule and condition of building, zone and space usage for energy calculation

Category of building		Representing zone(s) or space(s) for principal function(s) of building
1	Office	Office room, office room with heavy electrical load
2	Hotel	Guest room, banquet hall, conference hall
3	Hospital	Ward, consultation room
4	Shop	Large store, Small store, supermarket
5	Educational	Class room of junior and junior high school, class room of high school, lecture room of university, study room, experimental laboratory, lecture hall and gymnasium
6	Restaurant	Dining room of restaurant, guest room of coffee house, bar, kitchen
7	Library	Reading room, book stack
8	Museum	Exhibition room, storeroom
9	Sport and amusement	Gymnasium, spectator stand
10	Theatre	Auditorium, stage
11	Religious	Assembly room
12	Warehouse	Storage room

6.3 Category of space or zone

Categories of space or zone are provided in Annex C.

Minuteness of categories of space and zone should be determined by taking the characteristics of methods for energy calculation and their procedures. If fewer categories of space and zone are used for the calculation method, any rule shall be given on which type of space and zone and its schedule and

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condition should be applied to spaces and zones of the object building for the energy calculation. The rule shall be developed by taking all energy uses to be calculated into consideration. Some energy uses may need minuteness of types, while other energy uses may not need such minuteness.

Schedule and condition for types of space or zone are not only used directly as input parameters but also as the basis to draw more simplified input parameters for energy calculation. When merging adjacent spaces of different types according to the rule of an energy calculation method, their similarity and appropriateness to merge shall be checked by comparing their schedules and conditions.

The more types of space or zone are assumed, the more minute input parameters can be supplied. Since the minuteness of the energy calculation methods differs nation to nation, number of types of space or zone can be determined by taking the characteristic of the calculation method into calculation.

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Annex A
(informative)

Format of daily schedule

Figure A.1 is an example of format of daily schedule, which contains three different daily schedules (*a*, *b* and *c*). The actual examples for different spaces are given in Annex C. In Figure A.1, explanations of parameters are given around the format.

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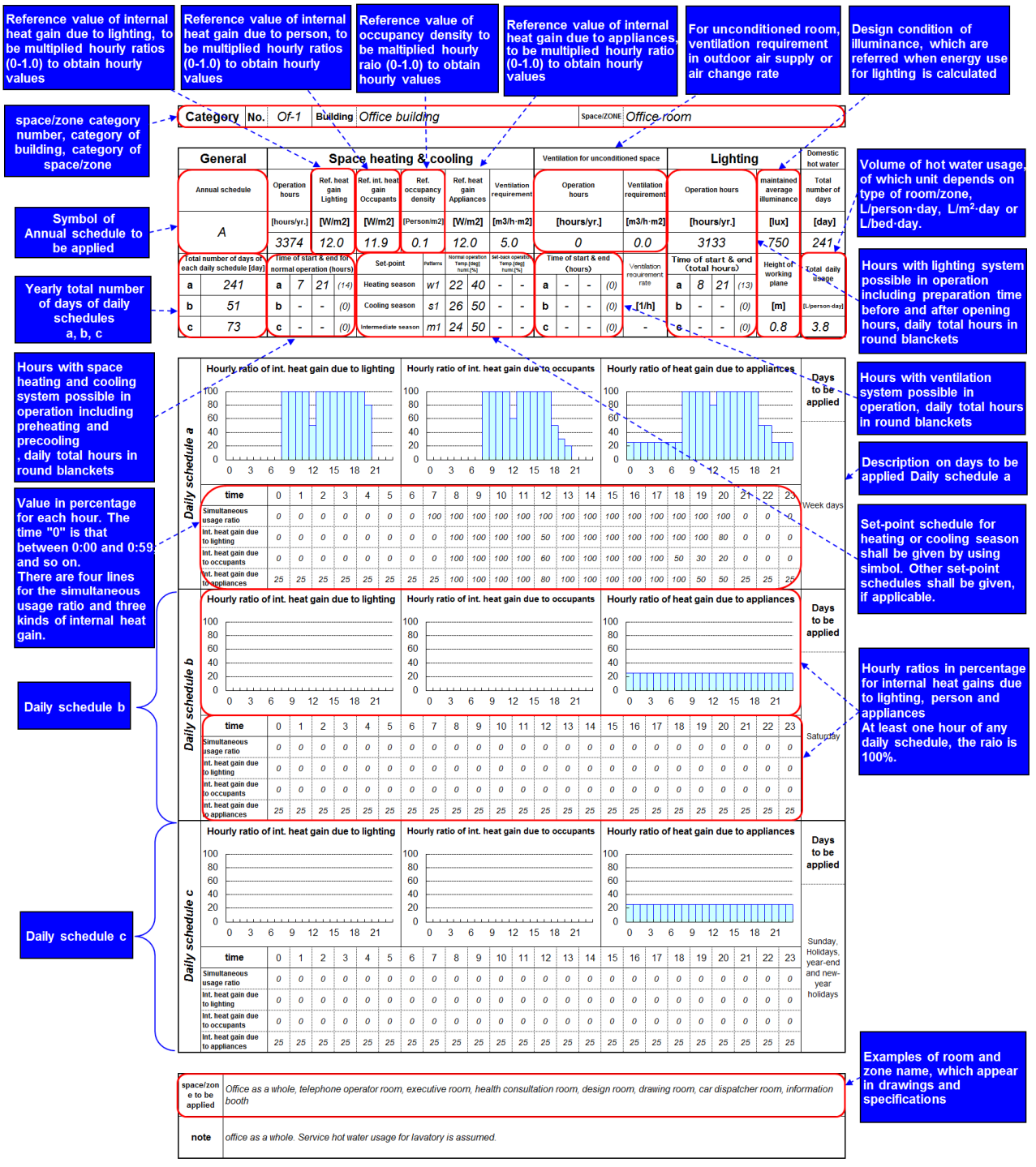

Figure A.1 — Format of a set of daily schedule for each category of space and zone

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Annex B
(informative)
Annual schedule by daily allocation of daily schedules

An example of the set of annual schedules by daily allocation of daily schedules is given in Table B.1. The daily allocation is for the minutest division of the year as prescribed in 4.3 (Table 3).

Table B.1 — Set of annual schedules by daily allocation of daily schedules

Annual schedule A		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					c*	c*	c*	c	a	a	a	a	a	b	c	c*	a	a	a	a	b
a b c	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
19 4 8	Daily schedule	c	a	a	a	a	a	b	c	a	a	a	a	a	b							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	c	a	a	a	a	a	b	c	a	a	c*	a	a	b	c	a	a	a	a	a	b
a b c	Date	22	23	24	25	26	27	28														
19 4 5	Daily schedule	c	a	a	a	a	a	b														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	c	a	a	a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	c*	b
a b c	Date	22	23	24	25	26	27	28	29	30	31											
21 4 6	Daily schedule	c	a	a	a	a	a	b	c	a	a											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	19	20	21	22	23	24	25	26	27	28	29	30									
21 4 5	Daily schedule	c	a	a	a	a	a	b	c	a	a	c*	a									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						a	b	c*	c*	c*	c*	a	a	b	c	a	a	a	a	a	b
a b c	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
18 5 8	Daily schedule	c	a	a	a	a	a	b	c	a	a	a	a	a	b	c						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		a	a	a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	21	22	23	24	25	26	27	28	29	30											
22 4 4	Daily schedule	c	a	a	a	a	a	b	c	a	a											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
22 4 5	Daily schedule	c	c*	a	a	a	a	b	c	a	a	a	a	a								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
21 5 5	Daily schedule	c	a	a	a	a	a	b	c	a	a	a	a	a	b	c	a					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			a	a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	20	21	22	23	24	25	26	27	28	29	30										
19 4 7	Daily schedule	c	c*	c*	c*	a	a	b	c	a	a	a										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					a	a	b	c	a	a	a	a	a	b	c	c*	a	a	a	a	b
a b c	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
21 5 5	Daily schedule	c	a	a	a	a	a	b	c	a	a	a	a	a	b							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	c	a	c*	a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	22	23	24	25	26	27	28	29	30												
19 4 7	Daily schedule	c	c*	a	a	a	a	b	c	a												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			a	a	a	a	b	c	a	a	a	a	a	b	c	a	a	a	a	a	b
a b c	Date	20	21	22	23	24	25	26	27	28	29	30	31									
19 4 8	Daily schedule	c	a	a	c*	a	a	b	c	a	c*	c*	c*									

Yearly total		
a	b	c
241	51	73

a: Week days
b: Saturday
c: Sunday
*: Holidays, year-end and new-year holidays

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Table B.1 *(continued)*

Annual schedule B		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c**	*c**	*c**	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
14 *14* *3*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28														
19 *9* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*b**	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30	31											
14 *17* *0*	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*b*	*b*	*b*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30									
18 *12* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						*a*	*b*	*b**	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
18 *13* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	21	22	23	24	25	26	27	28	29	30											
22 *8* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
16 *15* *0*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
a *b* *c*	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
0 *31* *0*	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30										
19 *11* *0*	Daily schedule	*b*	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
21 *10* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*b**	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30												
19 *11* *0*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*a*	*b*	*b*	*a*												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30	31									
16 *12* *3*	Daily schedule	*b*	*a*	*a*	*b**	*b*	*b*	*b*	*b*	*b*	*c**	*c**	*c**									

Yearly total		
a	*b*	*c*
196	*163*	*6*

a: Week days
b: Saturday, Sunday, Holidays, Spring summer and winter holidays
c: Year-end and new-year holidays
*: Holidays, year-end and new-year holidays

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Table B.1 *(continued)*

Annual schedule C		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c**	*c**	*c**	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
14 *14* *3*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28														
14 *14* *0*	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b**	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30	31											
0 *31* *0*	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*b*	*b*	*b*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30									
18 *12* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						*a*	*b*	*b**	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
18 *13* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	21	22	23	24	25	26	27	28	29	30											
22 *8* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
16 *15* *0*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
a *b* *c*	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
0 *31* *0*	Daily schedule	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30										
5 *25* *0*	Daily schedule	*b*	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
21 *10* *0*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*b**	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30												
19 *11* *0*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*a*	*b*	*b*	*a*												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30	31									
16 *12* *3*	Daily schedule	*b*	*a*	*a*	*b**	*b*	*b*	*b*	*b*	*b*	*c**	*c**	*c**									

Yearly total		
a	*b*	*c*
163	*196*	*6*

a: Week days
b: Saturday, Sunday, Holidays, Spring summer and winter holidays
c: Year-end and new-year holidays
*: Holidays, year-end and new-year holidays

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Table B.1 *(continued)*

Annual schedule D		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c**	*c**	*c**	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
18 | *9* | *4*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	22	23	24	25	26	27	28														
18 | *9* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*b**	*b*
a | *b* | *c*	Date	22	23	24	25	26	27	28	29	30	31											
20 | *10* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30									
20 | *9* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						*a*	*b*	*b**	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
17 | *13* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	21	22	23	24	25	26	27	28	29	30											
21 | *8* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
21 | *9* | *1*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
20 | *10* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	20	21	22	23	24	25	26	27	28	29	30										
18 | *11* | *1*	Daily schedule	*b*	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
20 | *10* | *1*	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*b**	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	22	23	24	25	26	27	28	29	30												
18 | *11* | *1*	Daily schedule	*b*	*b**	*a*	*a*	*a*	*a*	*b*	*b*	*a*												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a | *b* | *c*	Date	20	21	22	23	24	25	26	27	28	29	30	31									
18 | *9* | *4*	Daily schedule	*b*	*a*	*a*	*b**	*a*	*a*	*b*	*b*	*a*	*c**	*c**	*c**									

Yearly total		
a	*b*	*c*
229	*118*	*18*

a: Week days
b: Saturday, Sunday, Holidays
c: One day a month, Year-end and new-year holidays
*: Holidays, year-end and new-year holidays

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Table B.1 *(continued)*

Annual schedule E		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c**	*c**	*c**	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*c*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
15 *9* *7*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*b**	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28														
15 *9* *4*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*b**	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30	31											
16 *10* *5*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30									
17 *9* *4*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*b**	*a*									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						*a*	*b*	*b**	*b**	*b**	*b**	*c*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
14 *13* *4*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	21	22	23	24	25	26	27	28	29	30											
17 *8* *5*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
18 *9* *4*	Daily schedule	*b*	*b**	*c*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
16 *10* *5*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30										
15 *11* *4*	Daily schedule	*b*	*b**	*b**	*b**	*c*	*a*	*b*	*b*	*c*	*a*	*a*										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*c*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
17 *10* *4*	Daily schedule	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*b**	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30												
14 *11* *5*	Daily schedule	*b*	*b**	*c*	*a*	*a*	*a*	*b*	*b*	*c*												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*	*b*	*c*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30	31									
15 *9* *7*	Daily schedule	*b*	*c*	*a*	*b**	*a*	*a*	*b*	*b*	*c*	*c**	*c**	*c**									

Yearly total		
a	*b*	*c*
189	*118*	*58*

a: Week days
b: Saturday, Sunday, Holidays
c: One day a week, Year-end and new-year holidays
*: Holidays, year-end and new-year holidays

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Table B.1 *(continued)*

Annual schedule F		Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.
January	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c**	*c**	*b**	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
9 *10* *12*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*c*	*c*	*c*	*b*							
February	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28														
14 *9* *5*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*														
March	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*b**	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30	31											
9 *10* *12*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*											
April	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*c*	*c*	*c*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30									
10 *9* *11*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*b**	*c*									
May	Date						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Daily schedule						*c*	*b*	*b**	*b**	*b**	*b**	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
7 *13* *11*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*						
June	Date		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Daily schedule		*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	21	22	23	24	25	26	27	28	29	30											
15 *8* *7*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*											
July	Date				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Daily schedule				*c*	*c*	*c*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	19	20	21	22	23	24	25	26	27	28	29	30	31								
10 *9* *12*	Daily schedule	*b*	*b**	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*c*	*c*	*c*								
August	Date							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Daily schedule							*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
11 *10* *10*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*a*					
September	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30										
14 *11* *5*	Daily schedule	*b*	*b**	*b**	*b**	*c*	*c*	*b*	*b*	*c*	*c*	*c*										
October	Date					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Daily schedule					*c*	*c*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*b**	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
9 *10* *12*	Daily schedule	*b*	*c*	*c*	*c*	*c*	*c*	*b*	*b*	*c*	*c*	*c*	*c*	*c*	*b*							
November	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Daily schedule	*b*	*a*	*b**	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	22	23	24	25	26	27	28	29	30												
14 *11* *5*	Daily schedule	*b*	*b**	*c*	*c*	*c*	*c*	*b*	*b*	*c*												
December	Date			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Daily schedule			*c*	*c*	*c*	*c*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*	*b*	*a*	*a*	*a*	*a*	*a*	*b*
a *b* *c*	Date	20	21	22	23	24	25	26	27	28	29	30	31									
10 *9* *12*	Daily schedule	*b*	*c*	*c*	*b**	*c*	*c*	*b*	*b*	*c*	*c**	*c**	*c**									

Yearly total		
a	*b*	*c*
132	*119*	*114*

a: Week days
b: Saturday, Sunday, Holidays
c: Two weeks a month
*: Holidays, year-end and new-year holidays

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Annex C
(informative)

Categories of space and zone

C.1 General

Annex C provides an example of categories of space or zone for buildings listed in Table 9. In tables, spaces or zones in bold letters are representing ones for each category of building. This annex includes rather detailed categories of spaces or zones when they are compared with current categories used for building energy calculations. However, in practices for application process of complying with energy standard or for energy certification, any standardized rule to allocate one schedule and condition to any possible kinds of space and zone of target kinds of building has to be prepared for energy calculation. Therefore, even though it is not indispensable to prepare different schedules and conditions for each of different categories of space and zone, it is indispensable to set a table giving correspondence between possible names in drawings and categories of space and zone for energy calculations.

C.2 Categories of space or zone

C.2.1 Office building

Representing space or zone is “office room” or “office room with heavy electrical load”. For a set of personal offices or meeting room, the application of simultaneous usage ratio is recommended in order to make energy calculation more accurate, when partial air-conditioning is possible in the building. If the building contains other functions such as shops, restaurant and so on, types of space or zone for relevant categories of building shall be used.

Table C.1 — Categories of space or zone for office building

Of-1 **Office room**
Of-2 **Office room with heavy electrical load**
Of-3 Meeting room
Of-4 Tea room
Of-5 Canteen
Of-6 Central monitor room
Of-7 Changing room
Of-8 Corridor
Of-9 Lobby
Of-10 Lavatory
Of-11 Smoking room
Of-12 Kitchen
Of-13 Indoor parking garage
Of-14 Machine room
Of-15 Electric room
Of-16 Kitchenette with hot water server
Of-17 Storage room
Of-18 Printing room
Of-19 Garbage storage

C.2.2 Hotel building

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C.2.2 Hotel building

Representative spaces or zones are “guest room”, and “banquet hall”, “conference hall” or “wedding hall”. Especially the characteristics of “guest room” and the halls are quite different to each other. For the guest room and the halls, the application of simultaneous usage ratio is recommended in order to make energy calculation more accurate.

Table C.2 — Categories of space or zone for hotel building

Ht-1 **Guest room**
Ht-2 Bath room inside guest room
Ht-3 Front desk open all day
Ht-4 Office room open all day
Ht-5 Corridor open all day
Ht-6 Lobby open all day
Ht-7 Lavatory open all day
Ht-8 Smoking room open all day
Ht-9 **Banquet hall**
Ht-10 **Conference hall**
Ht-11 **Wedding ceremony hall**
Ht-12 Restaurant
Ht-13 Lounge
Ht-14 Bar
Ht-15 Shop
Ht-16 Staff canteen
Ht-17 Changing room
Ht-18 Front desk open not all day
Ht-19 Office room open not all day
Ht-20 Corridor open not all day
Ht-21 Lobby open not all day
Ht-22 Lavatory open not all day
Ht-23 Smoking room open not all day
Ht-24 Kitchen
Ht-25 Indoor parking garage
Ht-26 Machine room
Ht-27 Electric room
Ht-28 Kitchenette with hot water server
Ht-29 Storage room
Ht-30 Printing room
Ht-31 Garbage storage room

C.2.3 Hospital building

The representative spaces or zones are “ward” and “consultation room”. The schedules of those spaces are quite different to each other and some hospital buildings have only one of those spaces or zones.

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Table C.3 — Categories of space or zone for hospital building

Hp-1 **Ward**
Hp-2 Bathroom
Hp-3 Nurses' station
Hp-4 Corridor open all day
Hp-5 Lobby open all day
Hp-6 Lavatory for common use open all day
Hp-7 Smoking room open all day
Hp-8 **Consultation room**
Hp-9 Waiting room
Hp-10 Operating room
Hp-11 Examination room
Hp-12 Intensive care unit
Hp-13 Dissecting room
Hp-14 Restaurant
Hp-15 Office room
Hp-16 Changing room
Hp-17 Corridor open not all day
Hp-18 Lobby open not all day
Hp-19 Lavatory for common use open not all day
Hp-20 Smoking room open not all day
Hp-21 Kitchen
Hp-22 Indoor parking garage
Hp-23 Machine room
Hp-24 Electric room
Hp-25 Kitchenette with hot water server
Hp-26 Storage room
Hp-27 Printing room
Hp-28 Garbage storage room

C.2.4 Shop building

The representative spaces or zones are "large store", "small store" and "supermarket". Among shop buildings, there are various categories of room or zone depending on sold goods and the way of displaying them. The change of occupancy density during a week and seasons is remarkable for some categories of stop building.

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Table C.4 — Categories of space or zone for shop building

Sh-1 **Large store**
Sh-2 **Small store**
Sh-3 **Supermarket**
Sh-4 Storage and goods disposal room
Sh-5 Office room
Sh-6 Changing room
Sh-7 Lobby
Sh-8 Lavatory
Sh-9 Smoking room
Sh-10 Kitchen
Sh-11 Indoor parking garage
Sh-12 Machine room
Sh-13 Electric room
Sh-14 Kitchenette with hot water server
Sh-15 Storage room
Sh-16 Printing room
Sh-17 Garbage storage room

C.2.5 Educational building

There are various categories of educational building, from nursery school to university. Heat gains due to person can be different according to the size of occupants, and composition of spaces or zones can be different according to their function. The representative spaces or zones are “class room”, “lecture room” and “lecture hall”, but “office room”, “study room” and “experimental laboratory” should be added in the case of universities. Most of educational organizations have “gymnasium”, whose schedule and condition is quite different from other spaces or zones. “Canteen of junior, junior high and high school” and “kitchen” resemble “dining room of restaurant” and its “kitchen”, respectively, but their schedules are different to each other.

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Table C.5 — Categories of space or zone for educational building

Ed-1 **Class room of junior and junior high school**
Ed-2 **Class room of high school**
Ed-3 Teachers' room
Ed-4 Canteen of junior, junior high and high school
Ed-5 **Lecture room of university**
Ed-6 Canteen of university
Ed-7 **Office room**
Ed-8 **Study room**
Ed-9 Computer exercise room
Ed-10 **Laboratory**
Ed-11 Practice room
Ed-12 **Lecture hall and gymnasium**
Ed-13 Night watchman's room
Ed-14 Changing room
Ed-15 Corridor
Ed-16 Lobby
Ed-17 Lavatory
Ed-18 Smoking room
Ed-19 Kitchen
Ed-20 Indoor parking garage
Ed-21 Machine room
Ed-22 Electric room
Ed-23 Kitchenette with hot water server
Ed-24 Storage room
Ed-25 Printing room
Ed-26 Garbage storage room

C.2.6 Restaurant building

The representative spaces or zones are "dining room for restaurant", "guest room of coffee house", "bar" and "kitchen".

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Table C.6 — Categories of space or zone for restaurant building

Rs-1 **Dining room of restaurant**
Rs-2 **Guest room of Cafeteria**
Rs-3 **Guest room of coffee house**
Rs-4 Bar
Rs-5 Reception
Rs-6 Office room
Rs-7 Changing room
Rs-8 Corridor
Rs-9 Lobby
Rs-10 Lavatory
Rs-11 Smoking room
Rs-12 **Kitchen**
Rs-13 Indoor parking garage
Rs-14 Machine room
Rs-15 Electric room
Rs-16 Kitchenette with hot water server
Rs-17 Storage room
Rs-18 Printing room
Rs-19 Garbage storage room

C.2.7 Library building

The representative space or zone is “reading room”. Categories of attached space or zone are given in C.2.12.

Table C.7 — Categories of space or zone for library building

Lb-1 **Reading room**
Lb-2 Lobby
Lb-3 Lavatory
Lb-4 Smoking room

C.2.8 Museum building

The representative space or zone is “exhibition room”. Categories of attached space or zone are given in C.2.12.

Table C.8 — Categories of space or zone for museum building

Ms-1 **Exhibition room**
Ms-2 Lobby
Ms-3 Lavatory
Ms-4 Smoking room

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C.2.9 Sports and amusement building

Categories of attached space or zone are given in C.2.12.

Table C.9 — Categories of space or zone for sports facilities building

Sa-1 **Exercise room of sports club**
Sa-2 Lobby of sports club
Sa-3 Lavatory of sports club
Sa-4 Smoking room of sports club
Sa-5 **Skating rink for official competition**
Sa-6 **Gymnasium for official competition**
Sa-7 **Skating rink for general competition**
Sa-8 **Gymnasium for general competition**
Sa-9 **Skating rink for recreation**
Sa-10 **Gymnasium for recreation**
Sa-11 **Spectator stand of gymnasium or skating rink**
Sa-12 Lobby of gymnasium or skating rink
Sa-13 Lavatory of gymnasium or skating rink
Sa-14 Smoking room of gymnasium or skating rink
Sa-15 **Spectator stand of racing course**
Sa-16 Betting shop of racing course
Sa-17 Lobby of racing course
Sa-18 Lavatory of racing course
Sa-19 Smoking room of racing course
Sa-20 **Bowling alley**
Sa-21 **Karaoke room**
Sa-22 **Pachinko or slot machine hall**
Sa-23 **Bath hall of bathhouse**
Sa-24 Changing room of bathhouse
Sa-25 Lounge of bathhouse
Sa-26 Lobby of bathhouse
Sa-27 Lavatory of bathhouse
Sa-28 Smoking room of bathhouse

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C.2.10 Theatre building

Categories of attached space or zone are given in C.2.12.

Table C.10 — Categories of space or zone for theatre building

Th-1 **Auditorium of theatre**
Th-2 Stage of theatre
Th-3 Backstage of theatre
Th-4 Lobby of theatre
Th-5 Lavatory of theatre
Th-6 Smoking room of theatre
Th-7 **Auditorium of movie theatre**
Th-8 Lobby of movie theatre
Th-9 Lavatory of movie theatre
Th-10 Smoking room of movie theatre

C.2.11 Religious building

Categories of attached space or zone are given in C.2.12.

Table C.11 — Categories of space or zone for religious building

Re-1 **Main hall of religious building**
Re-2 Lobby
Re-3 Lavatory
Re-4 Smoking room

C.2.12 Attached space or zone for assembly buildings

The following spaces or zones are attached ones to library (C.2.7), museum (C.2.8), sports and amusement (C.2.9), theatre (C.2.10) and religious (C.2.11) buildings.

Table C.12 — Categories of attached space or zone for assembly buildings

At_As-1 Kitchen
At_As-2 Indoor parking garage
At_As-3 Machine room
At_As-4 Electric room
At_As-5 Kitchenette with hot water server
At_As-6 Storage room
At_As-7 Printing room
At_As-8 Garbage storage room

C.2.13 Warehouse building

Table C.13 — Categories of space or zone for warehouse building

Fc-1 Storage room
Fc-2 Outdoor parking garage

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Annex D
(informative)

A set of daily schedules for categories of space and zone

D.1 General

Annex D provides an example of a set of daily schedules is provided for the categories of space and zone listed in Table C.1 to Table C.13. The format and the items of the daily schedules are explained in Annex A. The annual schedules *A* to *F* referred in the part "General" are given in Annex B.

This set of daily schedules is developed in 2011 to 2012 for the energy calculation of non-residential buildings.[15] The values were determined on the basis of the questionnaire and the interview to designers of building technical systems and on the field measurement of electricity consumption for lighting equipment and electric appliances. As for the internal heat gain due to lighting, it should be noted that the values are based on the situation before a wide spread of LEDs. Therefore, the values in the daily schedules in this annex should be used only when no original daily schedule is available.

In the part "Lighting", the maintained average illuminance on the height of working plane are given as part of the requirement of lighting design. The values are given just as examples and the relevant standards, i.e. ISO 8995-1, shall be applied and referenced when determining the values.

D.2 Daily schedules

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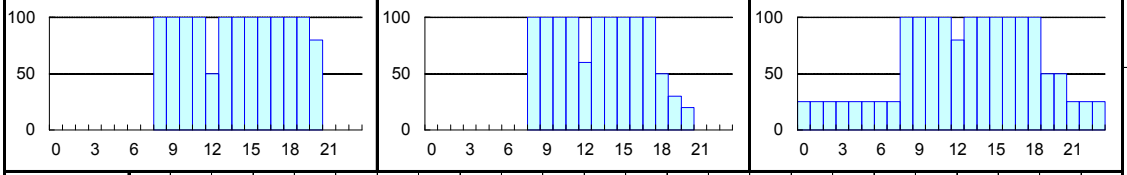
D.2.1 Office building

Category	No.	Of-1	Building	Office building	Space/ZONE	Office room

General		Space heating & cooling								Ventilation for unconditioned space		Lighting		Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement			Operation hours	Ventilation requirement	Operation hours	maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]			[hours/yr.]	[m3/h·m2]	[hours/yr.]	[lux]	[day]
		3374	12.0	11.9	0.1	12.0	5.0			0	0.0	3133	750	241
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)				Set-point	Patterns	Normal operation Temp.[deg] humi.[%]	Set-back operation Temp.[deg] humi.[%]	Time of start & end (hours)	Ventilation requirement rate	Time of start & end (total hours)	Height of working plane	Total daily usage
a	241	a	7	21	(14)	Heating season	w1	22	40	- -	a - - (0)	a 8	21 (13)	[L/person-day]
b	51	b	-	-	(0)	Cooling season	s1	26	50	- -	b - - (0)	[1/h]	b - - (0)	[m]
c	73	c	-	-	(0)	Intermediate season	m1	24	50	- -	c - - (0)	-	c - - (0)	0.8

Daily schedule a

Hourly ratio of int. heat gain due to lighting / Hourly ratio of int. heat gain due to occupants / Hourly ratio of heat gain due to appliances

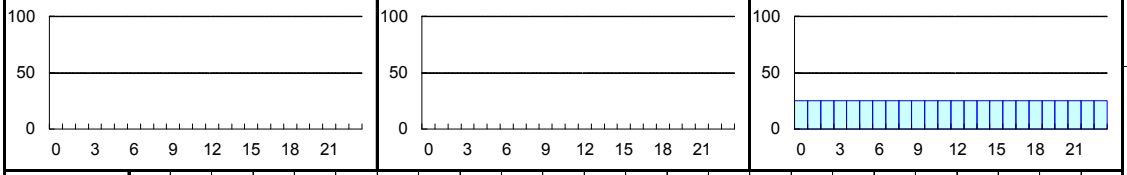


Days to be applied: Week days

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	100	100	100	100	50	100	100	100	100	100	100	100	80	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	100	100	100	100	60	100	100	100	100	100	50	30	20	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	100	100	100	100	80	100	100	100	100	100	100	50	50	25	25	25

Daily schedule b

Hourly ratio of int. heat gain due to lighting / Hourly ratio of int. heat gain due to occupants / Hourly ratio of heat gain due to appliances

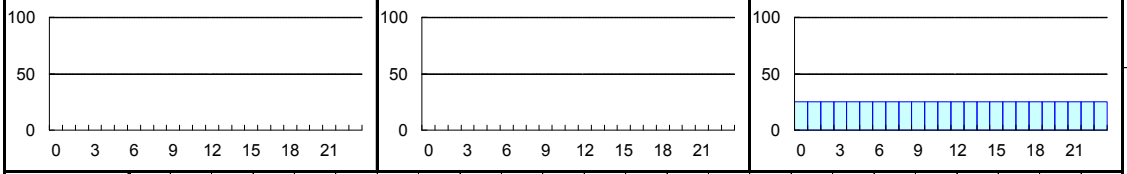


Days to be applied: Saturday

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

Daily schedule c

Hourly ratio of int. heat gain due to lighting / Hourly ratio of int. heat gain due to occupants / Hourly ratio of heat gain due to appliances



Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

space/zone to be applied	*Office as a whole, telephone operator room, executive room, health consultation room, design room, drawing room, car dispatcher room, information booth*
note	*office as a whole. Service hot water usage for lavatory is assumed.*

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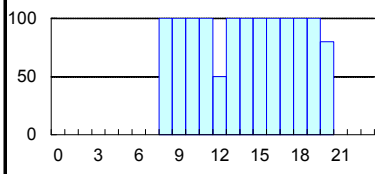
Category	No.	Of-2	Building	Office building	Space/ZONE	Office room with heavy electrical load

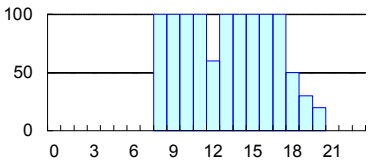
General		Space heating & cooling								Ventilation for unconditioned space		Lighting		Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement			Operation hours	Ventilation requirement	Operation hours	maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]			[hours/yr.]	[m3/h·m2]	[hours/yr.]	[lux]	[day]
		3374	12.0	11.9	0.1	30.0	5.0			0	0.0	3133	750	241
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)			Set-point	Patterns	Normal operation Temp.[deg] humi.[%]		Set-back operation Temp.[deg] humi.[%]	Time of start & end ihoursj		Ventilation requirement rate	Time of start & end (total hours)	Height of working plane	Total daily usage
a	241	a 7	21	(14)	Heating season	w1	22	40	- -	a -	- (0)		a 8	21 (13)	0.8	3.8
b	51	b -	-	(0)	Cooling season	s1	26	50	- -	b -	- (0)	[1/h]	b -	- (0)	[m]	[L/person-day]
c	73	c -	-	(0)	Intermediate season	m1	24	50	- -	c -	- (0)	-	c -	- (0)		

Daily schedule a

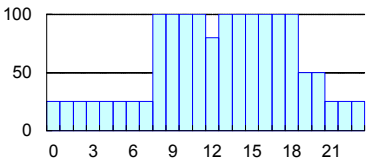
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

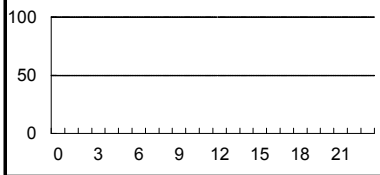


Days to be applied: Week days

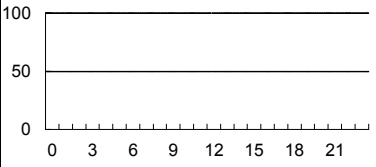
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	100	100	100	100	50	100	100	100	100	100	100	100	80	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	100	100	100	100	60	100	100	100	100	100	50	30	20	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	100	100	100	100	80	100	100	100	100	100	100	50	50	25	25	25

Daily schedule b

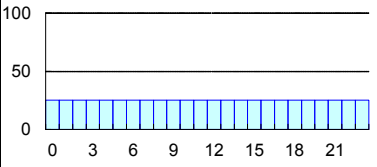
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

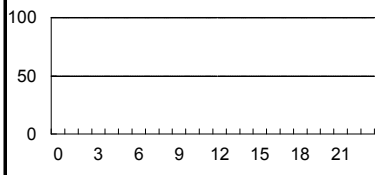


Days to be applied: Saturday

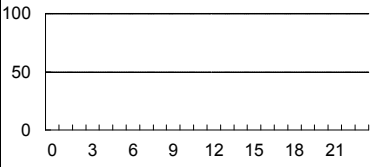
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

Daily schedule c

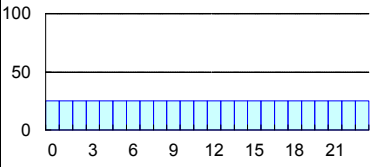
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances



Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

space/zone to be applied	*Computerized office room, server space, recording studio, control room, research room*
note	*office room with heavy electrical load. Service hot water usage for lavatory is assumed.*

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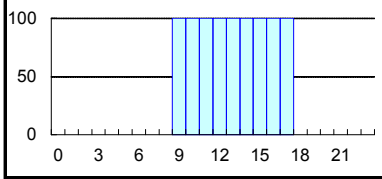
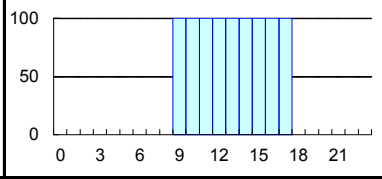
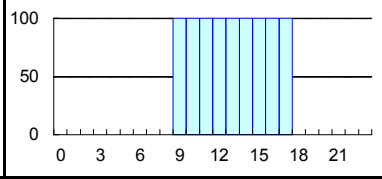
Category	No.	Of-3	Building	Office building	Space/ZONE	Meeting room

General		Space heating & cooling						Ventilation for unconditioned space		Lighting		Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement	Operation hours	Ventilation requirement	Operation hours	maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]	[hours/yr.]	[m3/h·m2]	[hours/yr.]	[lux]	[day]
		2410	10.0	29.8	0.3	2.0	12.0	0	0.0	2169	500	241
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)			Set-point	Patterns	Normal operation Temp.[deg] humi.[%]	Set-back operation Temp.[deg] humi.[%]		Time of start & end ihoursj		Ventilation requirement rate	Time of start & end (total hours)		Height of working plane	Total daily usage
a	241	a 8	18	(10)	Heating season	w1	22	40	- -	a -	- (0)		a 9	18 (9)		
b	51	b -	-	(0)	Cooling season	s1	26	50	- -	b -	- (0)	[1/h]	b -	- (0)	[m]	[L/person-day]
c	73	c -	-	(0)	Intermediate season	m1	24	50	- -	c -	- (0)	-	c -	- (0)	0.8	3.8

Daily schedule a



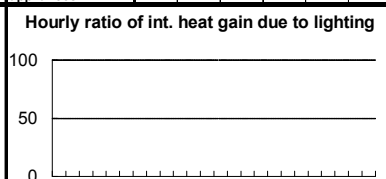


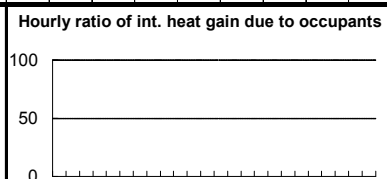


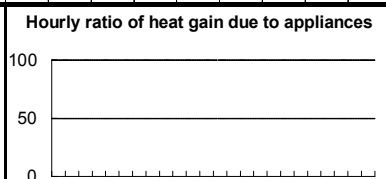
Days to be applied: Week days

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0

Daily schedule b



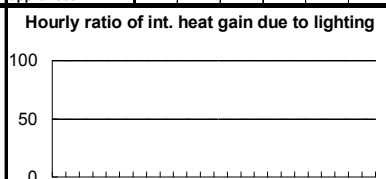


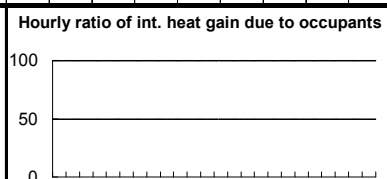


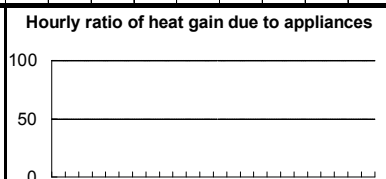
Days to be applied: Saturday

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule c







Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

space/zone to be applied	*Meeting corner, seminar room, multi-purpose room, assembly room, drawing room, lecture room, conference room*
note	*This room is used during the daytime. Occupancy density is higher than office room.*

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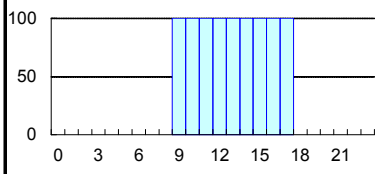
Category	No.	Of-4	Building	Office building	Space/ZONE	Tea room

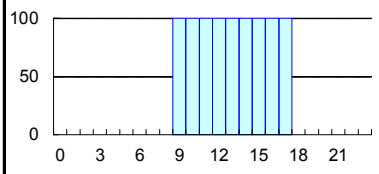
General		Space heating & cooling								Ventilation for unconditioned space		Lighting			Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement			Operation hours	Ventilation requirement	Operation hours		maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]			[hours/yr.]	[m3/h·m2]	[hours/yr.]		[lux]	[day]
		2410	10.0	29.8	0.3	2.0	12.0			0	0.0	2169		300	241
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)			Set-point	Patterns	Normal operation Temp.[deg] humi.[%]		Set-back operation Temp.[deg] humi.[%]	Time of start & end ihoursj		Ventilation requirement rate	Time of start & end (total hours)		Height of working plane	Total daily usage
a	241	a 8	18	(10)	Heating season	w1	22	40	- -	a -	-	(0)	a 9	18 (9)	[m]	[L/m2-day]
b	51	b -	-	(0)	Cooling season	s1	26	50	- -	b -	-	(0)	b -	- (0)	0.8	32.0
c	73	c -	-	(0)	Intermediate season	m1	24	50	- -	c -	-	(0)	c -	- (0)		

Daily schedule a

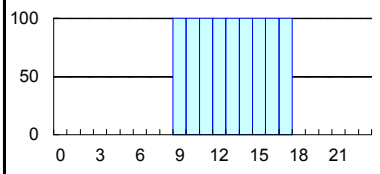
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

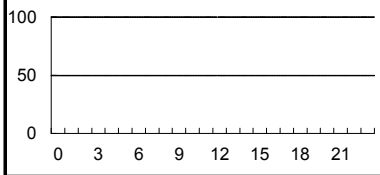


Days to be applied: Week days

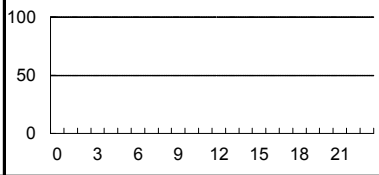
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0

Daily schedule b

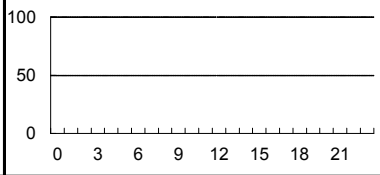
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

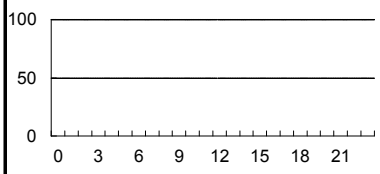


Days to be applied: Saturday

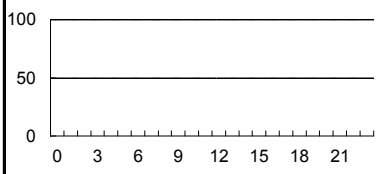
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule c

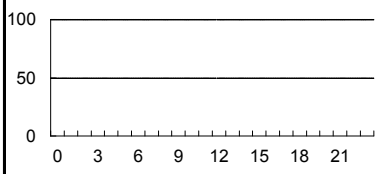
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances



Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

space/zone to be applied	*Resting room*
note	*service hot water usage for cafeteria and coffee house is assumed.*

Documents
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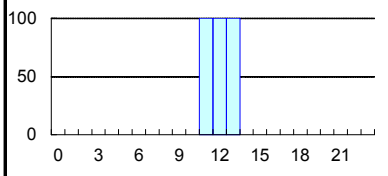
Full document details: BS ISO 18523-1:2016

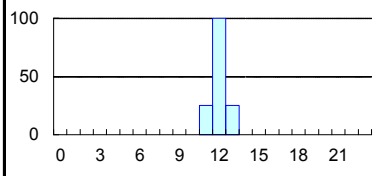
Category	No.	Of-5	Building	Office building	Space/ZONE	Canteen

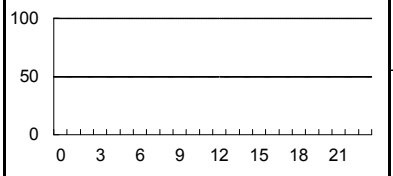
General		Space heating & cooling						Ventilation for unconditioned space		Lighting		Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement	Operation hours	Ventilation requirement	Operation hours	maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]	[hours/yr.]	[m3/h·m2]	[hours/yr.]	[lux]	[day]
		723	30.0	59.5	0.5	0.0	15.0	0	0.0	723	500	241

Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)				Set-point	Patterns	Normal operation Temp.[deg] humi.[%]		Set-back operation Temp.[deg] humi.[%]		Time of start & end ihoursj				Ventilation requirement rate	Time of start & end (total hours)				Height of working plane	Total daily usage
a	241	a	11	14	(3)	Heating season	w1	22	40	-	-	a	-	-	(0)		a	11	14	(3)		
b	51	b	-	-	(0)	Cooling season	s1	26	50	-	-	b	-	-	(0)	[1/h]	b	-	-	(0)	[m]	[L/m2-day]
c	73	c	-	-	(0)	Intermediate season	m1	24	50	-	-	c	-	-	(0)	-	c	-	-	(0)	0.8	48.0

Daily schedule a



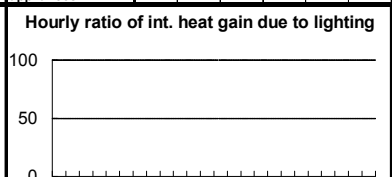


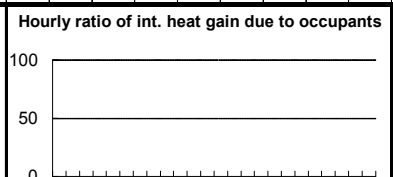


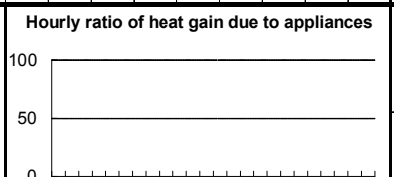
Days to be applied: Week days

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	100	100	100	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	100	100	100	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	25	100	25	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule b



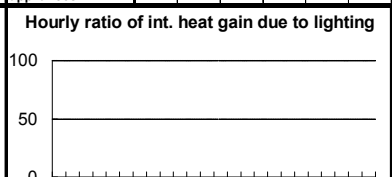


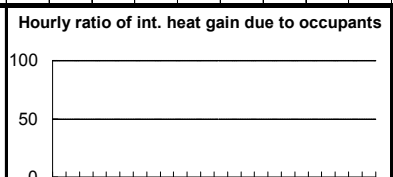


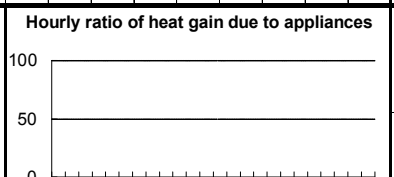
Days to be applied: Saturday

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule c







Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

space/zone to be applied	*Staff canteen, cafeteria, restaurant*
note	*service hot water usage for restaurant is assumed.*

Documents
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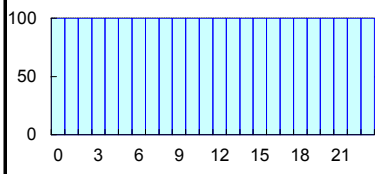
Full document details: BS ISO 18523-1:2016

Category	No.	Of-6	Building	Office building	Space/ZONE	Central monitor room

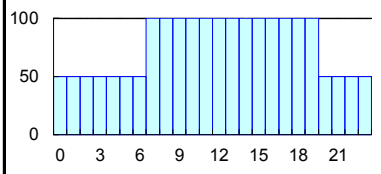
General		Space heating & cooling								Ventilation for unconditioned space		Lighting			Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement			Operation hours	Ventilation requirement	Operation hours		maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]			[hours/yr.]	[m3/h·m2]	[hours/yr.]		[lux]	[day]
		8760	20.0	17.9	0.2	30.0	4.0			0	0.0	8760		500	365
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)			Set-point	Patterns	Normal operation Temp.[deg] humi.[%]		Set-back operation Temp.[deg] humi.[%]	Time of start & end ihoursj		Ventilation requirement rate	Time of start & end (total hours)		Height of working plane	Total daily usage
a	241	a - 24 (24)			Heating season	w1	22	40	- -	a - - (0)			a - 24 (24)			
b	51	b - 24 (24)			Cooling season	s1	26	50	- -	b - - (0)		[1/h]	b - 24 (24)		[m]	[L/person-day]
c	73	c - 24 (24)			Intermediate season	m1	24	50	- -	c - - (0)		-	c - 24 (24)		0.8	3.8

Daily schedule a

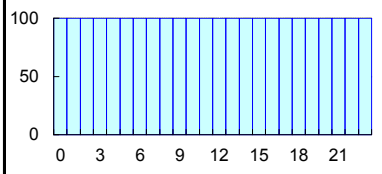
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

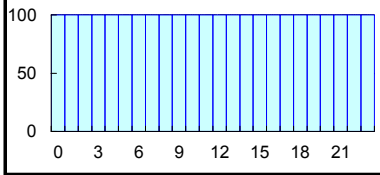


Days to be applied: Week days

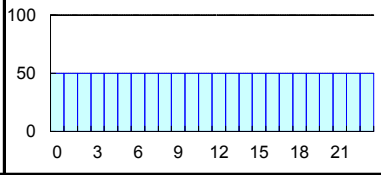
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to lighting	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to occupants	50	50	50	50	50	50	50	100	100	100	100	100	100	100	100	100	100	100	100	100	50	50	50	50
Int. heat gain due to appliances	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Daily schedule b

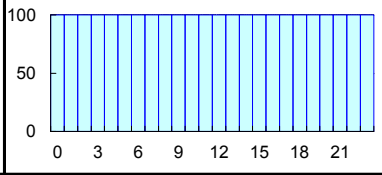
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances

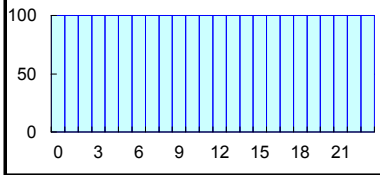


Days to be applied: Saturday

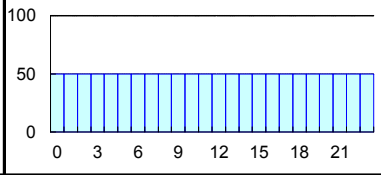
time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to lighting	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to occupants	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Int. heat gain due to appliances	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Daily schedule c

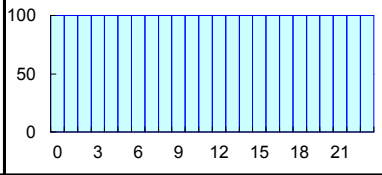
Hourly ratio of int. heat gain due to lighting



Hourly ratio of int. heat gain due to occupants



Hourly ratio of heat gain due to appliances



Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to lighting	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Int. heat gain due to occupants	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Int. heat gain due to appliances	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

space/zone to be applied	*Central control room, disaster prevention center, guardroom, night watchman's room*
note	*Continuous usage is assumed throughout the year.*

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Documents
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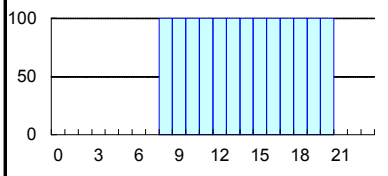
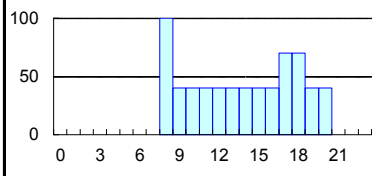
Full document details: BS ISO 18523-1:2016

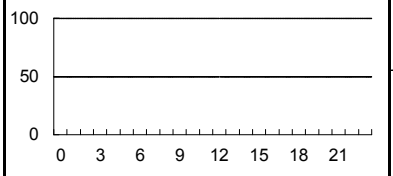
Category	No.	Building	Space/ZONE
	Of-7	Office building	Changing room

General		Space heating & cooling						Ventilation for unconditioned space		Lighting		Domestic hot water
Annual schedule		Operation hours	Ref. heat gain Lighting	Ref. int. heat gain Occupants	Ref. occupancy density	Ref. heat gain Appliances	Ventilation requirement	Operation hours	Ventilation requirement	Operation hours	maintained average illuminance	Total number of days
A		[hours/yr.]	[W/m2]	[W/m2]	[Person/m2]	[W/m2]	[m3/h·m2]	[hours/yr.]	[m3/h·m2]	[hours/yr.]	[lux]	[day]
		3374	15.0	35.7	0.3	0.0	4.0	3133	13.5	3133	300	241
Total number of days of each daily schedule [day]		Time of start & end for normal operation (hours)			Set-point	Patterns	Normal operation Temp.[deg] humi.[%]	Set-back operation Temp.[deg] humi.[%]		Time of start & end (hours)		Ventilation requirement rate	Time of start & end (total hours)		Height of working plane	Total daily usage
a	241	a 7	21	(14)	Heating season	w1	22	40	- -	a 8	21	(13)	a 8	21	(13)	
b	51	b -	-	(0)	Cooling season	s1	26	50	- -	b -	-	(0)	b -	-	(0)	[1/h]	[m]	[L/person-day]
c	73	c -	-	(0)	Intermediate season	m1	24	50	- -	c -	-	(0)	5	c -	-	(0)	0	62.0

Daily schedule a



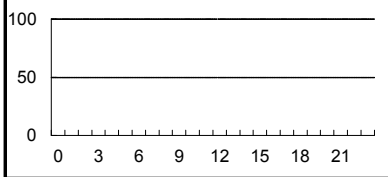


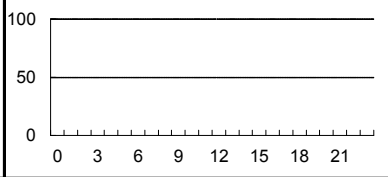


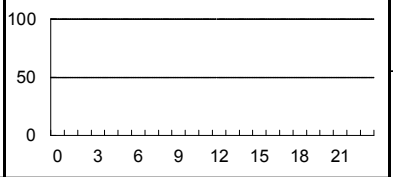
Days to be applied: Week days

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	40	80	40	40	40	40	40	40	40	40	80	80	40	40	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	100	100	100	100	100	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	100	40	40	40	40	40	40	40	40	70	70	40	40	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule b



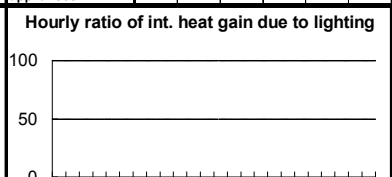


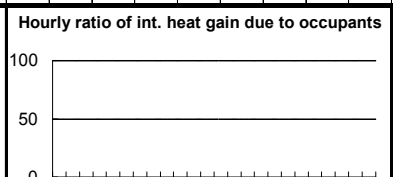


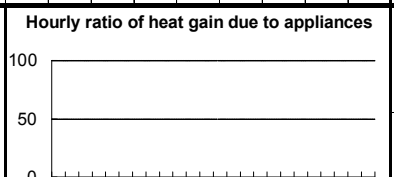
Days to be applied: Saturday

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Daily schedule c







Days to be applied: Sunday, Holidays, year-end and new-year holidays

time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Simultaneous usage ratio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to lighting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to occupants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Int. heat gain due to appliances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

space/zone to be applied	*Locker room, dressing room, collector waiting room, receptionist waiting room, storage room, library*
note	*Air change rate of 5 1/h is assumed. Service hot water usage for bathing or shower is assumed.*

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