A. Criteria for Building Owners Concerning the Rationalization of Energy Use in Buildings

Notification No. 1 of the Ministry of International Trade and Industry and the Ministry of Construction of July 29, 1993

1. Prevention of heat loss through external walls, windows, etc.

With regard to the buildings that are to be used for the purposes listed in Appendix 1 (a), the value calculated by dividing the annual heat load in indoor peripheral spaces of the applicable building (i.e. the internal spaces within five meters in level from the centerlines of outside-facing walls on each floor except for the basement, plus the internal space of the floor directly under the roof and the internal space of floors which directly face open air; this interpretation is applied throughout this Notification) by the total floor area (unit: square meters) of indoor peripheral space on every story shall be kept equivalent to or less than the value calculated by multiplying the value shown in Appendix 1 (b) by the scale adjustment factor. In this case, the annual heat load and the scale adjustment factor of indoor peripheral spaces are defined as indicated in the following clauses (1) and (2):

(1) The annual heat load of indoor peripheral spaces is the total value (unit: megacalorie) of heating load and cooling load listed in the following items (a) through (d) for one year (if use time of each room is set up for respective purposes, only such use time is applied; this interpretation is applied throughout this notification):
   (a) The amount of heat that penetrates through walls or windows due to difference of atmosphere temperatures between open air and internal peripheral spaces (in the case of heating load, the difference between 22° C and the open-air temperature, while for cooling load, the difference between 26° C and the open-air temperature; however, for heating load of buildings used for shops selling goods and for heating load of class rooms in school buildings, it shall be the difference of temperatures between 20° C and the open-air temperature).
   (b) Insulation heat penetrating through external walls, windows, etc.
   (c) Heat generated in indoor peripheral spaces
   (d) Heat amount of intake open air based on the volumes calculated in the following equations (equation (i) is applied to guest rooms in a building used as a hotel or inn; (ii) is applied to sickrooms in a building used as a hospital or clinic; (iii) is applied to non-

sickrooms in a building used as a hospital or clinic; (iv) is applied to classrooms in a building used as a school; and (v) is applied to non-guest rooms in a building used as a hotel or inn, a building for a shop selling goods, a building used for offices, or non-classrooms in a building used as a school):

(i) $V = 3.9A_p$

(ii) $V = 4.0A_p$

(iii) $V = 6.0A_p$

(iv) $V = 10A_p$

(v) $V = 20A_p/N$

V, A_p and N in the above equations represent the following respective values:

V: Intake volume of open air (unit: cubic meters per hour)

A_p: Floor area of indoor peripheral spaces (unit: square meters)

N: Occupied area per capita for each situation (unit: square meters)

(2) The scale adjustment factor is the values indicated in Appendix 2, which are applied according on the value calculated by dividing the total area on every floor in a building excluding the basement by the number of floors excluding the basement (hereinafter referred to as "the Average Floor Area") in relation to the number of floors excluding the basement.

2. Effective utilization of energy in relation to air-conditioning equipment

With regard to air-conditioners to be installed in the buildings which are used for the purposes listed in Appendix 1 (a), the value calculated by dividing the amount of calories that are converted from the volume of energy consumed for one year in order to correspond to air-conditioning load with the said air-conditioning equipment, by the virtual air-conditioning load of the said building in the same period shall be equivalent to or less than the applicable value indicated in Appendix 1 (c). In this case, conversion of energy volume into calories in relation to the energy shown in the left column of Appendix 3 depends on the values indicated in the right column of the said Appendix (i.e. the applicable value in cases where such a value below the values indicated in the right column of Appendix 3 can be achieved by installing equipment or devices that can improve efficiency of energy use (hereinafter referred to as "Energy Efficiency Improvement Equipment")). As for the other energies, they depend on their compositions, while air-conditioning loads and virtual air-conditioning loads depend on items (1) and (2) defined below:

(1) Air-conditioning load is the load that arises from the following heat listed:

(a) Heat penetrating through external walls and windows due to the difference of temperature between open air and indoors (limited to the air-conditioned spaces. This interpretation is also applied to the next sub-clause (2))

(b) Insulation heat penetrating through external walls, windows, etc.

(c) Heat generated indoors

(d) Heat from intaken open air

(e) Other heat generated depending on conditions of the said building

(2) The virtual air-conditioning load is the load generated from the heat listed items (a), (b), (c), and (e) of the above sub-clause (1) as well as the heat of intaken open-air based on the amount (in the case of guest rooms without bath room in a building used as a hotel, it is the amount depending upon the actual conditions) calculated from the following equations (equation (i) is applied to guest rooms in a building used as a hotel or inn; (ii) is applied to sickrooms in a building used as a hospital or clinic; (iii) is applied to non-sickrooms in a building used as a hospital or clinic; (iv) is applied to classrooms in a building used as a school; and (v) is to non-guest rooms in a building used as a hotel or inn, a building of shop selling goods, a building used for offices, or non-classrooms in a building used as a school). However, decrease of load due to collection of waste heat is not taken into consideration.

(i) $V = 3.9A_f$

(ii) $V = 4.0A_f$

(iii) $V = 6.0A_f$

(iv) $V = 10A_f$

(v) $V = 10A_f/N$

V, A_f and N in the above equations represent the following respective values:

V: Intake volume of open air (unit: cubic meters per hour)

A_f: Floor area of indoor floor area (unit: square meters)

N: Occupied area per capita for each situation (unit: cubic meters)

3. Effective utilization of energy in relation to mechanical ventilation equipment other than air-conditioning equipment

With regard to mechanical ventilation equipment (except for air-conditioning equipment) to be installed in the buildings which are used for the purposes listed in Appendix 1 (a), the value calculated by dividing the amount of calories, that is converted from the volume of energy

consumed for one year by the said mechanical ventilation equipment (hereinafter referred to as the "Volume of Energy Consumption for Ventilation"), by the amount of calories converted from the virtual energy consumption volume for ventilation in the said building in the same period shall be equivalent to or less than the applicable value indicated in Appendix 1 (d). In this case, conversion of energy volume into calories in relation to the energy shown in the left column of Appendix 3 depends on the values indicated in the right column of the said Appendix (the applicable value where such a value below the value indicated in the right column of Appendix 3 can be achieved by installing Energy Efficiency Improvement Equipment). As for the other energies, it depends upon their composition or other conditions, while the Volume of Energy Consumption for Ventilation and the amount of virtual energy consumption for ventilation depend upon items (1) and (2) defined below:

(1) The Volume of Energy Consumption for Ventilation is the total amount of electricity consumed for one year by the following equipment (a) through (c):
   (a) Air intake equipment
   (b) Air exhaust equipment
   (c) Other equipment required depending on types of ventilators

(2) The volume of virtual energy consumption for ventilation is calculated in accordance with the following equation:

$$E = Q \times T \times 3.676 \times 10^{-4}$$

In this equation, E, Q, and T represent the following respective values:

E: The amount of virtual energy consumption for ventilation (unit: kWh)

Q: Nominal ventilation capacity (unit: cubic meters per hour)

T: Annual operation hour (unit: hours)

4. Effective utilization of energy in relation to lighting apparatus

With regard to lighting apparatus to be installed in a building used for any of the purposes listed in Appendix 1 (a), the value calculated by dividing the amount of calories that are converted from the volume of energy consumed for one year by the said lighting apparatus (hereinafter referred to as the "Volume of Energy Consumption for Lighting"), by the amount of calories converted from the virtual energy consumption volume for lighting in the said building for the same period shall be equivalent to or less than the applicable value indicated in Appendix 1 (e). In this case, while conversion of energy volume into calories is based on 2,250 kilocalories per 1 kWh (the

applicable value where such a value below 2,250 kilocalories per kWh can be achieved by installing Energy Efficiency Improvement Equipment.), the Volume of Energy Consumption for Lighting and the amount of virtual energy consumption for lighting depend upon items (1) and (2) defined below:

(1) The Volume of Energy Consumption for Lighting is the total electricity consumption for lighting calculated for each indoor room or passage in accordance with the following equation:

$E_T = W_T \times A \times T \times F/1,000$

In this equation, E_T, W_T, A, T, and F represent the following respective values:

E_T: The amount of electricity consumption for lighting in each room or passage (unit: kWh)

W_T: Electricity consumption in each room or passage (unit: watts per square meter)

A: Floor area in each room or passage (unit: square meters)

T: Annual lighting hours in each room or passage (unit: hours)

F: Factors shown in the following diagram set forth for purposes of the building and control methods of the lighting systems

Purpose of Building	Control Method	Factor
Hospital or clinic, shop selling goods, offices or school	Control by a detector for human presence with card, light sensor, etc.	0.80
	Adjustment for the optimum luminance intensity	0.85
	Time schedule control or illumination control that adopts day light	0.90
	Others	1.00
Hotel or inn	Control by a detector for human presence with card, light sensor, etc., or power point control for guest rooms with room keys, light sensor, etc.	0.80
	Others	1.00

(2) The volume of virtual energy consumption for lighting is the total virtual electricity consumption for lighting calculated for each room or passage in accordance with the following equation:

$E_S = W_S \times A \times T \times Q_1 \times Q_2/1,000$

In this equation, E_S, W_S, A, T, Q_1 and Q_2 represent the following respective values:

E_S: The amount of virtual electricity consumption for lighting at each room or passage (unit: kWh)

W_S: Standard electricity consumption at each room or passage (unit: watts per square meter)

A: Floor area in each room or passage (unit: square meters)

T: Annual lighting hour in each room or passage (unit: hours)

Q_1: Factors shown in the following diagram set forth for each type of lighting apparatus

Type of Lighting Apparatus	Factor
Lighting apparatus with special measures such as attachment of a louver or translucent cover to control glare	1.3
Others	1.0

Q_2: Factors shown in the following diagram set forth for purposes and luminous intensity of the lighting apparatus

Purpose	Factor
Sales room of shop selling goods, or office room	L/750
Classroom of a school	L/500
Others	1.0
In this diagram, L represents the nominal luminous intensity (unit: lux)	

5. Effective utilization of energy in relation to hot water supply systems

With regard to hot water supply systems to be installed in a building used for any of the purposes listed in Appendix 1 (a), the value calculated by dividing the amount of calories converted from the volume of energy consumed for one year by the said hot water supply systems (hereinafter referred to as the "Volume of Energy Consumption for Hot Water Supply"), by the virtual hot water supply load in the said building for the same period shall be equivalent to or less than the applicable value indicated in Appendix 1 (f). In this case, conversion of energy amount into calories is based on the values shown in the right column of Appendix 3 in relation to the energies listed in the left column of the same diagram (the applicable value where the value below the figures shown in the right column can be achieved by installing Energy Efficiency Improvement Equipment). Values for the other energies depend upon their compositions and other conditions, while the Volume of Energy Consumption for Hot Water Supply and the virtual hot water supply load depend upon items (1) and (2) defined below:

(1) The Volume of Energy Consumption for Hot Water Supply is the total energy consumed for one year with the following systems (a) through (c):

(a) Boiler and other hot water supply system

(b) Water circulation pump

(c) Other equipment required for types of hot water supply systems

(2) The virtual hot water supply load is the total virtual hot water supply load calculated for each hot water supply location based on the following equation:

$$L = V \times (T_1 - T_2)$$

In this equation, L, T_1, and T_2 represent the following respective values:

L: Virtual hot water supply load (unit: kilocalories)

V: Volume of used hot water (unit: liters)

T_1: Temperature of hot water used (unit: ° C)

T_2: Temperature of hot water for each location (unit: ° C)

6. Effective utilization of energy in relation to elevators

With regard to elevators to be installed in a building that is used for any of the purposes listed in Appendix 1 (a), the value calculated by dividing the amount of calories converted from the volume of energy consumed for one year by the said elevators (hereinafter referred to as the "Volume of Energy Consumption for Elevators"), by the amount of calories converted from the virtual energy consumption volume for elevators in the said building for the same period shall be equivalent to or less than the applicable value indicated in Appendix 1 (g). In this case, while conversion of energy volume into calories is based on 2,250 kilocalories per 1 kWh (the applicable value where such a value below 2,250 kilocalories per kWh can be achieved by installing Energy Efficiency Improvement Equipment), the Volume of Energy Consumption for Elevators and the volume of virtual energy consumption for elevators depend upon items (1) and (2) defined below:

(1) The Volume of Energy Consumption for Elevators is the total electricity consumption for elevators calculated for each elevator in accordance with the following equation:

$$E_T = L \times V \times F_T \times T/860$$

In this equation, E_T, L, V, F_T, and T represent the following respective values:

E_T: The amount of electricity consumption for elevators (unit: kWh)

L: Carrying load (unit: kilograms)

V: Rated speed (unit: meters per minute)

F_T: Factors shown in the following diagram set forth for rated speeds and speed control methods

Rated Speed	Speed Control Method	Factor
120 m per minute or faster	Variable voltage/variable frequency control system	1/45
	Static Leonard system	1/35
	Ward Leonard system	1/30
60 m per minute or faster, but slower than 120 m per minute	Variable voltage/variable frequency control system	1/40
	Static Leonard system	1/30
	AC return control system	1/20
60 m per minute or slower	Variable voltage/variable frequency control system	1/40
	AC return control system, etc.	1/20

T: Annual operation hours (unit: hours)

(2) The volume of virtual energy consumption for elevators is the total of figures calculated by multiplying the amount of virtual electricity consumption calculated for each elevator by the transport capacity factor. In this case, the amount of virtual electricity consumption for elevators and the transport capacity factor depend upon the following items (a) and (b):

(a) The amount of virtual electricity consumption is calculated in accordance with the following equation:

$E_S = L \times V \times F_S \times T/860$

In this equation, E_S, L, V, F_S, and T represent the following respective values:

E_S: The amount of virtual electricity consumption (unit: kWh)

L: Carrying load (unit: kilograms)

V: Rated speed (unit: meters per minute)

F_S: Factors shown in the following diagram set forth for rated speeds

Rated Speed	Factor
120 m per minute or faster	1/35
Slower than 120 m per minute	1/20

T: Annual operation hours (unit: hours)

(b) The transport capacity factors are to be calculated in accordance with the following

equation. However, where the number of floors is four or less, or where the total floor area of the applicable building is 4,000 square meters or less, the transport capacity factor is calculated by dividing the average operation interval (unit: seconds) by 30 (it should be 1 if the average operation interval is 30 seconds or longer).

$M = A_1/A_2$

In this equation, M, A1, and A2 represent the following respective figures:

M: Transport capacity factor

A_1: Standard transport capacity for respective conditions of the applicable building shown in the following diagram:

Condition of the Applicable Building	Standard Transport Capacity
Building exclusively occupied by a single company	0.25
Other cases	0.20

A_2: The planned transport capacity calculated by dividing the transportable number of passengers in five minutes by the number of people who use the elevators

Supplementary Clauses

1. This Notification shall be go into force on August 1, 1993.

2. Notification No. 2 of the Ministry of International Trade and Industry and the Ministry of Construction of 1980, Notification No. 1 of the Ministry of International Trade and Industry and the Ministry of Construction of 1985, and Notification No. 2 of the Ministry of International Trade and Industry and the Ministry of Construction of 1991 shall all be abolished.

Appendix 1

(a)	Hotel or Inn	Hospital or Clinic	Shop Selling Goods	Office	School
(b)	100	85	90	80	80
(c)	2.5	2.5	1.7	1.5	1.5
(d)	1.5	1.2	1.2	1.2	0.9
(e)	1.2	1.0	1.2	1.0	1.0
(f)	1.6	1.8	—	—	—
(g)	—	—	—	1.0	—

Appendix 2

Average area per floor / No. of floors excluding basement	50 square meters or less	100 square meters or less	200 square meters or less	300 square meters or less
1	2.40	1.68	1.32	1.20
2 or more	2.00	1.40	1.10	1.00

Where the average area per floor is between the above figures, the scale adjustment factor is calculated proportionally from the closest scale adjustment factor.

Appendix 3

Heavy oil	9,700 kilocalories per liter
Kerosene	8,900 kilocalories per liter
Liquefied petroleum gas	12,000 kilocalories per kilogram
Electricity	2,250 kilocalories per kWh

B. Criteria for Building Owners Concerning Rationalization in the Use of Energy in Houses

(Notification No. 1 of the Ministry of International Trade and Industry and the Ministry of Construction of February 28, 1980.
Notification No. 2 of the Ministry of International Trade and Industry and Ministry of Construction.
Fully revised on February 28, 1992)

1. Referential, specific heat loss factors in accordance with the type of houses and classification of areas

(1) Owners of houses shall achieve residential specific heat loss factor of their houses (that of each house in the case of combined houses, row houses, apartment houses, etc.) that is less than the referential values as shown below in accordance with types of houses in each classified residential area (stipulated in the separate table, which must be applied hereinafter) as shown in the following table.

Types of houses	Specific heat loss factors (Unit: Kilocalories/hour/m^2/one time) Classification of residential areas					
	I	II	III	IV	V	VI
Detached houses, Combined or row houses	1.5	2.3	2.7	3.4	3.7	5.5
Apartment houses	1.3	1.9	2.3	2.7	3.2	4.8

(2) The specific heat loss factor must be calculated according to the following expression.

$$Q = \Sigma AiKiHi + \Sigma (LFi\ KLi\ Hi + AFi\ KFi) = 0.3nB)/S$$

where

Q = specific heat loss factor,

Ai = area of No. i building element (unit: m^2) contacting the space under the floor, attic space or garret exposed to the open air (hereinafter, referred to as "air, etc.") In this case floors in which the ground surface is covered with concrete or equivalent materials and floors with a space under them not exposed to the open air (hereinafter, referred to as "earth floors") shall be excluded.

Ki = thermal transmittance of No. i building element (This is the value in kilocalories expressing the quantity of heat flowing through per hour and square meter when the difference between temperatures inside and outside is 1°C. The thermal transmittance shall be calculated by taking into consideration the kinds and thickness of materials structuring the corresponding building element in the azimuth orientation of heat flow, and heat bridge (the part where thermal insulation property is deteriorated by structuring materials such as metals, etc.),

Hi = factor shown in the following table in accordance with the classification of "air, etc." to which the outer region of No. i building element or No. i earth floor,

Air	Attic space or garret exposed to the open air	Space under floors exposed to the open air
1.0	1.0	0.7

LFi = length of the outer region of No. i earth floor, etc. (unit: m)

KLi = thermal transmittance of the outer region of No. i earth floor (This is the value in kilocalories expressing the quantity of heat flowing through per hour and square meter when the difference between temperatures inside and outside is 1°C. The thermal transmittance shall be calculated by taking into consideration the kinds and thickness of materials structuring corresponding to building element in the azimuth orientation of heat flow.),

AFi = area of the central part of No. i earth floor (area of the floor reduced by one meter wide outer region (unit: m^2),

KFi = thermal transmittance of the central part of No. i earth floor (This is the value in kilocalories expressing the quantity of heat flowing through per hour and square meter when the difference between temperatures inside and outside is 1°C. The thermal transmittance shall be calculated by taking into consideration the kinds and thickness of materials structuring corresponding to building element in the azimuth orientation of heat flow.),

n = number of natural ventilations in accordance with the type of houses shown in the following table (unit: Frequency per hour)

	Types of houses	Number of natural ventilations
(a)	Reinforced concrete houses or airtight houses	0.5
(b)	Masonry structured houses other than those in (a) above, industrialized houses and wood-frame constructed houses	0.7
(c)	Houses other than those in (a) and (b) above	1.0

The "airtight houses" means those with a crack of $5cm^2$ or less per m^2 of floor area, which is calculated by the following expression.

$C = 0.7V/S$

where

C = crack in cm^2 per m^2 floor area,

V = quantity of air flow passing through the crack when the difference between pressures outside and inside is one mm water column (unit: m^3 per hour),

S = total floor area (in the case of apartment houses, common floor parts must be excluded) (unit: m^2),

B = air volume of houses (unit: m^3),

S = total floor area (in the case of apartment houses, common floor parts must be excluded) (Unit: m^2)

2. Types of houses in area I and area II

Owners of houses in area I stipulated in the separate table shall build airtight houses or reinforced concrete houses, while those in area II shall try to build airtight houses or reinforced concrete houses.

3. Referential solar heat gain factor of houses in each area

(1) The referential solar heat gain factor of houses in each area must be less than the following values:

Classification of areas					
I	II	III	IV	V	VI
		0.1			0.08

(2) The solar heat gain factor stipulated in (1) must be calculated by the following expression.

$$\mu = (\Sigma(\Sigma Aij \ \eta ij)vj + \Sigma A\gamma i \ \eta \gamma i) / S$$

where

μ = solar heat gain factor

Aij = Area of No. i wall exposed to the open air in No. j azimuth orientation (openings mounted to the wall shall be included, which must be applied hereinafter) (Unit: m^2),

η ij = solar radiation penetration factor of No. i wall in the No. j azimuth orientation (the ratio between the quantity of incident solar radiation and the quantity of solar radiation penetrates the house, which must be applied hereinafter),

vj = factors shown in the table below in accordance with the classified areas in No. j azimuth orientation,

Azimuth orientation \ Classification of areas	Ⅲ	Ⅳ	Ⅴ	Ⅵ
East/west	0.45	0.45	0.44	0.43
South	0.41	0.39	0.36	0.34
Southeast/southwest	0.46	0.45	0.43	0.42
North	0.25	0.24	0.23	0.20
Northeast/northwest	0.35	0.34	0.34	0.32

Aγ i = horizontal projecting area of No. i roof (including the openings mounted on the roof, which must be applied hereinafter) (Unit: m^2),

$\eta\gamma$ i = solar radiation penetrating factor of No. i roof or the ceiling immediately under corresponding roof (including openings mounted to the ceiling),

S = total floor area (in the case of apartment houses, common parts must be excluded) (Unit: m^2).

Separate table

Classification of areas	Name of prefectures
I	Hokkaido
II	Aomori, Iwate, Akita
III	Miyagi, Yamagata, Fukushima, Ibaraki, Tochigi, Gumma, Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano, Gifu, Shiga
IV	Saitama, Chiba, Tokyo, Kanagawa, Shizuoka, Aichi, Mie, Kyoto, Osaka, Hyogo, Nara, Wakayama, Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Tokushima, Kawaga, Aichi, Kochi, Fukuoka, Saga, Nagasaki, Kumamoto, Oita
V	Miyagi, Kagoshima
VI	Okinawa

C. Guideline for Design and Construction for Rationalization in Use of Energy in Houses

(Notification No. 195 of the Ministry of Construction of February 29, 1980.
Notification No. 451 of the Ministry of Construction.
Fully revised on February 28, 1992)

1. Parts to be thermal-insulating structured

The following parts shall be thermally insulated in order that heat loss may be prevented (hereinafter referred to as "adiabatic construction"). 1) Roofs (excluding those with attic space or garret exposed to the open air), or ceilings immediately under corresponding roofs. 2) Ceilings, walls, floors that expose to the open air (hereinafter, referred to as space under the floor, attic spaces, garrets, which are exposed to the open air). In this case floors in which the ground surface is covered with concrete or equivalent materials and floors with a space under them not exposed to the open air (hereinafter, referred to as "earth floors") shall be excluded. 3) Openings and earth floors whose outer regions expose to the open air. However, this shall not be applicable to any parts that fall under any one of the following articles (1) to (3).

(1) Building elements that divide a storeroom or garage (hereinafter referred to as "storeroom, etc.") and a division other than storeroom that is of thermal insulating structure.
(2) Space under the floor, attic spaces, garrets, which are exposed to the open air.
(3) Eaves, wing walls, and floor of a projecting veranda

2. Standard thermal insulating performance

When each building element is of thermal insulating structure in accordance with article 1. above, it shall be in accordance with those standards stipulated in the following (1) and (2).

(1) The thermal transmittance in each building element shall be equal to or less than the values stipulated in the following table in accordance with the type of houses and classification of areas.

Type of houses		Building elements		Thermal transmittance (Classification of areas)					
				I	II	III	IV	V	VI
(1)	Reinforced concrete houses and airtight houses	Roofs or ceilings		0.20	0.44	0.57	0.57	0.57	0.57
		Walls		0.36	0.66	0.66	0.75	0.96	
		Floors	Floors exposed to the open air	0.22	0.39	0.39	0.60	0.74	
			Others	0.31	0.55	0.55	0.85	1.06	
		Outer regions of the earth floor	Outer regions of earth floors exposed to the open air	0.37	0.67	0.67			
			Outer regions of other earth floors	0.53					
		Openings		2.0	3.0	4.0	5.6	5.6	5.6
(2)	Masonry structured houses other than those in (1) above, industrialized houses and wood-frame constructed houses	Roofs or ceilings			0.36	0.51	0.51	0.51	0.51
		Walls			0.57	0.57	0.67	0.88	
		Floors	Floors exposed to the open air		0.34	0.34	0.53	0.68	
			Other floors		0.48	0.48	0.75	0.97	
		Outer regions of earth floors exposed to the open air			0.57	0.57			
		Openings			3.0	4.0	5.6	5.6	
(3)	Houses other than those in (1) and (2)	Roofs or ceilings			0.28	0.41	0.41	0.41	0.41
		Walls			0.43	0.43	0.54	0.76	
		Floors	Floors exposed to the open air		0.26	0.26	0.43	0.58	
			Other floors		0.37	0.37	0.62	0.83	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air		0.42	0.42			
			Outer regions of other earth floors		0.60	0.60			
		Openings			3.0	4.0	5.6	5.6	5.6

1. For building elements other than outer regions of earth floors, etc., "thermal transmittance" means the value in kilocalories expressing the quantity of heat flowing through per hour and square meter when the difference between temperatures inside and outside is 1°C. The thermal transmittance shall be calculated by taking into consideration the kinds and thickness of materials structuring the corresponding building elements in the azimuth orientation of heat flow, and heat bridge (the part where thermal insulation property is deteriorated by structuring materials such as metals, etc.).
   For the outer region of earth floors, the "thermal transmittance" also means the quantity of heat in kilocalories that flows through per m^2 for one hour when the difference between outside temperature and inside temperature is 1°C. However, it shall be calculated by taking into consideration the kind and thickness of materials constituting the corresponding building elements in the azimuth orientation of heat flow only.

2. The "classification of areas" means area divisions stipulated in the Criteria for Building Owners Concerning Rationalization in the Use of Energy issued by the notification No. 2 of the Ministry of International Trade and Industry and the Ministry of Construction of February 28, 1992 (hereinafter referred to as "Judgment standard").

3. The "airtight houses" means the houses stipulated in item (2), 1, Judgment Standard, which must be applied hereinafter.
   (2) The thermal resistance in each building element other than openings shall be more than the values listed in Table 1 in accordance with types of houses and classification of areas. The fittings of openings must be of the same kinds or different combinations stipulated in Table 2, with performances equivalent to or better than those in the table.

Table 1

Types of houses		Building elements			Thermal resistances of thermal insulators (unit: m^2/time/degree per kilocalorie) Classification of areas					
					I	II	III	IV	V	VI
(1)	Reinforced concrete houses or airtight houses of wood frame construction	Roofs and ceilings			3.4	1.9	1.3	1.3	1.3	1.3
		Walls			2.0	1.1	1.1	0.9	0.6	
		Floors	Floors exposed to the open air	Tatami-floor	2.9	1.6	1.6	0.7	0.3	
				Boarded floor	3.4	2.1	2.1	1.2	0.8	
			Other floors	Tatami-floor	2.0	0.7	0.7	0.1		
				Boarded floor	2.5	1.2	1.2	0.6	0.4	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air		2.5	0.2	0.2			
			Outer regions of other earth floors		0.7					
(2)	Wooden airtight houses	Roofs and ceilings			5.1	2.0	1.5	1.5	1.5	1.5
		Walls			2.9	1.1	1.1	1.0	0.6	
		Floors	Floors exposed to the open air	Tatami-floor	3.9	1.7	1.7	0.7	0.4	
				Boarded floor	4.4	2.2	2.2	1.2	0.9	
			Other floors	Tatami-floor	2.4	0.7	0.7	0.1		
				Boarded floor	2.9	1.2	1.2	0.6	0.4	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air		2.5	0.2	0.2			
			Outer regions of other earth floors		0.7					
(3)	Airtight houses other than described in (1) and (2) above	Roofs and ceilings			6.1	2.4	1.8	1.8	1.8	1.8
		Walls			3.5	1.3	1.3	1.2	0.7	
		Floors	Floors exposed to the open air	Tatami-floor	4.8	2.1	2.1	0.9	0.6	
				Boarded floor	5.3	2.6	2.6	1.4	1.1	
			Other floors	Tatami-floor	3.0	0.9	0.9	0.2		
				Boarded floor	3.5	1.4	1.4	0.7	0.5	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air		2.5	0.2	0.2			
			Outer regions of other earth floors		0.7					

(4)	Masonry structured houses other than described in (1)	Roofs and ceilings				2.6	1.8	1.8	1.8	1.8
		Walls				1.3	1.3	1.1	0.7	
		Floors	Floors exposed to the open air	Tatami-floor		1.9	1.9	0.9	0.4	
				Boarded floor		2.4	2.4	1.4	0.9	
			Other floors	Tatami-floor		1.0	1.0	0.2		
				Boarded floor		1.5	1.5	0.7	0.4	
		Outer regions of earth floors exposed to the open air				0.5	0.5			
(5)	Wood frame constructed houses	Roofs and ceilings				2.6	1.8	1.8	1.8	1.8
		Walls				1.4	1.4	1.0	0.6	
		Floors	Floors exposed to the open air	Tatami-floor		2.1	2.1	1.0	0.5	
				Boarded floor		2.6	2.6	1.5	1.0	
			Other floors	Tatami-floor		1.3	1.3	0.3		
				Boarded floor		1.8	1.8	0.8	0.5	
		Outer regions of earth floors exposed to the open air				0.5	0.5			
(6)	Wooden houses other than described in (2) and (5)	Roofs and ceilings				3.3	2.2	2.2	2.2	2.2
		Walls				2.2	2.2	1.5	0.9	
		Floors	Floors exposed to the open air	Tatami-floor		3.3	3.3	1.4	0.8	
				Boarded floor		3.8	3.8	1.9	1.3	
			Other floors	Tatami-floor		1.7	1.7	0.6	0.1	
				Boarded floor		2.2	2.2	1.1	0.6	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air			1.7	1.7			
			Outer regions of other earth floors			0.4	0.4			
(7)	Houses other than described in (1) through (6)	Roofs and ceilings				3.9	2.6	2.6	2.6	2.6
		Walls				2.6	2.6	1.8	1.0	
		Floors	Floors exposed to the open air	Tatami-floor		4.1	4.1	1.8	1.1	
				Boarded floor		4.6	4.6	2.3	1.6	
			Other floors	Tatami-floor		2.0	2.0	0.7	0.3	
				Boarded floor		2.6	2.6	1.3	0.8	
		Outer regions of earth floors	Outer regions of earth floors exposed to the open air			1.7	1.7			
			Outer regions of other earth floors			0.4	0.4			

1. The "outer region of earth floors" means the peripheral area one meter wide measured from the outer edge.

2. If using such tatami-floors as "Polystyrene Form Sandwich Tatami Floor" stipulated in A5911-1985 of Japanese Industrial Standard (hereinafter referred to as "JIS"), "Insulation Fiberboard Sandwich Tatami Floor" in JIS A5912-1985, or "Tatami" in JISA5914-1990, the thermal resistance of thermal insulators of the board floors reducing the thermal resistance of thermal insulators used for those tatami-floors can be applied.

3. The thermal resistance of thermal insulator in the outer region of earth floors shall indicate the thermal resistance of the thermal insulator constructed vertically on the ground level outside or inside the foundation.

4. In the case of true-wall construction method where thermal insulators cannot be incorporated in the wall, one of the two methods below shall be followed.
   (a) If the total area of the true-wall is less than 30% of the area of all the walls to be thermally insulated, the thermal resistance of the thermal insulators reduced because of the corresponding true-wall shall be added to the thermal resistance of the thermal insulators used for any building elements such as roofs, ceilings, walls other than true-wall, or floors.
   (b) Heat insulators must be constructed outside the true-wall.

5. If building elements of different types of houses coexist in a house, the thermal resistance of each building element shall be in accordance with the corresponding types of houses.

6. If the values of thermal resistance of any building elements shown in the table above are reduced for any reason, the reduced thermal resistance values must be added to the thermal resistance of all the other building elements.

Table 2

Classification of areas	Types of fittings and their combination
I	Those falling under one of (a) to (e) below (a) Single glass panel incorporating a fitting of triple-constructed (b) Fittings double-constructed with a fitting incorporating a single glass panel and a fitting incorporating a low radiation, multiple-layer glass (with an air layer of more than 12mm) (c) Fittings double-constructed with a fitting incorporating a single glass panel and a fitting incorporating a multiple-layer glass (with an air layer of more than 12mm), in which one of the two fittings is made of wood or plastic or having the thermal resistance equivalent to that of wood or plastic or more. (d) Airtight, wooden fittings using three glass layers (Air layers must be more than 12mm.) (e) Fittings incorporating multi-layer glass with low radiation (air layers must be more than 12mm), which have the thermal resistance equivalent to that of wooden or plastic airtight fittings or more.
II	Those falling under one of (a) to (c) below (a) Fittings that are double-constructed with a glass panel incorporated fitting, where 1) one of the fittings is made of wood or plastic, or having the thermal resistance equivalent to wood or plastic, or 2) one of the fittings is made of metal, in which the frame is connected with soft polyvinyl chloride material (JIS K6723-1983, Soft polyvinyl compound) more than 3mm thick and less than 10mm wide or any other materials having thermal resistance equivalent to soft polyvinyl chloride material. (b) Fittings incorporating multi-layer glass (air layers must be more than 6mm), which have the thermal resistance equivalent to that of wooden or plastic airtight fittings. (c) Fittings double-constructed with a fitting incorporating glass panel and a fitting incorporating multi-layer glass
III	Those falling under (a) or (b) below (a) Double-constructed fittings incorporating single glass panel (b) Fittings incorporating multi-layer glass
IV V VI	Fittings incorporating a single glass panel

1. The "multi-layer, low-radiation glass" means a glass using one or more glass panes with vertical radiation ratio of 0.20 or less, or two glass panes with vitalistic radiation ratio of 0.35 or less in accordance with the stipulation in JIS R3106-1985 (glass transmittance, reflectance, and heat insulation acquisition testing methods).

2. The "airtight fittings" means those meeting airtightness of grade 2 stipulated in JIS A4706-1989 (metal-framed glass sliding door).

3. Standard in relation with airtight house construction

The airtight house to be constructed must be damp-proof with airtightness equal to damp-proof, airtight layer (0.1mm thick polyethylene film, stipulated in JIS Z1702-1986, Packing Polyethylene Film) in accordance with the type of houses and stipulation in the following (1), (2) and (3).

(1) Wooden houses

They must be constructed in any of the following construction methods (if building houses in the frame wall construction method, (a) and (b) below must be followed).

(a) The connections between a roof and a ceiling and a wall or between wall and floor corner of opening, where structuring building elements are exposed to the open air, must have 150mm damp-proof, airtight layers overlapped.

(b) In cases other than (a) above, when damp-proof, airtight layers are overlapped, they shall be overlapped 100mm or more at a part where the substrate materials exist.

(c) In the connections between partition walls and connections, substrate materials must be constructed after thermal insulation material and damp-proof, airtight layers are constructed.

(2) Steel structured houses

They must be constructed in accordance with the construction method (1).

(3) Masonry structured houses

Heat insulator must be constructed outside the part to be heat-insulated in accordance with the construction method (1).

4. Solar shading standard

(1) In the areas listed in separate tables III, IV, V and VI, roofs and ceilings must be thermally insulated as stipulated in article 2 above.

(2) In the areas listed in separate tables III, IV, V and VI, eaves must be mounted at windows facing east-north-east, south, and west-north-west so that the solar radiation penetrating factor (ratio of total quantity of incident solar radiation to quantity of solar radiation penetrating inside the house) may be less than 0.6.

5. Precautions for design and construction

The following precautions must be followed in addition to the stipulations of 1, 2, 3 and 4 above.

(1) Rationalization of residential energy use must be achieved by making the best use of solar radiation in winter, etc., and the following matters must be taken into consideration.

(a) The proper size of openings of a window must be positioned and structured properly so that the heat of solar radiation may enter in winter and ventilation may be good in summer.

(b) Eaves or hoods (awnings) must be properly positioned and structured so that the heat of solar radiation may be used by considering the solar altitude in winter.

(c) Facilities such as air-conditioners must provide good performance, mounting position, heating-medium conveying system in accordance with the application, floor area, thermal insulation property of the corresponding habitation rooms, etc.

(2) The following precautions must be followed to ensure the safety, coziness and thermal insulation property of houses.

A. In particular, following measures in (a), (b) and (c) must be taken into construction with thermal insulators.

(a) Heat insulators shall be constructed at required building elements without cracks.

(b) Necessary measures shall be taken to avoid air entering the room through connections between a roof, ceiling, wall and floor.

(c) An effective venting shutter must be mounted in the connections between a partition wall, ceiling, and floor when the inside space of a partition wall is open to garrets or space under floors.

B. In order to prevent condensation from occurring, the following measures must be taken.

(a) There must be high vapor resistance on the room side, while it must be low on the open air side.

(b) If thermal insulators such as glass fiber, rock fiber or similar materials with a small vapor resistance are used in the construction, moisture-proof layers must be applied without crevices on the room side.

(c) If wirings, pipings or similar materials penetrate thermal insulators or moisture-proof layers, thermal insulators must be constructed without cracks, and the moisture-proof layers must keep their airtightness.

(d) In the areas listed in Tables I and II, a ventilation layer must be provided on the open air side of heat insulators for walls and roofs for removal of moisture from the parts.

(e) In the space under floors, effective measures for moisture resistance shall be taken: the ground surface of the space shall be covered with a moisture-proof layer, or venting openings shall be provided in proper positions.

C. If a luminaire (stipulated in JIS Z8113-1988) is embedded in the ceiling of a thermal insulating structure, cover the luminaire with thermal insulating materials.

(3) Proper quantity of and route for ventilation must be ensured, and heating apparatus that does not contaminate the air must be provided when designing and constructing airtight houses.

D. Announcement of thermal insulation property of construction materials

(Notification from the Ministry of International Trade and Industry of February 29, 1980)

This is to announce the standard performance of thermal insulation for construction materials to carry out the Law Concerning Rational Use of Energy (Law No.49 in 1979).
Articles may be added to or revised on the list of thermal insulation performance, if necessary.
The kinds and conditions of thermal insulation performance are as follows:

(1) Kinds of thermal insulation performance

1 For uniform materials, heat conductivity must be indicated.

2 For materials in which differing substances or air layers are combined, in which the surface is smooth, thermal resistance must be indicated.

(2) Conditions for thermal insulation performance

1 Heat conductivity must be measured at room temperature (average of about 20°C) and in air-dried climate with moisture of 50 to 70%.

2 Thermal resistance must also be measured at the room temperature and in air-dried climate.

Thermal insulation performance of construction materials

(1) **Heat conductivity**

Classification / Name of materials	Kinds	Density (g/cm^3)	Referential values (kcal / mh℃)
Cement			
Concrete		2.3	1.4
Gas concrete	Autoclaved lightweight concrete (ALC)	0.5	0.11
Mortar	Cement mortar	2.0	1.1
	Perlite mortar	0.5～0.7	0.12
		0.8～1.0	0.19
		1.1～1.4	0.31
	Vermiculite mortar	0.50～0.55	0.12
		0.56～0.75	0.17
		0.76～0.95	0.22

Classification Name of materials	Kinds	Density (g/cm³)	Referential values (kcal / mh℃)
Lightweight aggregate concrete	Artificial lightweight aggregate (ALA) concrete		
	1st class	1.9	0.7
	2nd class	1.6	0.5
Asbestos cement corrugated sheet	Asbestos cement sheet	1.5～2.0	1.1
	Flexible sheet	1.1～1.5	0.6
	Asbestos cement calcium silicate sheet	0.6～1.2	0.13
Metals			
Copper		8.3	320
Aluminum alloy		2.7	180
Carbon steel	Carbon: 0.1% or less	7.9	47
Lead		11.4	30
Stainless steel	18-8	7.4	13
Rocks			
Granite		2.6～2.9	2.5
Marble		2.5～2.7	2.4
Daikoku stone		1.4～1.9	1.1
Natural slate		2.2～2.4	1.2
Inorganic fibers			
Glass fiber	Heat insulating board No. 2	0.010～0.015	0.045
	(Remarks) 10K, 12K	0.016～0.023	0.040
	(Remarks) 16K, 20K	0.024～0.039	0.035
	(Remarks) 24K, 32K	0.040～0.096	0.030
	(Remarks) 40K, 48K, 64K, 96K		
	Heat insulating board No. 3	0.080～0.120	0.036
	(Remarks) 96K, 100K		
Rock fiber	Rock fiber mats, Rock fiber felts	0.030～0.070	0.033
	Thermal insulating boards No. 1 and 2	0.071～0.160	0.030
	Thermal insulation board No. 3	0.161～0.300	0.035
	Fancy sound absorption boards	0.04～0.05	0.055
	Sheathing boards	0.04～0.05	0.055
	Spray rock fiber	0.15～0.25	0.04

Classification Name of materials	Kinds	Density (g/cm³)	Referential values (kcal / mh℃)
Glass			
Sheet glass		2.5	0.68
Foamed glass		0.15	0.05
Gypsum			
Gypsum board		0.71～0.1	0.19
Gypsum plaster		1.9	0.5
Other inorganic fibers			
Lime sand plaster		1.9	0.6
Plaster		0.3	0.6
Mud wall, Scratch coat		1.2	0.6
Vermiculite plaster		0.9	0.1
Normal brick		1.5	0.24
Tile		2.4	1.1
Perlite	Thermal insulating boards No. 1 and 2	0.2～0.3	0.06
Wooden			
Insulation boards	class A	0.23～0.30	0.042
	class B	0.35～0.40	0.050
	class T	0.20～0.25	0.039
	Sheathing board	0.30～0.40	0.045
Hard fiberboards		0.8～1.1	0.15
Semi-hard fiberboards		0.4～0.8	0.10
Particle boards	type 200	0.79～0.83	0.12
	type 150	0.70～0.74	0.11
	type 100	0.58～0.62	0.10
Cement chip board		0.5～0.7	0.15
Plastic			

Form polystyrene (Bead scuffing product)	Thermal insulating board No. 1	0.030～0.040	0.031
	Thermal insulating board No. 2	0.025～0.029	0.032
	Thermal insulating board No. 3	0.020～0.024	0.034
	Thermal insulating board No. 4	0.016～0.019	0.037
Extractive polystyrene		0.030～0.040	0.024
		0.025～0.029	0.032

Classification Name of materials	Kinds	Density (g/cm³)	Referential values (kcal / mh℃)
Low density polyethylene		0.065～0.11	0.045
		0.040～0.064	0.038
		0.030～0.039	0.032
		0.022～0.029	0.030
Urea foam		0.010～0.014	0.035
Hard polyurethane foam	Thermal insulating board No. 1	0.050～0.060	0.024
	Thermal insulating board No. 2	0.040～0.049	0.023
	Thermal insulating board No. 3	0.035～0.039	0.021
	Thermal insulating board No. 4	0.030～0.034	0.021
	Thermal insulating board No. 5	0.025～0.029	0.023
	(Remarks) Site foam products shall conform to the above.		
Glassfiber reinforced polyester		1.36	0.18

(2) Thermal resistance

Name of materials	Kinds		Referential values ($m^2h℃$ / kcal)
Multi-layered glass	Thickness	12mm (3-6A-3)	0.13
	〃	16mm (5-6A-5)	0.14
	〃	18mm (3-12A-3)	0.17

	〃	22mm (5-12A-5)	0.17
Carpet	Pile length	3～ 5mm	0.08
		6～ 8mm	0.14
		9～11mm	0.20
		12～15mm	0.25

(Remarks) Carpet backed by about 2mm thick jute or synthetic resin

Tatami	Thickness	55mm	0.6
Hollow concrete	Volumetric specific gravity	1.8	
	Thickness	100mm	0.19
		150mm	0.22
		190mm	0.25
	Volumetric specific gravity	1.2～1.5	
	Thickness	100mm	0.22
		150mm	0.27
		190mm	0.31

Name of materials	Kinds		Referential values ($m^2h℃$ / kcal)
Air layer sealed on both sides by ordinary materials (with emittance of 0.8 or more)		Thermal flow direction	
	Thickness 10mm	Upward	0.15
		Horizontal	0.16
		Downward	0.18
	Thickness 20mm or more	Upward	0.17
		Horizontal	0.19
		Downward	0.23
The same air layer in which aluminum foil is applied on one side.	Thickness 20mm or more	Upward	0.38
		Horizontal	0.45
		Downward	0.95
The same air layer in which aluminum foil is applied on both sides	Thickness 20mm or more	Upward	0.40
		Horizontal	0.47
		Downward	1.10

Air layer of panel which is sealed by ordinary materials on both sides of paper core (size of honeycomb cells: 24mm)	Thickness 26mm	0.30
	Thickness 46mm	0.42
	Thickness 86mm	0.65

E. Announcement of thermal insulation property of construction materials

(Notification of the Ministry of International Trade and Industry of March 15, 1980)

In relation with the announcement of the standard performance of thermal insulation for construction materials to carry out the Law Concerning Rational Use of Energy (Law No.49 in 1979) of February 29, 1980, this is to announce the addition of the following articles. These articles may be added or revised to the list of thermal insulation performance, if necessary.

1. Kinds of thermal insulation performances
   (1) For materials whose surface is complex, thermal transmitting resistance must be indicated.

2. Conditions for thermal insulation performance
   (1) Thermal transmitting resistance must be obtained by deducting 0.04$m^2h°C$ /kcal from the thermal transmittance resistance measured at room temperature (average of about 20°C) and in air-dried climate (moisture of 50 to 70%) under the condition of natural ventilation on both sides, taking into consideration the air speeds on the room side of the wall (natural ventilation) and on the open air side (3-5m/sec.).

Thermal insulation property values of construction materials

(1) **Thermal transmitting resistance**

Name of materials	Kinds	Referential values ($m^2h℃$ /kal)	Remarks
Double sliding, single aluminum-framed glass doors for houses	Glass 3mm	0.18	Sash of nominal module size of 1173mm
Double sliding, double aluminum-framed glass doors for houses	Frame, internally and externally integrated glass 3mm	0.31	Same as above
	Frame, internally and externally independent glass 3mm	0.33	Same as above

	External type	0.42	Same as above
	External: Multi-layered glass Air layer: 6mm Internal: Glass 3mm		
Double sliding, double aluminum-framed glass doors for houses	Internal and external glass: 3mm	0.40	Same as above
External: Aluminum-framed Internal: Vinyl-chloride-framed	Vinyl-chloride-framed glass doors with heat-ray reflecting film attached	0.57	Same as above
Glass block	Thickness: 95mm	0.35	

F. Criteria for Operators Concerning Rationalization of Energy Use at Factories

Based on the provision of Clause 1 of Article 4 in the Law Concerning Rationalization of Energy Use (Law No. 49 of 1993), the criteria for business operators in relation to rationalization of energy use at factories are defined as described below, and shall become effective on August 1, 1993.

At the same time, Notification No. 467 of the Ministry of International Trade and Industry of October 27, 1979 (Decision on Criteria of Business Operators for Rationalization of Energy Use at Factories) shall be abolished accordingly.

I. Standards for Rationalization of Energy Use

Those who carry out business operations (hereinafter referred to as Business Operators) at their factory or operation sites (hereinafter referred to as Factory) by using energy shall strive to achieve appropriate and effective rationalization of energy use at their Factory by strictly observing the following standards as far as they are technically and economically viable.

1. Rationalization of fuel combustion

(1) Control of fuel combustion

(a) Fuel combustion shall be controlled by determining control standards for air ratios in accordance with the performance of equipment for fuel combustion (hereinafter referred to as Combustion Equipment) as well as the type of fuel applied.

(b) The control standards stated in the above (a) must be set up so that air ratio can be lowered based on the air ratio specified in the attached Table 1 (A).

(c) In case that a plural number of Combustion Equipment is to be used, control standards should be established so that heat efficiency (i.e. the ratio of calorie used for adding value of the objects in the total input calorie. This interpretation is applied to the rest of this Notification) of the entire Combustion Equipment can be improved, and the combustion load within the Combustion Equipment must be adjusted based on such standards.

(2) Measurements and records concerning fuel combustion

Control standards for each item necessary to grasp and improve fuel supply volume, temperature of exhaust gas generated from combustion, remaining oxygen volume in the exhaust gas, and other combustion conditions of fuel for each Combustion Equipment shall be established, then

these values shall be periodically measured based on such standards, and result of the measurement shall be recorded.

(3) Maintenance and inspection of Combustion Equipment

After setting up control standards, Combustion Equipment must be periodically inspected for maintenance.

(4) Measures to be taken during installation of Combustion Equipment

(a) In case that a Combustion Equipment is installed, combustion devices such as a burner should be made adjustable for the type of Combustion Equipment and fuel as well as for supplying fuel volume and air ratio in accordance with fluctuation of load and combustion conditions.

(b) When a Combustion Equipment is newly installed, its ventilation system should be made adjustable for air volume and pressure in the combustion room.

2. Rationalization of heating, cooling, and heat conduction

(1) Control of heating, cooling, and heat conduction

(a) With regard to heating equipment, cooling equipment, drying equipment, heat exchanger, etc., that employ a thermal medium such as steam, control standards for temperature, pressure, and volume of thermal medium required for transfer of heating, cooling, and conduction (hereinafter referred to as Heating, etc.) as well as temperature, pressure, and volume of supplied thermal medium should be set forth in order to avoid excessive supply of calorie through the thermal medium.

(b) As for industrial furnaces used for heating, heat treatment, etc., control standards shall be established so that thermal efficiency is improved depending on the structure of the equipment, characteristics of the heated object, pre-process or post-process of heating or heat treatment, and the Business Operator shall improve the heating pattern (i.e. pattern of changes in temperature of a heated object corresponding to lapse of time. This interpretation is applied to the rest of this Notification).

(c) Control standards for equipment used for Heating, etc., shall be set forth in relation to the volume of heated objects or cooled objects as well as their positions within the furnace in order to avoid any overloading or underloading.

(d) When more than one equipment for Heating, etc., is used, control standards shall be established so that the total thermal efficiency of the said equipment can be enhanced, and load on each equipment shall be adjusted based on such standards.

(e) In case of the process in which heating is made repeatedly, control standards shall be determined in order to reduce idling time that happens due to waiting time between processes.

(f) As for equipment for Heating, etc., that can be intermittently operated, control standards shall be established to concentrate operations.

(g) With regard to water supply to a boiler, water quality should be controlled based on the rules of the Japan Industrial Standards (JIS) B 8223 concerning Water Supply for Boilers and Water Quality for Boilers (including other rules equivalent to these rules) in order to prevent heat transfer pipes from stack with scales or precipitation of sludge.

(h) Concerning air-conditioning, control standards for heating/cooling temperature, ventilation cycle, temperature, etc., should beset forth in consideration of the building structure, the layout of equipment, the type of operation, etc., after restricting the areas to be air-conditioned.

(i) Other control of Heating, etc., shall be implemented in accordance with the control standards established with regard to temperature of heating or cooling objects, temperature, pressure, flow rate, and other items related to Heating, etc., of thermal medium such as steam.

(2) Measurements and records concerning Heating, etc.

(a) Control standards shall be set forth in connection with items necessary for recognition and improvement of situations including temperature of heating or cooling objects, temperature, pressure, and flow rate as well as other thermal transfer conditions. These elements must be periodically measured based on the standards, and such data must be recorded.

(b) Control standards should be determined for each area to be air-conditioned in relation to the items necessary for knowing temperature, humidity, and other conditions of atmosphere, and for improving efficiency of air-conditioning. Such items must be periodically measured based on the standards, and result of the measurements should be recorded.

(3) Maintenance and inspection of equipment for Heating, etc.

(a) Control standards must be established for thermal conducting surface of a boiler, industrial furnace, heat exchanger, etc., and any other parts which affect thermal conduction, in order to periodically remove dust, scales, and other adhered particles and to prevent decrease in their thermal conductive performance.

(b) By establishing control standards, air-conditioning equipment should be maintained in a good condition through measures such as periodical cleaning of filters, eliminating frost on a

thermal exchanger, removing scales stack on a condenser, and the like.

3. Prevention of heat loss by radiation, transfer, etc.

(1) Standards for thermal insulation

(a) Construction of thermal insulating facilities including pipes or other similar equipment to transport thermal medium or process fluid as well as other equipment to make Heating, etc. (hereinafter referred to as Heat Utilization Equipment) must be carried out in compliance with the provisions of JIS A 9501, Standards for Thermal and Cold Insulation Works, or other equivalent rules.

(b) The quality of fire bricks to be applied must be in compliance with the provisions of JIS R 2611, Fire Bricks, or other equivalent rules.

(c) When an industrial furnace is constructed starting from the hearth, thermal insulation measures must be taken to improve insulation performance of the furnace walls, based on the temperature values on the outer surface of furnace wall as shown in the attached Table 2 (A) (with regard to an intermittently operated furnace or other industrial furnace that is used less than 12 hours per day, the portion of outer furnace wall of which temperatures reaches more than the values enlisted in the attached Table 2 (A), or more than 50% area of the inside wall of a furnace, of which inside temperature becomes 500℃ or higher, should be made of insulating material with bulk specific gravity of 1.3 or less.). Provided an existing industrial furnace can be modified to improve its insulation capability, insulation measures should be taken in accordance with the standard values of the outside furnace temperature shown in the attached Table 2 (A).

(2) Measurements and records concerning thermal loss

Control standards shall be established for each major equipment of Heating, etc., in order to know and improve the situations of heat loss, and Business Operators shall analyze heat efficiency based on the result of measurements for temperature of outside surface of furnace wall, temperature of heating objects, exhausted gas temperature, etc. The result must be recorded.

(3) Maintenance and inspection of Heat Utilization Equipment

(a) In relation to Heat Utilization Equipment, control standards shall be established to prevent any leakage of thermal medium from a defective condition. Maintenance and inspection must be periodically conducted for such equipment based on the standards established.

(b) In relation to portions of Heat Utilization Equipment which is modified for insulation,

control standards shall be established in order to prevent heat loss by radiation. Maintenance and inspection must be periodically conducted for such equipment based on the established standards.

(c) As for steam trap, control standards shall be established to prevent leakage of steam due to its improper condition. Maintenance and inspection must be periodically conducted for such a steam trap based on the standards.

(4) Measures to be taken for installation of Heat Utilization Equipment

(a) In case of installing a new Heat Utilization Equipment, its insulation property must be enhanced by increasing the thickness of insulation materials, or application of insulation material with lower thermal conductivity, or double insulation, or the like.

(b) In case of installing a new Heat Utilization Equipment, heat loss by radiation and inlet/outlet of air should be prevented by reducing or closing the opening of Heat Utilization Equipment, or by attaching double doors to the opening of heat utilization equipment, or the like.

(c) In case of installing a new heat utilization equipment, its radiating area should be reduced by rationalizing the piping channel that transports thermal media.

4. Collection of waste heat

(1) Standards for collection of waste heat

(a) With regard to collection of waste heat from exhausted gas, control conditions for temperature of exhausted gas or waste heat collection ratio shall be established depending on the type of equipment that emits waste gas.

(b) The control standards stated in the above clause should be set forth so that a collection rate of waste heat can be improved by means of reducing temperature of the exhausted gas in comparison with the standards of the exhaust gas temperature and waste heat collection ratios shown in the attached Table (A).

(c) Collection and utilization of waste heat from a steam drain shall be implemented by establishing control standards in connection with scopes of the temperature, volume, and the type of the steam drain that collects waste heat.

(d) With regard to collection and utilization of sensible heat, latent heat, pressure, combustible component, etc., that heated solid body or fluid has, control standards shall be established for a scope of collection.

(2) Measurements and records concerning waste heat

Business Operators shall grasp situations of waste heat temperature, calorie, components of thermal medium that emits waste heat, and other factors of waste heat, establish control standards of items necessary for promoting utilization of waste heat, periodically conduct measurements based on such standards, and report the result of such measurements.

(3) Maintenance and inspection of Waste Heat Collection Equipment

Control standards must be established for heat exchangers, waste heat boilers, etc., that utilize waste heat (hereinafter referred to as Waste Heat Collection Equipment). The heat conductive surface and other portions of such equipment must be periodically cleaned based on such standards. In addition, any leaking points on the thermal medium must be overhauled to maintain efficiency of waste heat collection as well as waste heat utilization.

(4) Measures to be taken for installation of a new Waste Heat Collection Equipment

(a) When a flue gas ducting or pipe that transports waste heat from an equipment generating waste heat to a Waste Heat Collection Equipment is constructed, proper measures should be taken in order to prevent infiltration of air, to strengthen insulating property, and to keep waste heat temperature high.

(b) In case that a new Waste Heat Collection Equipment is installed, proper measures such as improvement of properties and shape of thermal conductive surface, or increase of the thermal conducive area, or the like should be taken so that the waste heat collection rate can be enhanced.

5. Rationalization of heat conversion into motive power, etc.

(1) Control of dual-purpose electricity and steam generation

(a) With regard to the operation control of more than one boiler, gas turbine, steam turbine, gas engine, diesel engine, etc., to be used for dual-purpose electricity and steam generation, control standards should be set forth in order to enhance the total efficiency corresponding to fluctuation of load.

(b) When an extraction turbine or back-pressure turbine is used for a dual-purpose electricity and steam generation, control standards shall be established in connection with the minimum value permitted to extraction pressure of the extraction turbine or backing pressure of the back-pressure turbine, then should be observed.

(2) Measurements and records concerning dual-purpose electricity and steam generation

(a) As for boilers, gas turbines, steam turbines, gas engines, diesel engines, etc., to be used

for dual-purpose electricity and steam generation (hereinafter referred to as Dual-purpose Generation Equipment), control standards shall be established. Then, thermal efficiency corresponding to fluctuation of load must be periodically measured based on such standards, and the result of measurement must be recorded.

(b) When an extraction turbine or back-pressure turbine is operated with the permissible minimum extraction pressure or backing pressure, control standards shall be set forth. Then, operation time, inlet pressure, extraction or backing pressure, outlet pressure, steam volume, etc., shall be measured based on such standards, and result of measurements shall be recorded.

(3) Maintenance and inspection of Dual-purpose Generation Equipment

In relation to Dual-purpose Generation Equipment, control standards shall be established so that thermal efficiency is maintained at a high level, and such equipment shall be periodically inspected for maintenance.

6. Prevention of electricity loss due to resistance or other reasons

(1) Control of power receiving, transformation, and distribution units

(a) Control standards for transformer shall be established in order to maintain an appropriate demand factor, while the number of units as well as distribution of load shall be appropriately considered and adjusted.

(b) In relation to appropriate deployment of power receiving and transformation units, reduction of power distribution circuit length by changing the power distribution system, proper voltage of distributed electricity, and other similar factors, control standards shall be established in order to reduce power loss in distribution.

(c) The standard for power factor at the power receiving terminal should be set at 90% or over. The power factor of the equipment enlisted in the attached Table 4 (except for equipment with less capacity than the capacity enlisted) or other transformation equipment should be improved by installation of leading power factor condensers or other methods. However, this clause is not applied if the equipment is used for an in-house auxiliary equipment of the power plant.

(d) Leading power factor condensers must be controlled by establishing standards so that they can be operated or stopped in accordance with operation of the equipment installed there.

(e) When a single-phase load is connected to a three-phase power point, control standards shall be set forth to prevent unbalanced voltage.

(f) Electric power use in the Factory should be leveled, in order to reduce the maximum electric current, by establishing control standards and making necessary adjustment concerning equipment that uses electric power (hereinafter referred to as Electrical Equipment).

(g) Moreover, in relation to control of electric supply to the Electrical Equipment, control standards shall be established for voltage, current, power factor, load rate, and demand factor in the power receiving and transformation equipment, corresponding to the type of the Electrical Equipment, operation situation, and their capacity.

(2) Measurements and records concerning power receiving, transformation, and distribution equipment

After establishing control standards, measurements should be periodically conducted for the electric consumption at the Factory as well as voltage, current, power factor, load factor, and demand factor of the receiving and transformation units and major electric distribution units, then such measurements should be periodically implemented. The result of measurements should be recorded.

(3) Maintenance and inspection of power receiving, transformation, and distribution units

Control standards must be set forth for power receiving, transformation, and distribution units in order to keep good conditions, and inspection must be conducted for maintenance based on such standards.

(4) Measures for installation of power receiving, transformation, and distribution units

When a transformer is installed, it should match the actual necessary electric power.

7. Rationalization concerning conversion of electric power into motive power, heat, etc.

(1) Control of Electric Equipment

(a) As for equipment employing electric motive power, control standards shall be established, in consideration of its relation with electric power required at the starting, in order to reduce power loss due to idling of a motor, and such a motor must be stopped whenever it is not operated.

(b) When two or more motors are used, control standards shall be established so that an appropriate demand factor of each motor can be maintained, and adjustment of the number of motors and appropriate distribution of load should be implemented.

(c) Control standards shall be established for fluid handling machinery such as pump, fan,

blower, compressor, etc. Then, in order to reduce load on motors, outlet volume and pressure are properly adjusted by means of controlling he number of such machines, change in rotation, change in piping, impeller cut, etc., after reviewing their inlet pressures and outlet volume.

(d) Thermal efficiency of an induction furnace, electric art furnace, and electric resistance furnace should be enhanced by establishing control standards and by improving the charging method for materials to be heated.

(e) With regard to an electrolytic equipment, electric poles in appropriate shape and with properties should be adopted. Also, by establishing control standards, distance between electric poles, density of electrolytic solution, resistance at the contact point of the conductor must be appropriately controlled, so that the electrolytic efficiency can be improved.

(f) As for lighting equipment, control standards shall be set forth in compliance with the standards provided in JIS Z 9110 for Illuminant Standards or other equivalent rules. In addition, excess or unnecessary lighting should be avoided by switching off lighting properly.

(g) Moreover, concerning control of electricity use, control standards should be established and observed for voltage, current, power factor, and demand factor of each Electrical Equipment such as equipment using electric motive power, electrical heating equipment, lighting equipment, etc.

(2) Measurements and records concerning Electrical Equipment

(a) Control standards should be established in connection with voltage, current, power factor, and demand factor of each major Electrical Equipment. Then, such items shall be periodically measured, and the result must be recorded.

(b) In relation to lighting equipment, in addition to the above sub-clause (a), control standards for measurements of illuminant within a working room or the like, which uses lighting, shall be set forth. Then, such measurements shall be periodically conducted, and the result shall be recorded.

(3) Maintenance and inspection of Electrical Equipment

(a) As for equipment using electric motive power, control standards shall be established in order to reduce mechanical loss of loaded machinery (i.e. machinery of which load comes from a motor. This interpretation is applied throughout this Notification.) , power conveying units, and motors. Then, periodical inspection should be conducted for maintenance, based on such standards.

(b) In relation to fluid handling machinery such as pump, fan, blower, compressor, etc.,

control standards must be established in order to prevent leakage of fluid, and to reduce resistance within pipes to transport fluid. They must be periodically inspected for maintenance, based on such standards.

(c) Concerning electrical heating equipment or electrolytic equipment, control standards shall be established to reduce power loss by resistance at connecting points of the electric circuit, contact points of switches, etc. Then, inspection for maintenance shall be periodically conducted based on such standards.

(d) Control standards for lighting equipment must be set forth to clean lighting equipment and light source lamps, and to timely replace light source lamps.

II. Goal of rationalization of energy use

Business Operators shall strictly observe various standards described in the above chapter I, shall strive to achieve various goals set forth below within their technical and financial capabilities, and shall, through such measures, make efforts to rationalize utilization of energy with the goal to reduce the base unit of energy consumption (i.e. the value of total energy consumption used or production divided by production volume) by one percent or more in average every year at each Factory or by each Business Operator.

1. Improvement concerning energy consuming equipment, etc.

(1) Combustion equipment

(a) Business Operators shall strive to reduce the air ratio of combustion equipment with the goal to achieve the values of air ratio enlisted in the attached Table 1 (B).

(b) Combustion devices such as burner, etc., shall be reviewed so that they properly match types of the combustion systems and fuel, and that their fuel supply volumes and air ratios can be adjusted in accordance with fluctuation of the load and combustion situations.

(c) Blowers should be reviewed so that air volume and pressure in the combustion chamber can be adjusted.

(2) Heat Utilization Equipment

(a) Business Operators should review wall surfaces of industrial furnaces to enhance their emissivity by improving their properties and shapes.

(b) Business Operators should review heat conductive surfaces of equipment for Heating, etc., to enhance their thermal conductivity by improving their properties and shapes.

(c) Business Operators should review portions which are related to heat exchange of the equipment for Heating, etc., to be applied materials with higher thermal conductivity.

(d) Business Operators should review the body of industrial furnace, frames, fixtures, carriage to transport materials to be heated in order to reduce their heat capacities.

(e) Provided it is possible to heat directly materials by a direct burner or submerged combustion or other method, Business Operators should considered to heat materials directly.

(f) When heating is carried out by using multi-effect evaporator, the Business Operator should consider to enhance comprehensive thermal efficiency by increasing the number of effect evaporators.

(g) Business Operators should review distillation towers in order to enhance thermal efficiency comprehensively by reducing their reflux ratio through improving pressure in operation or increasing the number of steps or any other methods.

(h) Business Operators should consider to enhance thermal efficiency comprehensively by increasing the number of heat exchangers as well as their proper deployment.

(i) By combining an industrial furnace to be used in high temperature with an industrial furnace used in low temperature or any other ways, the Business Operator should consider to use heat at multiple stages and to enhance thermal efficiency comprehensively.

(j) Business Operators should strive to make use of heat more effectively by improving the control methods of equipment for Heating, etc.

(k) Business Operators should review processes that requires Heating, etc. repeatedly to operate them continuously, or integrate or shortening or partial elimination of the processes.

(l) When an industrial furnace is newly constructed, the Business Operator shall strive to enhance insulation of the furnace wall to satisfy the value of the attached Table 2 (B) for temperatures of outside furnace wall (with regard to an intermittently operated furnace or other industrial furnace that is used less 12 hours per day, the portion of outside furnace wall of which temperatures reach more than the value enlisted in the attached Table 2 (B), or more than 50% area of the inside wall of a furnace, of which inside temperature becomes 500℃ or higher, should be made of insulating material with bulk specific gravity of 0.75 or less.). Provided an existing industrial furnace can be modified to improve its insulation capacity, the Business Operator should make efforts to enhance insulation property of furnace wall to satisfy the value enlisted in the attached Table 2 (B) for outside surface of furnace walls.

(m) Business Operators should consider to enhance insulation of Heat Utilization Equipment by measures such as increase in thickness of insulation, application of insulation material with less thermal conductivity, double insulation layers, etc.

(n) Business Operators should consider to prevent heat loss due to radiation and inlet/outlet of air by reducing or closing opening of the Heat Utilization Equipment, or by attaching double doors to the opening of the Heat Utilization Equipment, or the like.

(o) Business Operators should review rotating portions, couples, etc. to take measures of preventing leakage of thermal medium by sealing or any other methods.

(p) Business Operators should consider to reduce the thermal radiation area by rationalizing pipe channel to transport thermal medium.

(q) Business Operators should review an open type steam utilization equipment, open type conveying equipment for high temperature materials, etc. to reduce heat loss from radiation or diffusion of thermal medium by attaching a cover or any other proper methods. However, this sub-clause is not applicable when it is necessary to cool down the materials while transporting.

(r) With regard to collection and utilization of heat from exhausted gas, Business Operators should strive to reduce temperature of exhausted gas and to enhance collection rate of exhausted heat with the goal to be achieved based on the values enlisted on the attached Table 3 (B) for exhaust gas temperature and collection rate for exhaust gas.

(s) With regard to energy generated from combustion of inflammable waste, Business Operators should collect and utilize such energy as much as possible. When such energy is collected, control standards for the scope of collection should be considered.

(3) Equipment for Waste Heat Collection Equipment

(a) In relation to flue gas ducting, pipes, etc., that transport exhaust gas from a discharging equipment for exhaust heat to an Waste Heat Collection Equipment, Business Operators should consider to take appropriate measures in order to reinforce their insulation capability and any other measures to maintain exhaust heat temperature in a high level.

(b) In order to enhance the collection rate of exhaust heat, Business Operators should consider to take proper measures including improvement of and shapes of the heat conductive surface, increase in the heat conductive area of their Waste Heat Collection equipment, and so forth.

(c) Business Operators should consider and research utilization methods of exhaust heat, depending on discharging conditions of exhaust heat.

(4) Dual-purpose Generation Equipment

In relation to extraction turbines or back-pressure turbines to be used for Dual-purpose Generation Equipment, Business Operators should consider remodeling of an extraction turbine or back-pressure turbine if its efficiency can be improved by changing their extraction or back-

pressure conditions.

(5) Electrical Equipment

(a) Aiming to keep the power factor 95% or over at a power receiving unit, Business Operators should consider to improve the power factor of the equipment shown in the attached Table 4 (except for equipment of which capacity is less than the capacities listed there) or a transformation equipment by installing a leading power condenser or other measures.

(b) As for lighting equipment, Business Operators should consider to take any proper measures such as adoption of a type of switches that can adjust illuminant, or installation of illuminant control unit or automatic switch-off device, etc., so lighting can be adjusted corresponding to daylight.

(c) Business Operators should consider to eliminate unnecessary wide-area lighting and high intensity illuminant by means of using spot lighting, change in deployment of lighting equipment, and so forth.

2. Installation of equipment to contribute to rationalization of energy use

(1) Equipment contributing to rationalization of fuel combustion

(a) Business Operators should consider to install combustion a control device in order to control air ratios in accordance with the control standards established for air ratios.

(b) In case that the required heat volume fluctuates largely, Business Operators should consider to install a heat accumulator, provided fluctuation of combustion load can be reduced to enhance thermal efficiency of the combustion equipment by installing a heat accumulator.

(2) Equipment concerning rationalization of Heating, etc.

(a) Business Operators should consider to adopt a high heat efficiency equipment when they install a heating equipment, dryer, etc., that uses a boiler, industrial furnace, heat medium such as steam.

(b) Business Operators should consider to adopt a high heat efficiency equipment such as a heat pump or the like for air-conditioning equipment.

(3) Equipment concerning rationalization of conversion of electricity into motive power, heat, etc.

(a) When an equipment using electrical motive power is operated in a situation that the load

fluctuates largely, Business Operators should consider to install a rotation control system or a similar device in order to enable to control its operation depending on changes in load.

(b) Motors should be applied in consideration of their features, types, and capacities for operational characteristics of the loaded machinery and their operation conditions, so that the motor power matches the required capacity.

(c) Electrical heating equipment should be introduced in consideration and in comparison of features of heating by combustion of fuel and electrical heating. Furthermore, Business Operators should consider to adopt an appropriate heating system for required level of temperature when they introduce an electrical heating system.

(d) As for lighting equipment, Business Operators should consider adopting high efficiency discharge lamps such as fluorescent high pressure mercury lamps, high pressure sodium lamps, metal halide lamps, high-frequency lighting fluorescent lamps, etc.

3. Utilization of excess steam, etc.

(a) When there is high temperature combustion gas or steam, that can be utilized, exists in the Factory, its Business Operator should study to utilize such gas or steam for power generation, motive power for operation, etc., in consideration of comprehensive thermal efficiency. In addition, Business Operators should consider enhancement of conversion efficiency of heat into motive power by means of co-generation as well as improvement of steam conditions.

(b) When there is excess heat, steam, etc., in a Factory that can be utilized, Business Operators should study to utilize such heat, steam, etc. at another Factory or for consumers in consideration of comprehensive thermal efficiency.

4. Optimum control of a power generation facility

In case that, in operation of a thermal power plant, reduced pressure operation is possible by applying a partial load onto a steam turbine, control standards shall be established and observed in relation to its optimization.

Table 1 (A) Standard Air Ratios (Ref. I-(1)-(b))

(1) Standard Air Ratios for Boilers

Classification		Load Ratio (unit: %)	Standard Air Ratio				
			Solid fuel		Liquid fuel	Gaseous fuel	Blast furnace gas or other by-product gas
			Fixed bed	Fluid bed			
For Electric Power Operation		75~100	-	-	1.05 ~1.2	1.05 ~1.1	1.2
Others	Hourly evaporation: 30 tons or more	50~100	1.3 ~1.45	1.2 ~1.45	1.1 ~1.25	1.1~1.2	1.2~1.3
	Hourly evaporation: 10 tons to less than 30 tons	50~100	1.3 ~1.45	1.2 ~1.45	1.2~1.3	1.2~1.3	-
	Hourly evaporation: 5 tons to less than 10 tons	50~100	-	-	1.3	1.3	-
	Hourly evaporation: less than 5 tons	50~100	-	-	1.3	1.3	-

Note: Electric Power Operation means boilers to be installed for the purpose of power generation by an electric power Business Operator (i.e. Electric Power Business Operator stipulated in the Article 2 (6) of the Electric Power Business Act).

[Remarks]

1. The values of the standard air ratios in the above Table are the figures that should be measured at the exits of boilers in a stable condition after implementation of periodical inspection and when combustion is made in a constant load.
2. Load ratios in the above Table mean turbine load ratios for boilers installed for the purpose of electric power generation, while the other ratios mean boiler load ratios.
3. Calculation of the above air ratios were worked out using the following formula, and calculation results are rounded to the nearest one decimal place in case one decimal place is shown, while rounded to the nearest two decimal places in case two decimal places are indicated.

   Air ratio = 21/(21- Density of oxygen in exhaust gas (%))
4. The values of standard air ratios in relation to pulverized coal firing type boilers shown in the column of fixed bed boilers using solid fuel are 1.2 to 1.3 for electric power Business Operators, and 1.2 to 1.3 for the others (this is restricted to the boiler of which evaporation volume is 10 tons to less 30 tons).
5. With regard to boilers that use mixture of two or more different types of fuels, a standard air ratio of fuel that has a higher mixed fuel burning ratio (i.e. mixed fuel burning ratio based on

calorie power) is applied.

6. The values of standard air ratios in the above Table are not applied to the air ratios of the following boilers:

(a) Small boilers defined in Article 1 (4) of the Enforcement Ordinance of the Labor, Safety, and Hygienic Act

(b) Boilers that were modified for the purpose of changing fuel type after the installation

(c) Boilers that use mixed fuels with industrial waste such as wood chips, barks, sludge, etc.

(d) Boilers that burn black liquor

(e) Boilers that burn disposed tires

(f) Boilers that exclusively burn by-product gas of which calorie power is less than one cubic meter per 900 kilo calorie under normal conditions (i.e. one kilo cubic meter per 3,765.6 kilo joule under normal conditions)

(g) Boilers for the purpose of incinerating harmful gas

(h) Boilers using exhaust heat

(i) Boilers using thermal medium other than water

(j) Boilers of which air inlet system is to take open air

(k) Boilers that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or prototype

(l) Boilers that were installed on or before December 31, 1979 and of which nominal air ratios do not satisfy the standard air ratios

(2) Standard Air Ratios for Industrial Furnace (Ref. I- 1 (1) (b))

Classification	Standard Air Ratio		
	Furnace Type		
	Continuous type	Intermittent type	Remarks
Melting furnace for metal casting	1.3	1.4	
Continuous billet heating furnace	1.25	-	
Metal heating furnace other than continuous billet heating furnace	1.25	1.35	
Metal heat treatment furnace	1.25	1.3	
Oil heating furnace	1.25	-	
Heat decomposition furnace and reforming furnace	1.25	-	

Cement kiln	1.30	-	
Lime kiln	1.30	1.35	
Drying furnace	1.3	1.5	Only for combustion unit of burner

[Remarks]

1. The values of standard air ratios shown in the above Table are the air ratios that should be measured at the air exit of furnaces operating with a load close to the standard after implementation of inspection and overhauling.
2. The volumes of the standard air ratios are not applied to air ratios of the following industrial furnaces:
   (a) furnaces using solid fuel (except for furnaces exclusively use pulverized coal)
   (b) furnaces of which rated capacities (combustion performance of the fuel for burner) are less than 50 liter per hour (when converted to heavy oil)
   (c) furnaces that require specific environment for the purpose of oxidation or deoxidation
   (d) furnaces of which door is needed to be opened often, or of which burner must be ignited and extinguished frequently
   (e) Furnaces that require diluted air, or furnaces for the purposes of maintaining heat pattern or leveling temperature in the furnace
   (f) furnaces that exclusively burn by-product gas of which calorie power is less than one cubic meter per 900 kilo calorie in normal condition (i.e. one kilo cubic meter per 3,765.6 kilo joule in normal condition)
   (g) furnaces that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or prototype
   (h) industrial furnaces built with materials of which quality is degraded in high temperature, so they need cooled diluted air
   (i) and furnaces that incinerate inflammable waste.

Table 1 (B) Targeted Air Ratios (Ref. II-1-(1) (a))

(1) Targeted Air Ratios Concerning Boilers

Classification		Load Ratio (unit: %)	Targeted Air Ratio				
			Solid fuel		Liquid fuel	Gaseous fuel	Blast furnace gas or other by-product gas
			Fixed bed	Fluid bed			
Others	For Electric Power Operation	75~100	-	-	1.05 ~1.1	1.05 ~1.1	1.15~11.2
	Hourly evaporation: 30 tons or more	50~100	1.2 ~1.3	1.2 ~1.25	1.05 ~1.15	1.05 ~1.15	1.2~1.3
	Hourly evaporation: 10 tons to less than 30 tons	50~100	1.2 ~1.3	1.2 ~1.25	1.2 ~1.25	1.2 ~1.25	-
	Hourly evaporation: 5 tons to less than 10 tons	50~100	-	-	1.2 ~1.3	1.2 ~1.25	-
	Hourly evaporation: less than 5 tons	50~100	-	-	1.2 ~1.3	1.2 ~1.25	-

Note: Electric Power Operation means boilers to be installed for the purpose of power generation by an electric power Business Operator.

[Remarks]

1. The values of the targeted air ratios in the above Table are the figures that should be measured at the exits of boilers in a stable condition after implementation of periodical inspection and when combustion is made in a constant load.
2. Calculation of load ratios and air ratios are based on Remarks 2 and 3 of Table 1 (A) (1).
3. The values of the targeted air ratios in relation to the pulverized coal firing type boilers in the column of fixed bed boilers using solid fuel are 1.15 to 1.25 for electric power Business Operators, and 1.2 to 1.25 for the others (restricted to boilers of which evaporation volume is 10 tons to 30 tons).
4. The values of the targeted air ratios concerning boilers that burn black liquor shall be between 1.2 and 1.3 when the load ratio is 50% to 100%.
5. With regard to boilers that use mixture of two or more different types of fuel, targeted air ratios of fuel with higher mixed fuel burning ratios are applied.
6. The values of targeted air ratios in the above Table are not applied to the air ratios of the following boilers. However, Business Operators shall consider to control the air ratios pursuant to the above Table as far as it is possible.

(a) Small boilers defined in Article 1 (4) of the Enforcement Ordinance of the Labor, Safety, and Hygienic Act

(b) Boilers that use mixed fuel with industrial waste such as wood chips, barks, sludge, etc.

(c) Boilers that burn disposed tires

(d) Boilers that exclusively burn by-product gas of which calorie power is less than one cubic meter per 900 kilo calorie under normal conditions (i.e. one kilo cubic meter per 3,765.6 kilo joule under normal conditions)

(e) Boilers for the purpose of incinerating harmful gas

(f) Boilers using exhaust heat

(g) Boilers of which air inlet system is to take open air

(h) Boilers that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or as a prototype

(2) Targeted Air Ratios for Industrial Furnace (Ref. I- 1 (1) (b))

Classification	Targeted Air Ratio		
	Furnace Type		
	Continuous type	Intermittent type	Remarks
Melting furnace for metal casting	1.25	1.3	
Continuous billet heating furnace	1.2	-	
Metal heating furnace other than continuous billet heating furnace	1.2	1.3	
Metal heat treatment furnace	1.2	1.3	
Oil heating furnace	1.25	-	
Heat decomposition furnace and reforming furnace	1.25	-	
Cement kiln	1.25	-	
Lime kiln	1.25	1.35	
Drying furnace	1.3	1.5	Only for combustion unit of burner

[Remarks]

1. The values of targeted air ratios shown in the above Table are the air ratios that should be measured at air exit of furnaces operating with load close to the standard after implementation of inspection and overhauling.
2. The volumes of the targeted air ratios are not applied to air ratios of the following industrial furnaces. However, Business Operators shall consider to control the air ratios pursuant to the

above Table as far as it is possible.

(a) Furnaces of which rated capacities (combustion performance of the fuel for burner) are less than 50 liter per hour (when converted to heavy oil)

(b) Furnaces that require a specific environment for the purpose of oxidation or deoxidation

(c) Furnaces of which door is needed to be opened often, of which burner must be ignited and extinguished frequently

(d) Furnaces that require diluted air for the purposes of maintaining heat pattern or leveling temperature in the furnace

(e) Furnaces that exclusively burn by-product gas of which calorie power is less than one cubic meter per 900 kilo calorie under normal conditions (i.e. one kilo cubic meter per 3,765.6 kilo joule under normal conditions)

(f) Furnaces that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or as a prototype

(g) Industrial furnaces built with materials of which quality is degraded in high temperature, so they need cooled diluted air.

Table 2 (A) Standard Temperature on Outside Surface of Furnace Wall

(Ref. I-3-(1)-(c))

Inner Furnace Temperature (unit: ℃)	Standard Temperature on Outside Furnace Wall Surface (unit: ℃)		
	Ceiling	Side wall	Bottom facing to outside atmosphere
1,300℃ or higher	140	120	180
1,100℃ to 1,299℃	125	110	145
900℃ to 1,099℃	110	95	120
Less than 900℃	90	80	100

[Remarks]

1. The values of the standard temperature of outside surface of furnace wall are the required average temperatures of the outside wall surfaces of furnaces (excluding irregular portions) during regular operations at 20℃ outside atmosphere.
2. The values of the standard temperature of outside surface of the furnace wall shown in the above Table are not applied to the temperature of outside surface of the following industrial furnace wall.

(a) Furnaces of which rated capacities (combustion performance of the fuel for burners) are less than 50 liter per hour (when converted to heavy oil)

(b) Furnaces of which walls are forcibly cooled

(c) Rotary type kiln

(d) Furnaces to be used for development, researches, and as a prototypes

Table 2 (B) Targeted Temperature on Outside Surface of Furnace Wall

(Ref. II-1- (2)-(l))

Inner Furnace Temperature (unit: ℃)	Targeted Temperature on Outside Furnace Wall Surface (unit: ℃)		
	Ceiling	Side wall	Bottom facing to outside atmosphere
1,300℃ or higher	120	110	160
1,100℃ to 1,299℃	110	100	135
900℃ to 1,099℃	100	90	110
Less than 900℃	80	70	90

[Remarks]

1. The values of the standard temperatures of outside surface of furnace wall shown in the above Table are the required average temperatures of the outside wall surfaces of furnaces (excluding irregular portions) during regular operations at 20℃ of the outside atmosphere.
2. The values of the standard temperatures of outside surface of furnace wall shown in the above Table are not applied to the temperature of outside surface of the following industrial furnace wall. However, Business Operators shall consider to improve insulation of furnace walls in accordance with the above Table where it is possible.

(a) Furnaces of which rated capacities (combustion performance of the fuel for burners) are less than 50 liter per hour (when converted to heavy oil)

(b) Furnaces of which walls are forcibly cooled

(c) Rotary type kiln

(d) Furnaces to be used for development, researches, or as a prototypes

Table 3 (A) Standard Exhaust Gas Temperatures and Standard Collection ratios of Exhaust Heat (Ref. I-4-(1) (b))

(1) Standard Exhaust Gas Temperatures Concerning Boilers

Classification		Standard Exhaust Gas temperature (unit: ℃)				
		Solid fuel		Liquid fuel	Gaseous fuel	Blast furnace gas or other by-product gas
		Fixed bed	Fluid bed			
For Electric Power Operation		-	-	145	110	200
Others	Hourly evaporation: 30 tons or more	200	200	200	170	200
	Hourly evaporation: 10 tons to less than 30 tons	250	200	200	170	-
	Hourly evaporation: 5 tons to less than 10 tons	-	-	220	200	-
	Hourly evaporation: less than 5 tons	-	-	250	220	-

Note: Electric Power Operation means boilers to be installed for the purpose of power generation by an electric power Business Operator.

[Remarks]

1. The values of the standard exhaust gas temperatures shown on the above Table are the exhaust gas temperatures that should be measured at the exits of a boiler (i.e. the applicable exit in case that an equipment for collection and utilization, or a smoke and soot removal equipment is installed as an environmental measures) when combustion is made with 100% load ratio (i.e. loading factor on a turbine for boilers installed for the purpose of power generation, while loading factor on boilers for other cases) at 20℃ of inlet air temperature measured at the air entrances of the boiler after implementation of a periodical inspection is made.
2. The standard exhaust gas temperature concerning solid fuel type fixed bed boilers that use pulverized coal shall be 150℃ for boilers of electric power Business Operators, and 200℃ for other cases (restricted to boilers of which evaporation is more than 30 tons for more per hour, or from 10 tons to 30 tons).
3. In relation to boilers of which evaporation volume is less ten tons per hour, the standard exhaust gas temperature of boilers that have no equipment to collect exhaust heat shall be 320℃ for boilers using liquid fuel, and 300℃ for boilers using gaseous fuel.
4. The values of temperatures shown in the above Table are not applied to the exhaust gas

temperature of the following types of boilers:

(a) Small boilers defined in Article 1 (4) of the Enforcement Ordinance of the Labor, Safety, and Hygienic Act

(b) Boilers that were modified for the purpose of changing fuel after installation

(c) Boilers that use mixed fuel with industrial waste such as wood chips, barks, sludge, etc.

(d) Boilers that burn black liquor

(e) Boilers for the purpose of incinerating harmful gas

(f) Boilers using exhaust heat or remaining heat

(g) Boilers using thermal medium other than water

(h) Boilers of which air inlet system is to take open air

(k) Boilers that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or prototype.

(2) Standard Collection Ratios of Exhaust Heat Concerning Industrial Furnace (Ref. I-4-(1)-(b))

Exhaust Gas Temperature (unit: ℃)	Classification of Capacity	Standard Collection Rate of Exhaust Heat (unit: %)
Less than 500	A • B	25
500 to 599	A • B	25
600 to 699	A B C	35 30 25
700 to 799	A B C	35 30 25
800 to 899	A B C	40 30 25
900 to 999	A B C	45 35 30
1,000 or higher	A B C	45 35 30

Note:

1. Exhaust gas temperature refers to the temperature measured at the exhaust gas exit of the furnace chamber and the entrance of the recuperator.
2. Capacity classification is made in the following manner:

(A) The rated capacity is 20 million kilo calorie (83.68 million kilo joule) or more per hour.

(B) The rated capacity is 5 million kilo calorie (20.92 million kilo joule) or more, and less than 20 million kilo calorie (83.68 million kilo joule) per hour.

(C) The rated capacity is 1 million kilo calorie (4.184 million kilo joule) or more, and less than 5 million kilo calorie (20.92 million kilo joule) per hour.

[Remarks]

1. The values of the standard collection ratios of the exhaust heat shown in the above Table should be observed as the ratios of collected calorie power against the sensible heat power of exhaust gas discharged from a furnace chambers when combustion is made with load close to the rated capacity.
2. The values of the standard collection ratios of exhaust heat shown in the above Table are applied to any industrial furnaces constructed on and after January 1, 1980.
3. The values of the standard collection ratios of the exhaust heat shown in the above Table are not applied to the collection ratios of the following industrial furnaces:

(a) Furnace of which rated capacity is less than one million kilo calorie (4.184 kilo joule)

(b) Furnaces that need a specific environment for the purpose of oxidation or deoxidation

(c) Furnaces incinerating by-product gas of which calorie power is one cubic meter per 900 kilo calorie (3,765.6 kilo joule) under normal conditions

(d) Boilers that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or as a prototype.

Table 3 (B) Targeted Exhaust Gas Temperatures and Targeted Collection Ratios of Exhaust Heat (Ref. II-1-(2) (r))

(1) Targeted Exhaust Gas Temperatures Concerning Boilers

Classification		Targeted Exhaust Gas Temperature (unit: ℃)				
		Solid fuel		Liquid fuel	Gaseous fuel	Blast furnace gas or other by-product gas
		Fixed bed	Fluid bed			
For Electric Power Operation		-	-	135	110	190
Others	Hourly evaporation: 30 tons or more	180	170	160	150	190
	Hourly evaporation: 10 tons to less than 30 tons	180	170	160	150	-
	Hourly evaporation: 5 tons to less than 10 tons	-	300	200	180	-
	Hourly evaporation: less than 5 tons	-	320	220	200	-

Note: Electric Power Operation means boilers to be installed for the purpose of power generation by an electric power Business Operator.

[Remarks]

1. The values of the targeted exhaust gas temperatures shown on the above Table are the exhaust gas temperatures that should be measured at the exits of boilers (i.e. the applicable exit in case that an equipment for collection and utilization, or a smoke and soot removal equipment is installed as an environmental measures) when combustion is made with 100% load ratio (i.e. loading factor on a turbine for a boiler installed for the purpose of power generation, while loading factor on boilers for other cases) at 20℃ of inlet air temperature at the air entrances of the boilers after implementation of a periodical inspection is made.
2. The targeted exhaust gas temperature concerning solid fuel type fixed bed boilers that use pulverized coal shall be 140℃ for boilers of electric power Business Operators, and 160℃ for other cases (restricted to boilers of which evaporation is more than 30 tons or more per hour, or from 10 tons to 30 tons).
3. The targeted value of exhaust gas temperature concerning boilers that incinerate black liquor shall be 180℃.

4. With regard to boilers that use mixture of two or more different types of fuels, the targeted air ratio of fuel with a higher mixed fuel burning ratio is applied.
5. The values of temperatures shown in the above Table are not applied to the exhaust gas temperature of the following types of boilers. However, Business Operators shall consider to reduce exhaust gas temperature in accordance with the above Table where it is possible.
   (a) Small boilers defined in Article 1 (4) of the Enforcement Ordinance of the Labor, Safety, and Hygienic Act
   (b) Boilers that use mixed fuel with industrial waste such as wood chips, barks, sludge, etc.
   (c) Boilers for the purpose of incinerating harmful gas
   (d) Boilers using exhaust heat or remaining heat
   (e) Boilers of which air inlet system is to take open air
   (f) Boilers that are under a periodical inspection or not used regularly. Also, boilers used for development, research, or as a prototype

(2) Targeted Collection Ratios of Exhaust Heat Concerning Industrial Furnaces

(Ref. II-1-(2)-(r))

Exhaust Gas Temperature (unit: ℃)	Classification of Capacity	Standard Collection Rate of Exhaust Heat (unit: %)	Reference	
			Exhaust gas temperature (unit: %)	Remaining air heat temperature (unit: %)
Less than 500	A • B	30	300	165
500 to 599	A • B	30	365	200
600 to 699	A	35	400	270
	B	30	435	230
	C	25	470	195
700 to 799	A	35	460	310
	B	30	505	265
	C	25	545	220
800 to 899	A	40	480	395
	B	35	525	345
	C	30	575	295
900 to 999	A	50	430	550
	B	40	535	440
	C	35	590	385
1,000 or higher	A	50	-	-
	B	40		
	C	35		

Note:

1. Exhaust gas temperature refers to the temperature measured at the exhaust gas exit of the furnace chamber and the entrance of the recuperator.
2. Capacity classification is made in the following manner.
   (A) The rated capacity is 20 million kilo calorie (83.68 million kilo joule) or more per hour
   (B) The rated capacity is 5 million kilo calorie (20.92 million kilo joule) or more, and less than 20 million kilo calorie (83.68 million kilo joule) per hour
   (C) The rated capacity is 1 million kilo calorie (4.184 million kilo joule) or more, and less than 5 million kilo calorie (20.92 million kilo joule) per hour

[Remarks]

1. The values of the targeted collection ratios of exhaust heat shown in the above Table should be observed as the ratios of collected calorie power against the sensible heat power of exhaust gas discharged from a furnace chambers when combustion is made with load close to the rated capacity.
2. The values of the targeted collection ratios of exhaust heat shown in the above Table are not

applied to the exhaust heat collection ratio of the following industrial furnaces. However, Business Operators shall consider to improve exhaust heat collection ratio in accordance with the above Table.

(a) Furnaces of which rated capacity is less than one million kilo calorie (4.184 kilo joule)

(b) Furnaces that need a specific environment for the purpose of oxidation or deoxidation

(c) Furnaces incinerating by-product gas of which calorie power is one cubic meter per 900 kilo calorie (3,765.6 kilo joule) under normal conditions

(d) Boilers that are under a periodical inspection, or not used regularly. Also, boilers used for development, research, or as a prototype

3. The values of exhaust gas temperatures and remaining air heat temperatures shown above as reference are the temperatures of exhaust gas when exhaust gas is collected at the targeted ratio of exhaust heat, and the temperatures of remaining air heat when air is preheated with the applicable collected exhaust heat, respectively, which were worked out in the following conditions:

(a) Temperature drops by 60℃ due to heat loss by radiation during transfer from the exit of furnace to the heat exchanger for air preheat, and other factors

(b) Heat radiation from the heat exchanger is 5%.

(c) The fuel is liquid fuel (equivalent to heavy oil)

(d) Outside atmosphere is 20℃.

(e) Air ratio is 1.2.

Table 4 Equipment to improve power factor (Ref. I-6-(1)-(c) and II-1-(5)-(a))

Equipment	Capacity (unit: kW)
Squirrel cage induction motor	100
Wound-rotor induction motor	100
Crucible induction furnace	100
Channel induction furnace	100
Vacuum induction furnace	100
Electric arc furnace for steel making	-
Rocking electric arc furnace	-
Flush bat welder (except for portable type)	10
Electric arc welder (except for portable type)	10
Rectifier	10,000

[Remarks]

Equipment that are difficult to be applied due to safety such as explosion- proof or other factors are excluded.

G. Regulations Concerning Tests and Supply of Certificates for Energy Controllers

Article 1. Definition

The terms used in this Ordinance are based on the terms used in the Law Concerning Rational Use of Energy (hereinafter referred to as Law).

Article 2. Certification

The certification by the Minister of International Trade and Industry (hereinafter referred to as Certification) stipulated in the clause 1 .2 of Article 8 of the Law are to be granted to those who completed the Energy Control Training course (hereinafter referred to as Training) implemented by the Minister of International Trade and Industry or the organization designated by the Minister of International Trade and Industry.

Article 3. Training

1. The Training consists of the Heat Management Training and the Electricity Management Training.
2. The eligible persons who can take the Training are those who fall into one of the items listed in the right column for each segment stated in the left column. In addition, eligible persons who take the Heat Management Training must be those who have been engaged in the actual operations regarding rationalization of Fuels use for three years or longer, while eligible persons who take the Electricity Management Training must be those who have engaged in the actual operations regarding rationalization of electricity use for three years or longer.
3. The date and location of the Training conducted, and other information necessary for implementation of the Training shall be notified on an official gazette in advance.

Article 4. Application for Certification

Persons who wish to take the Training must submit an Application for Certification in Form No.1 to the Minister of International Trade and Industry through the Director of the Regional Bureau of International Trade and Industry who has jurisdiction over the location where the applicant is to take the Training.

Article 5. Grant of the Certificate to those who are certified

1. With regard to the persons who are certified, the Minister of International Trade and

Industry shall grant the Certificates of Heat Controller to those who completed the Heat Management Training, and the Certificates of Electricity Controller to those who completed the Electricity Management Training respectively.

2. The form of the Certificate of Energy Controller (hereinafter referred to as Certificate) is based on Form No.2.

Article 6. Application for grant of the Certification

A person who wishes for the Certificate to be granted as a proof he/she successfully passed the Energy Controller Examination (hereinafter referred to as the Examination) that is conducted by the Designated Examination Institution must submit an Application for Grant of Certification of Form No.3 to the Minister of International Trade and Industry through the Director of the Regional Bureau of International Trade and Industry who has jurisdiction over the address of the applicant.

Article 7. Grant of the Certificate to the successful applicants

The Minister of International Trade and Industry shall grant the Certificates of Heat Controller to those who passed the Examination of Heat Management Controller and have engaged in the actual operations in relation to rationalization of Fuel use for one year or longer, and the Certificates of Electricity Controller to those who passed the Examination of Electricity Management Controller and have engaged in the actual operations in relation to rationalization of electricity use for one year or longer.

Article 8. Application for re-issuance of the Certificate

1. A person who wishes for the Certificate to be reissued because it has deteriorated, damaged or lost must submit an Application for Re-issuance of the Certificate of Energy Controller to the Ministry of International Trade and Industry through the Director of the Regional Bureau of International Trade and Industry who has jurisdiction over the address of the applicant.
2. In case that such an application is made because the Certificate has been deteriorated or damaged, the applicable Certificate must be attached to the above Application.

Article 9. Subjects of the Examination

1. The Examination shall be implemented at least once a year in the style of a written test of the subjects for each segment listed below:

Classification	Test Subject
Examination for Heat Management Controller	General theory, laws, and order based on laws of heat management
	Thermodynamics
	Heat conductivity and flow of fluid
	General theory on fuels, test methods for fuels, combustion theory, calculation for combustion, combustion methods, and combustion equipment
	Measurement and control
	Heat utilizing equipment, etc. (i.e. limited to boiler and its relevant equipment, steam power plant, steam transportation/storage/drain collection equipment, industrial furnace, distilling equipment, evaporation/condensing equipment, dryer, heating equipment, heat exchanger, dry distillation/gasfication equipment, freezing/air-conditioning equipment, internal combustion engine, gas turbine, and materials for heat-related equipment)
Examination for Electricity Controller	General theory, laws, and order based on laws for electricity management
	Electric theory and control theory
	Electric distribution in factories
	Electrical equipment
	Application of electric motors
	Electrical heating, electrochemistry, lighting, and air-conditioning

2. The date and location of the Examination conducted, and other information necessary for implementation of the Training shall be notified on an official gazette in advance.

Article 10. Announcement of the successful applicants

The examinees who passes the Examination shall be announced on an official gazette.

Article 11. Application of Designated Examination Institution

1. Organizations that wish to be designated in accordance with Clause 2 (2) of Article 8 of the Law must submit an Application describing the following items to the Minister of International Trade and Industry:
   (1) Name and address
   (2) Name and address of the office at which the Examination is carried out
   (3) The date to start the Examination
2. The above mentioned application must be attached with the following documents:
   (1) the certificate of incorporation or donation performance and the attested copy of corporate registration
   (2) the list of assets and the balance sheet of the business fiscal year immediate before the fiscal year of application
   (3) the statement of earning of the business fiscal year immediate before the fiscal year of

application

(4) and the document describing names and personal histories of the directors.

Article 12. Report on change in the Designated Examination Institution, etc.

1. When the Designated Examination Institution changes its name, address or location of the office at which the Examination is implemented, it must submit a report describing the following items to the Minister of International Trade and Industry:

(1) the new name, address or location of the Designated Examination Institution or the office at which the Examination is to be implemented after the change

(2) the effective date of such change

(3) and the reason for the change.

2. When the Designated Examination Institution is to open a new office or close the existing office to implement the Examination, it must submit a report describing the following items to the Minister of International Trade and Industry:

(1) the name and location of the office to be opened or closed

(2) the date to start the Administration of the Examination at the newly opened office, or the date to finalize the Administration of the Examination at the closing office

(3) the reason to open or close such office.

Article 13. Application for authorization of the Rules for Administration of the Examination

When the Designated Examination Institution wishes to receive the authorization described in the first part of Clause 5 (1) of Article 12 of the Law, it must submit a written application together with the Rules for Administration of the Examination.

Article 14. Items to be described in the Rules for Administration of the Examination

The items to be stipulated in the Rules for Administration of the Examination stated in Clause 5(12) of Article 12 of the Law shall be as follows:

(1) item concerning the implementation method of the Examination

(2) tem concerning the method to receive the charges

(3) item concerning issuance and re-issuance of the qualification certificates

(4) item concerning non-disclosure requirements for knowledge obtained through the Administration of the Examination

(5) item concerning preservation of record books and documents in connection with the Administration of the Examination

(6) and any other items necessary for carrying out the Administration of the Examination.

Article 15. Application for authorization of change in the Rules for Administration of the Examination

When the Designated Examination Institution wishes to receive the authorization described in the latter part of Clause 5 (1) of Article 12 of the Law, it must submit an application including the following items to the Minister of International Trade and Industry:

(1) items to be changed

(2) effective date for the change

(3) and the reason for such change.

Article 16. Application for authorization of suspension or discontinuance of the Administration of the Examination

When the Designated Examination Institution wishes to have an authorization based of Clause 6 of Article 12 of the Law, it must submit an application describing the following items to the Minister of International Trade and Industry:

(1) The scope of the operation concerning the Administration of the Examination to be suspended or discontinued

(2) The date to suspend or discontinue a part of or the entire operations concerning the administration of the Examination, and the period to suspend a part of or the entire operations of the Administration of the Examination

(3) The reason to suspend or discontinue a part of or the entire operations of the Administration of the Examination.

Article 17. Application for authorization of selection and dismissal of directors

When the Designated Examination Institution wishes to have an authorization based on Clause 8 of Article 12 of the Law, it must submit an application describing the following items to the Minister of International Trade and Industry:

(1) Name and personal history of the director to be selected or dismissed

(2) The reason for selection or dismissal.

Article 18. Requirements for the Examiners

The requirements stipulated in the Ordinance of the Ministry of International Trade and Industry based on Clause 2 of Article 12 of the Law, the Examiner must be the person who falls in one of the following conditions:

(1) the person who are or have been a professors or an assistant professor for the subject in relation to use of Fuels or electricity at a university or college defined in the School Education Act, or

(2) the person who has completed the regular curriculum of science at a university or an upper professional college defined in the School Education Act, and has an experience of engaging in the research on use of Fuels or electricity at a research institute that is established by the government or a local public entity or a corporation established based on the provisions of the Article 34 of the Civil Law Act, or other organization equivalent to them, or

(3) the person who is regarded to have knowledge and experience equivalent to the person described in the above Sub-clause (2) or ones who have better knowledge and experience in connection with rationalization of energy use.

Article 19. Report on selection or dismissal of an Examiner

1. The Designated Examination Institution that reports based on the provision in the first part of Sub-clause 10 (3) of Article 12 of the Law must submit a report describing the name and personal history of the Examiner for the Energy Controller (hereinafter referred to as Examiner) described in the Sub-clause 1 of the said Article, the subject of the Examination in charge, and the reason for selection to the Minister of International Trade and Industry.

2. Whenever a name of an Examiner changes, or the subject that an Examiner is in charge changes, or an Examiner is dismissed, it must be reported to the Minister of International Trade and Industry within 15 days of the effective date.

Article 20. Report on result of the Examination

When an Examination is implemented, the Designated Examination Institution must submit the list with names, dates of birth, addresses, and the Certificate numbers of the successful examinees in Form No. 5, Report on the Examination Result, for each segment to the Minister of International Trade and Industry.

Article 21. Items to be recorded in the record book

The items to be recorded in the record book that is defined in Sub-clause 1 of Article 12.14 of the Law are as follows:

(1) names of successful examinees
(2) date of birth of the successful examinees
(3) addresses of the successful examinees
(4) certificate numbers
(5) and classification of the Examination they passed.

Article 21.2 Preservation of records in a electromagnetic medium

1. When the items enlisted in the above clause are recorded using an electromagnetic method (methods beyond human perception using such means as electronics or magnetic method), and such records can be immediately displayed on a computer or other devices when necessary, such a medium can be replaced for record books with the said information defined in Sub-clause 2 of Article 12.14 of the Law.

2. When the data are recorded in accordance with the provision of the above Clause (1), the Designated Examination Institution shall strive to ensure the standards stipulated by the Minister of International Trade and Industry.

Article 22. Preservation of the record books

The record books stipulated in the Ordinance of the Ministry of International Trade and Industry made in accordance with Clause 2 of Article 12.14 of the Law must be preserved until the Administration of Examination becomes discontinued.

Article 23. Transfer, etc. of the Administration of Examination

If the Designated Examination Institution does what is defined in Sub-clause 2 of Article 12.15 of the Law, it must carry out the following items:

(1) to transfer the Administration of Examination to the Minister of International Trade and Industry.

(2) to transfer the record books and other documents concerning the Administration of Examination to the Minister of International Trade and Industry.

(3) and other items that the Minister of International Trade and Industry deems necessary.

Article 24. Public announcement

The Minister of International Trade and Industry shall publicly announce the items, listed in the right columns of the Table below, on a official gazette, when one of the situations enlisted in the left column of the same Table arises:

In case designation stated in Sub-clause 2 of Article 8.2 of the Law is made	(1) Name of the Designated Examination Institution and location of its main office (2) The scope of the Administration of Examination permitted (3) The date of designation

In case the authorization stated in the Article 12.6 is made	(1) Name of the Designated Examination Institution that suspends or discontinues a part of or the entire Administration of Examination, and location of its main office (2) The scope of the Administration of Examination to be suspended or discontinued (3) The date to suspend or discontinue a part of or the entire Examination Administration (4) The period if a part of or the entire Administration of Examination is suspended
When the designation is cancelled due to the provision of Article 12.13 of the Law, or when the Designated Examination Institutions ordered to suspend a part of or the entire Administration of Examination in accordance with the Clause 2 of the same Article.	(1) Name of the Designated Examination Institute and the location of its main office (2) The date the designation is cancelled, or the date when a part of or the entire Administration of Examination is suspended (3) In case that a part of or the entire Administration of Examination is ordered for suspension, the scope of the suspended Administration of Examination as well as its period
When the Minister of International Trade and Industry implements a part of or the entire Administration of Examination directly in accordance with the provision of Clause 1 of Article 12.15 of the Law	(1) The date when a part of or the entire Administration of Examination is to be implemented (2) The scope and period of the Administration of Examination to be implemented
When the Minister of International Trade and Industry decides not to implement a part of or the entire Administration of Examination, which had been carried out by the Minister, in accordance with the provision of Clause 1 of Article 12.15	(1) The date it is decided not to implement a part of or the entire Administration of Examination (2) The scope of the Administration of Examination decided not to be implemented

Additional Clauses (March 9, 1984)

1. This Ordinance shall be executed on the date of the promulgation.
2. The Rules for Grant of the Energy Controller (Ordinance No. 51 of Ministry of International Trade and Industry of 1979) is abolished.
3. Until June 30, 1985, in addition to the persons who fall into the provision of the Article 2, those who have been engaged in operations of heat management, described in Clause 1 of Article 3 of the Heat Management Act before its abolition in accordance with Clause 3 of the Additional Rules of the Law, for three years or longer, and completed the Training

concerning Heat Management defined in Article 12.2 of the Law.

Additional Clause (March 20, 1987)

This Ordinance shall be executed on April 1, 1987.

Additional Clause (January 25, 1996)

This Ordinance shall be executed on the day of its promulgation.

Table (Concerning Article 3)

Classification	Eligible persons who can take the Training
Training of heat management	(1) Persons who completed the curriculum of mechanical engineering or chemical engineering or metal engineering at a junior college, a professional school, or a former professional school defined by the old Professional School Act, or other equivalent school, and graduated such a school (2) Persons who are granted the Class A Gas Chief Engineer Certification or the Class B Gas Chief Engineer defined in Clause 1 of Article 32 of the Gas Business Act (the Law No. 51 of 1954) (3) Engineers defined in Clause 1 of Article 2 of the Engineer Act (the Law No. 25 of 1983) (limited to persons who successfully passes the second examination on machinery or chemistry or metal engineering) (4) Persons who are granted the Certificate of the Class I Boiler and Turbine Chief Engineer or the Class II Boiler and Turbine Chief Engineer defined in Clause 1 of Article 54 of the Electricity Enterprises Act (the Law No. 170 of 1964) (5) Persons who are granted the Special Class Boiler Engineer defined in Clause 1 of Article 97 of the Safety Rules for Boilers and Pressure Containers (the Ordinance No. 33 of the Ministry of Labor of 1972)
Electricity Management Training	(1) Persons who completed the curriculum of electric engineering at a junior college, a professional school, or a former professional school defined by the old Professional School Act, or other equivalent school, and graduated such a school (2) Engineer defined in Clause 1 of Article 2 of the Engineer Act (the Law No. 25 of 1983) (limited to persons who successfully passes the second examination on electric engineering) (3) Persons who are granted the Certificate of Class I Chief Electric Engineer or Class II Chief Electric Engineer or Class III Chief Electric Engineer defined in Clause 1 of Article 54 of the Electricity Enterprises Act (persons who has the Certificate of the Class III Chef Electric Engineer are limited to ones who have been engaged in the actual operations concerning rationalization of electricity use for two years or longer after the Certificate was granted.)