

6. Efficient Use of Energy of Vertical Transportation

6-1. Construction clients shall take proper measures to achieve efficient use of energy by vertical transportation, with due consideration given to the following practices.

- (1) They shall adopt a proper control system for vertical transportation.
- (2) They shall adopt a drive system with high energy efficiency.
- (3) They shall adopt a proper installation plan for the required transport capacity.

6-2. The judgment whether construction clients have taken proper measures for the matters listed in Paragraph 6-1 related to elevators (limited to the cases where three or more elevators are installed. The same applies to Paragraphs from 6-2 to 6-4) among vertical transportation installed in a building (only for that of the building type described in Column (1) and Column (4) of Attached Table 1 and common in Paragraphs from 6-2 to 6-4) shall be made based on Paragraph 6-3. Note that the judgment for elevators among vertical transportation installed in a building having a total floor area of 5,000 square meters or less may be made based on Paragraph 6-4, as well as Paragraph 6-3.

6-3. The value, which is calculated by dividing the annual primary energy consumption for elevators installed in a building (hereinafter called the “primary energy consumption for elevators”) in terms of heat quantity (Joule) by the annual assumed primary energy consumption for elevators of the building in the same period in terms of heat quantity, shall be equal to or smaller than the value specified in each cell of Row (g) of Attached Table 1. In this case, when converting the quantity of consumed energy shown in the left-hand column of Attached Table 3 into the heat quantity, the corresponding value in the right-hand column of the table shall be used for the calculation. (If a smaller value than the value given in the right-hand column can be obtained by installing energy-efficient equipment, the smaller value shall be used.) For other energy types, the conversion shall depend on their actual data, such as their composition. The primary energy consumption for elevators and the assumed primary energy consumption for elevators shall be as specified in (1) and (2) below:

- (1) The primary energy consumption for elevators shall be the total electric power for all elevators, calculated from the following equation:

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

where E_T , L , V , F_T , and T are the values shown below:

E_T : Electric power for elevators (unit: kWh)

L : Loading weight (unit: kg)

V : Rated velocity (unit: m/minute)

F_T : Coefficient specified in the table below for each velocity control system (If

there is an alternative coefficient calculated obtained by the result of special study or research, it may be used instead.)

T: Annual operation time (unit: hour)

Velocity control system	Coefficient
Variable voltage variable frequency control system (with power regenerative control)	1/45
Variable voltage variable frequency control system (without power regenerative control)	1/40
Static Leonard system	1/35
Ward Leonard system	1/30
AC feedback control system	1/20

(2) The assumed primary energy consumption for elevators shall be the total of the values calculated by multiplying the assumed electric power for each elevator by the transport capacity coefficient. In this case, the assumed electric power for each elevator and the transport capacity coefficient shall be as specified in a and b below:

a. The assumed electric power for each elevator shall be calculated from the following equation:

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

where E_S , L , V , F_S , and T are the values shown below:

E_S : Assumed electric power for each elevator (unit: kWh)

L : Loading weight (unit: kg)

V : Rated velocity (unit: m/minute)

F_S : Coefficient by velocity control system (1/40)

T : Annual operation time (unit: hour)

b. The transport capacity coefficient shall be calculated from the following equation:

Note that when the building concerned is a building of the building type listed in Column (4) of Attached Table 1 with four or fewer floors or a total floor area of 4,000 m² or less, the value obtained by dividing the average operation interval (unit: second) by 30 shall be used as the transport capacity coefficient (if the average operation interval is thirty second or more, the transport capacity coefficient shall be 1).

$$M = A_1/A_2$$

where M , A_1 , and A_2 are the values shown below:

M : Transport capacity coefficient

A_1 : Standard transport capacity specified in the table below depending on the application and actual data of the building concerned

A_2 : Planned transport capacity calculated by dividing the number of people that can be transported by the elevator in five minutes by the average

number of people who use the elevator in a five-minute period

Application of the building concerned	Actual data of the building concerned	Standard transport capacity
Application listed in Row (4) of Attached Table 1	When occupied by a single company	0.25
	In other cases	0.20
Application listed in Row (1) of Attached Table 1	-	0.15

6-4. For the elevators installed in buildings having a total floor area of 5,000 square meters or less that are important from the viewpoint of energy use, the score, which is calculated by adding 80 to the total of evaluation scores for the elevator control specified in the following table, shall be 100 or more.

Implemented measures	Score
One or more units by the variable voltage variable frequency control system (with power regenerative control) are used.	40
One or more units by the variable voltage variable frequency control system (without power regenerative control) are used.	20
Other than those above	0

6-5. Owners of specified buildings shall take proper measures to achieve efficient use of energy by the vertical transportation, with due consideration given to the following practices.

- (1) They shall maintain the control system of the installed vertical transportation by inspecting its operation status.
- (2) They shall maintain the energy efficiency of the installed drive system by inspecting the drive unit.