ADDENDA

ANSI/ASHRAE/IES Addendum dw to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on August 24, 2016; by the ASHRAE Tech Council on August 29, 2016; by the IES Board of Directors on September 26, 2016; and by the American National Standards Institute on August 30, 2016.

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FOREWORD

Addendum dw addresses one update. The update establishes baseline elevator energy use for motors, fans, and lights for Appendix G. The calculations and many of the assumptions are based on the PNNL technical support documentation. For buildings less than or equal to four stories, the baseline elevator is based on a hydraulic elevator with a speed of 150 fpm (45 m/min). For buildings greater than four stories the baseline elevator is based on a traction elevator with a speed of 350 fpm (107 m/min).

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum dw to 90.1-2013

Revise the Standard as follows (I-P and SI). Note: Table G3.X.X.X will be renumbered to fit the current numbering scheme for tables referenced in Table G3.1.

Table G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance

Part 16. Elevators – Baseline Building Performance

hmotor = the motor efficiency in accordance with ~~from~~ Table G3.3.9.2. ~~X.X.X~~ ~~For the next motor size greater than the bhp (kW)~~ ~~using a totally enclosed motor at 1800 rpm~~

Table G3.1 Modeling Requirements for Calculating Proposed and Baseline Building Performance

No.	Proposed Building Performance	Baseline Building Performance
16. Elevators		
	Where the proposed building includes elevators, the elevator motor, ventilation fan, and light load shall be included in the model. The cab ventilation fan and lights shall be modeled with the same schedule as the elevator motor.	Where the proposed building includes elevators, the baseline shall be modeled to include the elevator cab motor, ventilation fans and lighting power. The elevator peak motor power shall be calculated as follows: *IP Units:* *bhp = (weight of car + rated load – counterweight) × speed of car / (33,000 × $h_{mechanical}$)* *P_m = bhp × 746/h_{motor}* *SI Units:* *(kW = (weight of car + rated load – counterweight) × speed of car × 0.00981 / $h_{mechanical}$* *P_m = kW / h_{motor})*

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where

weight of car = the proposed design elevator car weight (lbs.) (kg)

rated load = the proposed design elevator load to operate at (lbs.) (kg)

counterweight of car = the elevator car counterweight (lbs.) (kg) from Table G3.X.X

speed of car = the speed of the proposed elevator (feet per minute) (meters per second)

$h_{mechanical}$ = the mechanical efficiency of the elevator from Table G3.X.X

h_{motor} = the motor efficiency from Table G.X.X .X for the next motor size greater than than the bhp (kW) using a totally enclosed motor at 1800 rpm

P_m= peak elevator motor power (watts) (kW)

The elevator motor use shall be modeled with the same schedule as the proposed.

When included in the proposed design, the baseline elevator cab ventilation fan shall be 0.33 W/cfm (0.69 W/L-s) and the lighting power density shall be 3.14 W/ft^2 (33.79 W/m^2), both operate continuously.

TABLE G3.9.2 Performance Rating Method Baseline Elevator Motor

Number of Stories (including basement)	*Motor Type*	*Counterweight*	*Mechanical Efficiency*	*Motor Efficiency*[a]
<= 4	Hydraulic	None	58%	Table G3.9.3
> 4	Traction	Proposed design counterweight, if not specified use weight of the car plus 40% of the rated load	64%	Table G3.9.1

a. Use the efficiency for the next motor size greater than the calculated bhp (kW)

TABLE G3.9.3 Performance Rating Method Hydraulic Elevator Motor Efficiency

HP	*Full-Load Efficiency*
10 (7.5 kW)	72%
20 (15 kW)	75%
30 (22 kW)	78%
40 (30 kW)	78%
100 (75 kW)	80%

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(The following table was introduced in Addendum DI and is referenced by this addendum. With this addendum, this table will be renumbered G3.9.1.)

TABLE G3.9.1 Performance Rating Method Motor Efficiency Requirements

Motor Horsepower	Minimum Nominal Full-Load Efficiency (%)
1.0 (0.8 kW)	82.5
1.5 (1.1 kW)	84.0
2.0 (1.5 kW)	84.0
3.0 (2.2 kW)	87.5
5.0 (3.7 kW)	87.5
7.5 (5.6 kW)	89.5
10.0 (7.5 kW)	89.5
15.0 (11.1 kW)	91.0
20.0 (14.9 kW)	91.0
25.0 (18.7 kW)	92.4
30.0 (22.4 kW)	92.4
40.0 (29.8 kW)	93.0
50.0 (37.3 kW)	93.0
60.0 (44.8 kW)	93.6
75.0 (56.0 kW)	94.1
100.0 (74.6 kW)	94.5
125.0 (93.3 kW)	94.5
150.0 (111.9 kW)	95.0
200.0 (149.2 kW)	95.0

Appendix E. INFORMATIVE REFERENCES

International Organization for Standardization

ISO 25745-2:2015 Energy Performance of lifts, escalators and moving walks – Part 2: Energy calculation and classification for lifts (elevators)

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ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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