Public Review Draft

Proposed Addendum bs to Standard 189.1-2017

Standard for the Design of High-Performance Green Buildings

Except Low-Rise Residential Buildings

First Public Review (June 2020)
(Draft Shows Proposed Changes to Current Standard)

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Foreword

This addendum makes changes to the current standard and its published addenda by re-formatting defined terms to be italicized in cases where this convention had not been applied. In some cases, changes are proposed to reconcile current text to match defined terms if that was the original intent. Additional changes that will be necessitated by the approval of pending (but not yet approved) addenda are listed in a separate table.

[Note to Reviewers: This addendum makes proposed changes to the current standard and its published addenda. The section numbering indicated in the tables below will match the numbering that goes into effect once these addenda are inserted into the current standard. For each proposed correction, a link to the impacted text is provided where the change has been indicated in strikethrough and underline format.]

Addendum bs to 189.1-2017

Make the following corrections to italics based on defined terms in 189.1-2017:

Section	Existing	Proposed	Reasoning
3.2 - *permeable pavers*	*spaces*	spaces	Defined term "space" is intended for enclosed space within a building
3.3	*ET_0 – maximum evapotranspiration*	*ET_o* – reference *evapotranspiration*	To better match the definition of ET_o in 3.2.
3.3	*L_{eq}* – hourly average sound pressure level	*L_{eq} – hourly average sound pressure level*	Defined term was not italicized
3.3	*NPLV* – nonstandard part-load value	*NPLV – nonstandard part-load value*	Defined term was not italicized
3.3	*water factor (WF):* a. *clothes washer (residential and commercial)…* b. *residential dishwasher…*	*water factor (WF):* a. clothes washer (residential and commercial)… b. residential dishwasher…	Only water factor (WF) is defined; the equipment type is not.

5.3.3.2(b)(1)	Open *space*	Open space	Defined term “space” is intended for enclosed space within a building
5.3.5.2	Retaining *wall*	Retaining wall	Defined term “wall” is intended for walls that are part of the building envelope
5.3.7.2.1; 5.3.7.2.1 (Exception 2); 5.3.7.2.2; 5.3.7.2.3; 5.3.7.2.4; 5.3.7.2.5	Bicycle parking *spaces*	Bicycle parking spaces	The defined term “spaces” is not intended to be used in the context of bicycle parking.
5.3.7.3(a); 5.3.7.3(b)(2)	Parking *spaces*	Parking spaces	The defined term “spaces” is not intended to be used in the context of vehicle parking.
6.3.1.2; Exception to 6.3.1.2; 6.3.3(a); Exception to 6.3.3(a); 6.3.5.3; 6.3.8.1(Exception 2)	Reclaimed water	*Reclaimed water*	Defined term was not italicized
6.3.1.2.2	Weather-Based Irrigation Controllers	*Weather-Based Irrigation Controllers*	Defined term was not italicized
6.3.1.2.3	potable or off-site treated *reclaimed water*	*potable* or off-site treated *reclaimed water*	Potable should be italicized because it is associated with “water” and “potable water” is defined.
6.3.2.2(a)	*Clothes washers* and *dishwashers*	Clothes washers and dishwashers	Not defined terms
6.3.2.2(a)(1)	*Clothes washers*	Clothes washers	Not a defined term
Exception to 7.4.2.7; 8.3.3.2.3.3	Fenestrations	*Fenestrations*	Defined term was not italicized
Table 7.4.6.1B	*seating*	seating	Defined term is associated with office furniture
7.4.7.3.2(a)(3)	*Residential Dishwashers*	Residential Dishwashers	Not a defined term
8.3.1.1	Outdoor air-flow rates	*Outdoor air*-flow rates	Defined term was not italicized
Table 8.3.3.2	Residential	*Residential*	Defined term was not italicized
Table 8.3.3.3	Dwelling unit	*Dwelling unit*	Defined term was not italicized
8.3.4.1.1	Soil-gas retarder systems	*Soil-gas retarder systems*	Defined term was not italicized

8.4.1.2(c); 8.4.2.6; 8.4.2.6.1; 8.5.2(c)	*Walls*, *wall* panels and coverings, *wall* coverings, and *wall* and ceiling paneling and planking, ceiling and *wall* assemblies, *wall* paneling	Walls, reflective wall coatings, wall panels and coverings, wall coverings, and wall and ceiling paneling and planking, ceiling and wall assemblies, wall paneling	Defined term "wall" is intended for walls that are part of the building envelope
8.5.2(c)	Particleboard	*Particleboard*	Defined term was not italicized
9.5.1.2(d)	LCA	*LCA*	Defined term was not italicized
10.3.1.1.1.1(a)	Commissioning *(Cx) providers*	*Commissioning (Cx) providers*	Part of defined term was not italicized
10.3.1.2.1(c)	*Automatic* shut-off controls	*Automatic shut-off controls*	Part of defined term was not italicized
10.3.1.2.1(c)	Lighting power allowance	*Lighting power allowance*	Defined term was not italicized
10.3.1.2.1(c)	Institutional tuning	*Institutional tuning*	Defined term was not italicized

Make the following corrections to italics based on defined terms in the published addenda to 189.1-2017:

Addendum	**Section**	**Existing**	**Proposed**	**Reasoning**
j	3.3	*LSI* – Langelier Saturation Index	*LSI – Langelier Saturation Index*	Defined term was not italicized
j	7.3.2(a)	roof	*roof*	Defined term was not italicized
j	7.4.1	Building project	*Building project*	Defined term was not italicized
j	Table 7.4.1.2	Community Renewable Energy System	*Community Renewable Energy Facility*	Modify to match the defined term
l	7.3.5(a)	Permanently installed	*Permanently installed*	Defined term was not italicized
l	7.3.5 (Exception 2)	Spaces	*Spaces*	Defined term was not italicized
l	7.3.5 (Exception 3)	Dwelling units	*Dwelling units*	Defined term was not italicized
l	7.3.5 (Exception 4)	Residential	*Residential*	Defined term was not italicized
y	7.4.2.2; Table C1.1(5)	Wall	*Wall*	Defined term was not italicized

ai	7.4.4.2(a)	0.92 E_t	0.92 E_t	Defined term was not italicized
ai	7.4.4.2 (Exception 2)	Individual dwelling units	Individual *dwelling units*	Defined term was not italicized
an	7.4.6.6	*Conditioned floor area*	Conditioned floor area	Not a defined term without inclusion of "gross"
ar (to 2014)	7.5.3	$PDSE_i$ = Proposed design site energy use	$PDSE_i$ = *Proposed design site* energy use	Defined terms were not italicized
ar (to 2014)	7.5.3	$BBSE_i$ = baseline building site energy use	$BBSE_i$ = baseline building *site* energy use	Defined term was not italicized
bm (to 2014)	Table C1.2(4)	CHP	*CHP*	Defined term was not italicized
bm (to 2014)	Table C1.2(6)	Carbon dioxide equivalent emission factors	*Carbon dioxide equivalent* emission factors	Defined term was not italicized

The following pending addenda included incorrect italicizations or made modifications to the defined terms in Section 3.2 that required italicizations. If these addenda are approved for publication, the following corrections to italicized terms will also be made:

Addendum	**Section**	**Existing**	**Proposed**	**Reasoning**
aa	Table 7.5.3B (informative note)	Carbon dioxide equivalent emissions	*Carbon dioxide equivalent* emissions	Defined term was not italicized
ah	7.4.6.2	Permanently installed	*Permanently installed*	Defined term was not italicized
ar	6.3.1.2.2; 6.3.5.4; 6.3.6; 6.3.7;	Labeled	*Labeled*	Will become a defined term
ar	6.3.5.4; 6.3.6; 6.3.7	Listed	*Listed*	Will become a defined term
ar	8.3.4.2	Approved	*Approved*	Will become a defined term
at (be)	7.4.6.1.1(d); 7.4.6.1.1(d)(1)	General lighting	*General lighting*	Will be a defined term with the passage of either Addendum at or Addendum be

Excerpts from published 189.1-2017

The following excerpts are provided to demonstrate how the proposed changes to the published standard will appear if approved.

3.2 Definitions

permeable pavers: units that present a solid surface but allow natural drainage and migration of water into the base below by permitting water to drain through the ~~*spaces*~~spaces between the pavers.

3.3 Abbreviations and Acronyms

ET_0 – ~~*maximum*~~reference *evapotranspiration*

L_{eq} – ~~hourly average sound pressure level~~*hourly average sound pressure*

NPLV – ~~nonstandard part-load value~~*nonstandard part-load value*

water factor (WF):
a. ~~***clothes washer (residential and commercial):***~~ **clothes washer (residential and commercial):** the quantity of water in gallons (litres) used to wash each cubic foot (cubic metre) of machine capacity.
b. ~~***residential dishwasher:***~~ **residential dishwasher:** the quantity of water use in gallons (litres) per full machine wash and rinse cycle.

5.3.3.2(b)(1) (Greenfield Sites): Where 20% or less of the area of the predevelopment *site* has existing *native plants* or *adapted plants*, a minimum of 20% of the *site* shall be developed or retained as vegetated area. Such vegetated areas include bioretention facilities, rain gardens, filter strips, grass swales, vegetated level spreaders, constructed *wetlands*, planters, and open ~~*space*~~space with plantings.

5.3.5.2 Walls Above-grade building *walls* and retaining ~~*walls*~~walls shall be shaded in accordance with this section…

a. Shade shall be provided on at least 30% of the east and west above-grade *walls* and retaining ~~*walls*~~walls from grade level to a height of 20 ft (6 m) above grade, or the top of the exterior *wall*, whichever is less…
b. …Trees shall be placed a minimum of 5 ft (1.5 m) from and within 50 ft (15 m) of the building or retaining ~~*wall*~~wall.

5.3.7.2.1 Minimum Number of Spaces. Bicycle parking ~~*spaces*~~spaces shall be provided for at least 5% of the *occupant load* of each building but not less than two parking ~~*spaces*~~spaces. Occupants who are nonambulatory, under restraint, or under custodial care need not be included in the total *occupant load* for the building. *Building projects* with *dwelling units* shall be provided with at least 0.5 bicycle parking ~~*spaces*~~spaces per bedroom for each building but not less than two parking ~~*spaces*~~spaces.

5.3.7.2.1 (Exception 2): The number of bicycle parking ~~*spaces*~~spaces shall be allowed to be reduced subject to *AHJ* approval of a transportation plan, prepared by a *registered design professional*, that demonstrates the likelihood that building occupants will use public transportation and/or walk to the *building project site*.

5.3.7.2.2 Location. Not fewer than two bicycle parking ~~*spaces*~~spaces shall be located within 50 ft (15.2 m) of, and be visible from, the *building entrance* being served. All other bicycle parking ~~*spaces*~~spaces shall be located inside the building, or the nearest point of the bicycle parking areas shall be within 50 ft (15.2 m) of the *building entrance* being served. Bicycle parking shall not obstruct pedestrian access to the building.

5.3.7.2.3 Horizontal Parking Racks. Horizontal bicycle parking racks shall provide a ~~*space*~~space for each bicycle that is not less than 18 in. (305 mm) in width and not less than 72 in. (1829 mm) in length. Each ~~*space*~~space shall provide at least two points of contact between the bicycle frame and rack. Each ~~*space*~~space shall have access to a clear exit pathway not less than 36 in. (914 mm) in width.

5.3.7.2.4 Ability to Lock. Each bicycle parking ~~*space*~~space shall be provided with a securely mounted rack or other facilities for locking or securing a bicycle. A rack shall allow the locking of the frame and the front or rear wheel of the bicycle to the rack using a U-shaped shackle lock.

5.3.7.2.5 Security and Visibility. All bicycle parking ~~*spaces*~~spaces shall be visible from the entrance being served; secured in a locker, cage, or room; or provided with valet service or security cameras. Signage shall be provided to identify parking that is not visible from the *building entrance*.

5.3.7.3(a) Provisions for preferred parking spaces. Not less than 5% of the parking ~~*spaces*~~spaces provided shall be designated as preferred parking for vehicles that meet both the minimum greenhouse gas and air pollution scores as required for USEPA SmartWay designation. Where calculation of the parking ~~*spaces*~~spaces yields a fraction, such fractions shall be rounded up to the next whole number. Preferred parking ~~*spaces*~~spaces shall be located on the shortest route of travel from the parking facility to a *building entrance* but shall not take precedence over parking ~~*spaces*~~spaces that are required to be accessible for individuals with disabilities. Where buildings have multiple entrances with adjacent parking, parking ~~*spaces*~~spaces shall be dispersed and located near the entrances. Such parking ~~*spaces*~~spaces shall be provided with signage approved by the *AHJ* that specifies the permitted use.

5.3.7.3(b) Provisions for electric-vehicle charging infrastructure. The *building project* shall comply with one of the following:

…2. Electrical raceways shall be installed and extend from one or more of the building's electrical power distribution panels to not less than the number of parking ~~*spaces*~~spaces specified in Table 5.3.7.3 to facilitate the future installation of vehicle charging stations. Electrical power distribution panels serving such raceways shall be sized to supply the future charging stations based on a design load of not less than 40 amp per required parking ~~*space*~~space at a supply voltage of not less than 208/240 VAC.

6.3.1.2 Irrigation. For golf courses and driving ranges, only municipally ~~reclaimed water~~*reclaimed water* or *alternate on-site sources of water* shall be used to irrigate the landscape. For other landscaped areas, not greater than one-third of *improved landscape* area is allowed to be irrigated with *potable water*. The area of dedicated athletic fields shall be excluded from the calculation of the *improved landscape* for schools, *residential* common areas, and public recreational facilities. All other irrigation shall be provided from *alternate on-site sources of water* or municipally ~~reclaimed water~~*reclaimed water*.

Exception to 6.3.1.2: *Potable water* is allowed to be temporarily used on such newly installed landscape for the *landscape establishment period*. The amount of *potable water* allowed to be applied to the newly planted areas during the temporary *landscape establishment period* shall not exceed 70% of ET_o for *turfgrass* and 55% of ET_o for other plantings. Where municipally ~~reclaimed water~~*reclaimed water* is available at a water main within 200 ft (60 m) of the project *site*, such water shall be used instead of *potable water* during the *landscape establishment period*....

6.3.3(a) (Special Water Features): Water use shall comply with the following:...Ornamental fountains and other ornamental water features shall be supplied either by *alternate on-site sources of water* or by municipally ~~reclaimed water~~*reclaimed water* delivered by the local water utility….

Exception to 6.3.3(a): Where *alternate on-site sources of water* or municipally ~~reclaimed water~~*reclaimed water* are not available within 500 ft (150 m) of the *building project site*, *potable water* is allowed to be used for water features with less than 10,000 gal (38,000 L) capacity.

6.3.5.3 Waste Connections. Waste water from water softener regeneration shall not discharge to ~~reclaimed water~~*reclaimed water* collection systems and shall discharge in accordance with the *International Plumbing Code*.

6.3.8.1 (Exception 2): Urinals and water closets designed to operate without the use of water shall not be required to have alternate or ~~reclaimed water~~*reclaimed water* supply to the fixture.

6.3.1.2.2 Controls. …Qualifying *smart controllers* shall be labeled according to USEPA WaterSense Specification for ~~Weather-Based Irrigation Controllers~~*Weather-Based Irrigation Controllers* or tested in accordance with Irrigation Association SWAT Climatologically Based Controllers, 8th Testing Protocol.

6.3.1.2.3 Irrigation of Rainfall-ET_c Compatible Plants. The use of *potable water* or *reclaimed water* for irrigation of *adapted plants* is prohibited after the *landscape establishment period*. In-ground irrigation systems for *rainfall-ET_c compatible plants* using ~~potable~~*potable* or off-site treated *reclaimed water* are prohibited.

6.3.2.2(a): ~~*Clothes washers*~~ Clothes washers and ~~*dishwashers*~~ dishwashers installed within *dwelling units* shall comply with the ENERGY STAR® Program Requirements for Clothes Washers and ENERGY STAR Program Requirements for Dishwashers. Maximum water use shall be as follows:

6.3.2.2.(a)(1): ~~*Clothes washers*~~Clothes washers (residential)—Maximum *water factor* (*WF*) of 5.4 gal/ft^3 of drum capacity (0.72 L/L of drum capacity).

8.5.1.2 Excessive Sunlight. The *ASE*, calculated with a threshold of 93 fc (1000 lux) and 250 hours, shall not exceed 20% of the floor area.

(Exception 1): ~~Spaces~~*Spaces* less than 250 ft^2 (23 m^2).

Exceptions to 7.4.2.7: Permanent projections are not required for the following buildings and ~~fenestrations~~*fenestrations*:...

7.4.7.3.2(a)(3) Dishwashers: ENERGY STAR Program Requirements Product Specifications for Residential Dishwashers ~~*Residential Dishwashers*~~ (see also the water efficiency requirements in Section 6.3.2.2).

8.3.3.2.3.3 Penetrations and Fenestrations. All penetrations through, and ~~fenestrations~~*fenestrations* within, sound rated assemblies shall be sealed in accordance with ASTM C919 and installed per the manufacturer's recommendations.

Table 7.4.6.1B Lighting Power Density (LPD) Allowances and Room Cavity Ratio (RCR) Thresholds Using the Space-by-Space Method

Informative Note: This table is divided into two sections. The first section covers *space* types that can be commonly found in multiple-building types. The second part covers *space* types that are typically found in a single-building type.

Common Space Types [a]	LPD, W/ft^2	LPD, W/m^2	RCR Threshold
Atrium			
<20 ft (6.1 m) in height	0.023/ft total height	0.81/m total height	NA
≥20 ft (6.1m) and ≤40 ft (12.2 m) in height	0.023/ft total height	0.81/m total height	NA
>40 ft (12.2 m) in height	0.30 + 0.015/ft total height	3.2 + 0.53/m total height	NA
Audience Seating Area			
Auditorium	0.67	7.2	6
Convention center	0.65	7.0	4
Gymnasium	0.43	4.6	6
Motion picture theater	0.64	6.9	4
Penitentiary	0.44	4.7	4
Performing arts theater	1.34	14.4	8
Religious building	0.98	10.5	4
Sports arena	0.42	4.5	4
All other audience ~~*seating*~~seating areas	0.40	4.3	4

8.3.1.1 Minimum Ventilation Rates. … In *residential dwelling units*, the *dwelling unit* ventilation rates and local exhaust airflow rates as required by ASHRAE Standard 62.2 shall apply. ASHRAE Standard 62.2, Section 4.1.2, shall not apply. In all other

cases, ASHRAE Standard 62.1, Sections 6.1.1 and 6.2, shall be used to determine minimum zone and intake ~~outdoor air~~*outdoor air*-flow rates. …

Table 8.3.3.2 Maximum Interior Background Sound Pressure Levels from Building Systems and Exterior Sound Sources [a]

	Hourly Average Sound Pressure Level (L_{eq})		Maximum Sound Pressure Level (L_{max} [slow time weighting])	
Room Type	**dBA**	**dBC**	**dBA**	**dBC**
~~Residential~~*Residential* sleeping areas (nighttime[b])	35	60	45	70
~~Residential~~*Residential* living and sleeping areas (daytime)	40	60	50	70

…

Table 8.3.3.3 Minimum Sound and Impact Sound Ratings

	Hourly Average Sound Pressure Level (L_{eq})	
Room Type	**cSTC [c,d]**	**IIC**
~~Dwelling unit~~*Dwelling unit* (apartment, condominium, duplex, hotel guest room, etc.)	55	55

…

8.3.4.1.1 Soil-Gas Barriers. ~~Soil gas retarder systems~~*Soil-gas retarder systems* shall be provided and shall comply with all of the following:…

8.4.1.2(c) (Minimum Sidelighting Effective Aperture for Office Spaces and Classrooms): Opaque interior surfaces in *daylight areas* shall have aver- age visible light reflectances greater than or equal to 80% for ceilings, 40% for partitions higher than 60 in. (1.5 m), and 60% for *walls*.

8.4.2.6 Ceiling and Wall Assemblies and Systems. Ceiling and wall assemblies and systems include acoustical treatments, ceiling panels and tiles, gypsum panel products, tackable ~~*wall*~~wall panels and coverings, ~~*wall*~~wall coverings, and ~~*wall*~~wall and ceiling paneling and planking. Emissions from these assemblies and systems shall be determined according to CDPH/EHLB/Standard Method V1.1…

8.4.2.6.1 Deemed to Comply. Ceiling and ~~*wall*~~wall assemblies and systems that are composed of materials listed in Table 8.4.2.6.1 shall be deemed to comply with the requirements of Section 8.4.2.6.

8.5.2(c) (Materials):… Rigid panel products, including gypsum board, other ~~*wall*~~wall paneling, insulation board, oriented strand board, medium density fiber board, wood structural panel, acoustical ceiling tiles, and ~~particleboard~~*particleboard*.

9.5.1.2(d) (Procedure): The ~~LCA~~*LCA* tool (or tools) or software shall include a published third-party impact indicator method.

10.3.1.1.1.1(a): Designate *FPT providers*. For systems that are required to comply with Section 10.3.1.1.1, *FPT providers* shall be *owner's* qualified employees, independent ~~commissioning~~*commissioning* (*Cx*) *providers*, or qualified designers experienced with *FPT* on the designated systems. …

10.3.1.2.1(c) (Systems to be Commissioned): Lighting systems: *automatic* and manual daylighting controls, occupancy sensing devices, *automatic* ~~shut-off controls~~*shut-off controls*, time switching, and other lighting control devices, and dimming systems claiming a ~~lighting power allowance~~*lighting power allowance* for ~~institutional tuning~~*institutional tuning* according to Section 7.4.6.1.1(f).

189.1-2017 Addendum j (published)

3.3 Abbreviations and Acronyms

LSI – ~~Langelier Saturation Index~~*Langelier Saturation Index*

7.3.2(a) (On-site Renewable Energy Systems): …Shaded areas that are defined as ~~roof~~*roof* area where direct-beam sunlight is blocked by structures or natural objects for more than 1500 annual hours between 8 a.m. and 4 p.m.

7.4.1 Renewable Energy Systems. The adjusted renewable energy provided to the project shall be equal to or greater than the gross conditioned and semiheated floor areas of the *building project* multiplied by the renewable energy requirement from Table 7.4.1.1. For allocations to multiple tenants within a ~~building project~~*building project*, the requirements shall be assigned to each tenant based on the total square footage of *gross conditioned* and *semiheated floor area* of each tenant space....

189.1-2017 Addendum l (published)

7.3.5 Fault Detection and Diagnostics (FDD). ...The FDD system shall

a. include ~~permanently installed~~*permanently installed* devices to monitor HVAC system performance;

7.3.5 (Exception 2): Individual tenant ~~spaces~~*spaces* with gross floor area less than 10,000 ft2 (1000 m2).

7.3.5 (Exception 3): ~~Dwelling units~~*Dwelling units* and hotel/motel guest rooms.

7.3.5 (Exception 4): ~~Residential~~*Residential* buildings with less than 10,000 ft^2 (1000 m^2) of common area.

189.1-2017 Addendum y (published)

7.4.2.2 Mechanical Equipment Penetration Requirements. Where the total area of penetrations from mechanical equipment listed in ANSI/ASHRAE/IES 90.1, Table 6.8.1-4 exceeds 2% of the opaque above-ground ~~wall~~*wall* area, the mechanical equipment penetration area shall be calculated as a separate assembly with a published U-factor value for that equipment or a default U-factor of 0.5 Btu/h·ft^2·°F…

Table C1.1 Modifications and Additions to ANSI/ASHRAE/IES Standard 90.1, Appendix G, Table G3.1

…5. Building Envelope

When the total area of penetrations from mechanical equipment listed in ANSI/ASHRAE/IES Standard 90.1, Table 6.8.1-4, exceeds 1% of the opaque above-grade ~~wall~~*wall* area, the mechanical equipment penetration area shall be calculated as a separate assembly with a default U-factor of 0.5 Btu/h·ft^2·°F (3 W/m^2·K).

189.1-2017 Addendum ai (published)

7.4.4.2 Buildings with High-Capacity Service water Heating Systems. …

7.4.4.2(a): Fuel-burning water heating equipment shall have a minimum rated efficiency of 0.92 ~~E_t~~*E_t* or 0.92 UEF,

7.4.4.2 Exception 2: Water heaters installed in individual ~~dwelling units~~*dwelling units*.

189.1-2017 Addendum an (published)

7.4.6.6 Dwelling Unit Lighting Controls. … *Dwelling units* with greater than 5000 ft^2 (460 m^2) of ~~*conditioned floor area*~~conditioned floor area shall have a lighting *control* system that has the capability to turn off all *permanently installed* interior lighting from a control located at an exit door or have a lighting *control* system that has the capability to turn off all *permanently installed* interior lighting from remote locations.

189.1-2014 Addendum ar (published)

7.5.3 Zero Energy Performance Index…

$$zEPI_{2004} = \frac{\sum_i PDSE_i * r_i - \sum_k RE_k * REPF_k * r_e}{\sum_i BBSE_i * r_i}$$

…

PDSE$_i$ = ~~proposed design site~~*proposed design site* energy use for energy type *i*.

BBSE$_i$ = baseline building ~~site~~*site* energy use for energy type *i*; created following the rules in Standard 90.1, Normative Appendix G.

189.1-2014 Addendum bm (published)

Table C1.2 Performance Modeling of District Energy System Requirements

…4. Combined Heat and Power Systems
Model *combined heat and power systems* using the following methodology.
Allocate electricity to the *building project* as a fraction of the total electricity output of the *district energy system*, where the fraction is the thermal energy provided to the *building project* divided by the total thermal energy output of the *district energy system.*
Use Equation C-1 to determine the amount of electricity generated from the ~~CHP~~*CHP* system to be applied to the *building project*. Alternatively, use Equation C-2 if the ~~CHP~~*CHP* system includes cooling generation from recovered heat or if there is an additional waste heat recovery stream Z_{OTHER} (e.g., a ~~CHP~~*CHP* system could extract steam and hot water on two separate loops).

$$\text{CHP\_ELEC}_{BLDG} = (X_{HEAT} \times \text{BLDG}_{HEAT}) \times \text{CHP\_ELEC}_{TOTAL} \text{ (C-1)}$$

$$CHP\_ELEC_{BLDG} = [(X_{HEAT} \times BLDG_{HEAT}) + Y_{CHW} \times BLDG_{CHW}) + (Z_{OTHER} \times BLDG_{OTHER})] \times CHP\_ELEC_{TOTAL} \text{ (C-2)}$$

where

CHP_ELEC$_{BLDG}$ = ~~CHP~~*CHP* electricity generation allocated to the building
X_{HEAT} = fraction of the ~~CHP~~*CHP* plant's total production of waste heat applied to the DES
BLDG$_{HEAT}$ = fraction of total district heat provided to the building
CHP_ELEC$_{TOTAL}$ = total ~~CHP~~*CHP* electricity generated at the DES plant
Y_{CHW} = fraction of the ~~CHP~~*CHP* system's total production of waste heat applied to producing chilled water in the DES
BLDG$_{CHW}$ = fraction of total district chilled water provided to the building
Z_{OTHER} = fraction of the ~~CHP~~*CHP* system's total production of waste heat applied to an additional form of district energy
BLDG$_{OTHER}$ = fraction of an additional form of district energy that is provided to the building

…6. Carbon Dioxide Equivalent Emissions Factors

~~Carbon dioxide equivalent~~*Carbon dioxide equivalent* emission factors shall be applied to the energy supplied to the *district energy system* and reflect the values used in Table 7.5.2B, and shall be applied uniformly for all *building project* and *district energy systems*

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The following additional independent substantive changes are required as shown in strikethrough and underline:

Table 7.5.3B (informative note): *Informative Note:* The values in this table represent national averages for the United States and include both direct and indirect emissions. The ~~carbon dioxide equivalent~~*carbon dioxide equivalent* emissions of methane (CH_4) and nitrous oxide (N_2O) are based on their global warming potential for a 20-year time horizon. Other assumptions are documented in Informative Appendix K.

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The following additional independent substantive changes are required as shown in strikethrough and underline:

7.4.6.2 Dwelling Units. This section supersedes ANSI/ASHRAE/IES Standard 90.1, Section 9.4.4. Not less than 90% of the ~~permanently installed~~*permanently installed* lighting serving *dwelling units* shall be provided…

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The following additional independent substantive changes are required as shown in strikethrough and underline:

3.2 Definitions

***approved*:** Acceptable to the *authority having jurisdiction.*

labeled: Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, *approved* agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

listed: Equipment, materials, products or services included in a list published by an *approved* organization and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

…

6.3.1.2.2 Controls. …Qualifying *smart controllers* shall be ~~labeled~~*labeled* according to USEPA WaterSense Specification…

6.3.5.4 Efficiency and Listing. Water softeners that regenerate in place, that are connected to the water system they serve by piping not exceeding 1 1/4 in. (31.8 mm) in diameter, or that have a volume of 3 ft3 (0.085 m3) or more of cation exchange media shall have a rated salt efficiency of not less than 4000 grains of total hardness exchange per pound of salt (571 grams of total hardness exchange per kilogram of salt), based on sodium chloride equivalency, and shall be ~~listed~~*listed* and ~~labeled~~*labeled* in accordance with NSF 44.

6.3.6 Reverse Osmosis Water Treatment Systems. Reverse osmosis systems shall be equipped with an *automatic* shutoff valve that prevents the production of reject water when there is no demand for treated water. Point-of-use reverse osmosis treatment systems for drinking water shall be ~~listed~~*listed* and ~~labeled~~*labeled* in accordance with NSF 58.

6.3.7 On-Site Reclaimed Water Treatment Systems. …grey water reuse treatment systems and waste water treatment systems, used to produce *nonpotable water* for use in water closet and urinal flushing, surface irrigation, and similar applications shall be ~~listed~~*listed* and ~~labeled~~*labeled* in accordance with NSF 350.

8.3.4.2 Alternative Methods of Soil-Gas Control. A soil-gas control system shall be provided, and such system shall be clearly identified or otherwise noted on *construction documents* and shall be ~~approved~~*approved* by a qualified soil-gas professional and the *building project FPT provider*.

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The following additional independent substantive changes are required as shown in strikethrough and underline:

3.2 Definitions

general lighting: see ANSI/ASHRAE/IES Standard 90.1.

…

7.4.6.1.1(d): Additional lighting power when using the Space-by-Space Method: For those areas where the Space-by-Space Method is used, the additional increase in the interior lighting power allowed by ANSI/ASHRAE/IES Standard 90.1, Section 9.6.2, for specific lighting functions shall be replaced by the requirements and allowances of this section. Additional power shall be allowed only if the specified lighting is installed and automatically controlled separately from the ~~general lighting~~*general lighting* and is designed and installed to be turned off during nonbusiness hours. This additional power shall be used only for the specified luminaires and shall not be used for any other purpose. An increase in the interior *lighting power allowance* is permitted in the following cases:

7.4.6.1.1(d)(1): For *spaces* in which lighting is specified to be installed in addition to the ~~general lighting~~*general lighting* for the purpose of decorative appearance or for highlighting art or exhibits, provided that the additional lighting power shall not exceed $0.5 W/ft^2$ ($5.4 W/m^2$) of such *spaces*.