ANSI/ASHRAE/IES Addendum ac to
ANSI/ASHRAE/IES Standard 90.1-2019

Energy Standard
for Buildings
Except Low-Rise
Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2022; by the ASHRAE Board of Directors on June 29, 2022; by the Illuminating Engineering Society on June 17, 2022; and by the American National Standards Institute on July 29, 2022.

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FOREWORD

Addendum ac updates the exceptions to interior lighting power and minimum control requirements found in Table 9.2.3.1 and includes a power exception for the germicidal function in luminaires and sources (sometimes referred to as “germicidal lighting” or “germicidal ultra-violet irradiation” [GUVI]). The COVID-19 pandemic has brought germicidal function for room air and room surface disinfection into the forefront as a viable, effective strategy for protecting people and keeping interior environments healthy. The power exception of the germicidal function for disinfection from Standard 90.1-2016 was confirmed by Interpretation IC 90.1-2016-8 OF approved in January 2019. Adding the power exception for germicidal function to Table 9.2.3.1 supports the official interpretation.

Some changes clarify the exception language to improve application, and better differentiate lighting that must follow the lighting power and control requirements. The exception for lighting used in photographic processes, intended for photographic development darkrooms, was eliminated due to the limited instances of this space type and confusion in the application.

Where the allowed lighting power density allowance and control requirements can be determined for a specific lighting application, including it in the standard, and not excepting it, delivers consistent energy efficient implementation. This was accomplished for two lighting power applications, the prior Table 9.2.3.1 item nine for casino gaming areas and the prior Table 9.2.3.1 item 18 for parking garage daylight transition zone lighting. Both of these lighting applications were removed from the exceptions table, and lighting power density values and control requirements were added to Table 9.6.1. Particularly in the creation of the casino gaming area lighting power density, considerable effort was taken to establish values to support the design variability and flexibility needed for these spaces. These new baseline lighting power density values take into account the additional lighting power for the purpose of decorative appearance, remaining available for use through Section 9.6.2, “Additional Interior Lighting Power.”

A new lighting power density value is added to Table 9.6.1 for parking garage daylight transition zone lighting. The addendum also updates the lighting power density value for parking garage lighting because of review of the model, lighting efficacy improvements, and the relationship between these two values in a parking garage area. A definition for “parking garage daylight transition zone” aligned with IES recommended practice was also added to support this new requirement.

Energy savings is anticipated with this addendum resulting from improved compliance due to clearer language and the removal of several applications from exempted power status. These changes do not increase in the cost of construction.

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 ac to Standard 90.1-2019

Modify Section 3.2 as shown (I-P and SI).

3.2 Definitions

[. . .]

parking garage daylight transition zone: covered vehicle entrances and exits from buildings and parking structures not exceeding a depth of 66 ft (20 m) inside the structure, or a depth as determined by ANSI/IES RP-8, and not exceeding a width of 30 ft (9.1 m) to either side of the drive aisle centerline and not extending beyond adjacent walls.

[. . .]

Modify Section 9 as shown (I-P and SI).

9.4.1.2 Parking Garage Lighting Control. Lighting for parking garages shall comply with the following requirements:
<table>
<thead>
<tr>
<th>Item #</th>
<th>Equipment/Application</th>
<th>In Addition to and Controlled Separately from General Lighting</th>
<th>Required Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lighting that is integral to equipment, medical equipment or instrumentation, and is installed by its manufacturer</td>
<td>YES</td>
<td>No control requirements</td>
</tr>
<tr>
<td>2</td>
<td>Power for only the germicidal function in luminaires or sources</td>
<td>YES</td>
<td>No control requirements</td>
</tr>
<tr>
<td>23</td>
<td>Lighting specifically designed for use only during medical or dental procedures</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control</td>
</tr>
<tr>
<td>24</td>
<td>Lighting specifically designed for the life support of non-human life forms</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control</td>
</tr>
<tr>
<td>25</td>
<td>Lighting for theatrical purposes, including performance, stage, video broadcasting, broadcast studio, and video or film and video-production, or live performance</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control</td>
</tr>
<tr>
<td>26</td>
<td>Lighting in sporting activity areas for television broadcasting</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control</td>
</tr>
<tr>
<td>27</td>
<td>Lighting for photographic processes</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control</td>
</tr>
<tr>
<td>28</td>
<td>Lighting that is an integral part of advertising or directional signage</td>
<td>YES</td>
<td>9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>29</td>
<td>Lighting integral to both open and glass-enclosed refrigerator and freezer cases</td>
<td>YES</td>
<td>9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>30</td>
<td>Casino gaming areas</td>
<td>NO</td>
<td>9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>31</td>
<td>Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>32</td>
<td>Display or accent lighting that is an essential element for the function performed in galleries, museums, and monuments</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>33</td>
<td>Lighting integral to food warming and food preparation equipment</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>34</td>
<td>Lighting that is for sale or lighting educational demonstration systems</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>35</td>
<td>Mirror lighting in makeup or dressing rooms areas used for theatrical or broadcast functions</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>36</td>
<td>Accent lighting in religious pulpit and choir areas</td>
<td>YES</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
<tr>
<td>37</td>
<td>Lighting in interior spaces that have been specifically designated as a registered interior historic landmark</td>
<td>NO</td>
<td>9.4.1.1(a)—Local control and either 9.4.1.1(h)—Automatic full OFF or 9.4.1.1(i)—Scheduled shutoff</td>
</tr>
</tbody>
</table>
Parking garage lighting shall have automatic lighting shutoff per Section 9.4.1.1(i).

Lighting power of each luminaire shall be automatically reduced by a minimum of 50% when there is no activity detected within a lighting zone for 10 minutes. Lighting zones for this requirement shall be no larger than 3600 ft² (334 m²).

Parking garage daylight transition zone lighting exempt per Section 9.2.3.1 shall be separately controlled to automatically reduce the lighting to no more than the general light level at night from sunset to sunrise.

The power to any luminaire within 20 ft (6 m) of perimeter wall openings totaling at least 24 ft² (2.2 m²) shall be automatically reduced through continuous dimming in response to available daylight.

Exceptions to 9.4.1.2(d):

1. Parking garage daylight transition zone lighting exempt per Section 9.2.3.1.
2. Where permanent screens or architectural elements obstruct more than 50% of the opening.
3. Where the top of any existing adjacent structure or natural object is at least twice as high above the openings as its horizontal distance from the opening.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Equipment/Application</th>
<th>In Addition to and Controlled Separately from General Lighting</th>
<th>Required Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.15</td>
<td>Furniture-mounted supplemental task lighting</td>
<td>YES</td>
<td>9.4.1.3(c)—Special Applications 9.4.1(a)—Local control and 9.4.1.1(h)—Automatic full OFF</td>
</tr>
<tr>
<td>18</td>
<td>Parking garage daylight transition lighting—lighting for covered vehicle entrances and exits from buildings and parking structures; each transition zone shall not exceed a depth of 66 ft inside the structure and a width of 50 ft.</td>
<td>YES</td>
<td>9.4.1.2(a) and (c)—Parking Garage Control</td>
</tr>
</tbody>
</table>
Table 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type:

• All REQs shall be implemented.
• At least one ADD1 (when present) shall be implemented.
• At least one ADD2 (when present) shall be implemented.

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

<table>
<thead>
<tr>
<th>Common Space Types¹</th>
<th>LPD, W/ft² (W/m²)</th>
<th>RCR Threshold</th>
<th>Local Control (See Section 9.4.1.1[a])</th>
<th>Restricted to Manual ON (See Section 9.4.1.1[b])</th>
<th>Restricted to Partial Automatic ON (See Section 9.4.1.1[c])</th>
<th>Bilevel Lighting Control (See Section 9.4.1.1[d])</th>
<th>Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1[e])</th>
<th>Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1[f])</th>
<th>Automatic Partial OFF (See Section 9.4.1.1[g]) [Full Off complies]</th>
<th>Automatic Full OFF (See Section 9.4.1.1[h])</th>
<th>Scheduled Shutoff (See Section 9.4.1.1[i])</th>
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<tr>
<td>Parking Area, Indoor</td>
<td>0.15 (1.6)</td>
<td>4</td>
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<td>Parking Garage</td>
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<tr>
<td>Daylight transition zone</td>
<td>1.06 (11.4)</td>
<td>4</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other parking and drive areas</td>
<td>0.11 (1.2)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Buildings Type Specific/Space Types¹</td>
<td>LPD, W/ft² (W/m²)</td>
<td>RCR Threshold</td>
<td>Local Control (See Section 9.4.1.1[a])</td>
<td>Restricted to Manual ON (See Section 9.4.1.1[b])</td>
<td>Restricted to Partial Automatic ON (See Section 9.4.1.1[c])</td>
<td>Bilevel Lighting Control (See Section 9.4.1.1[d])</td>
<td>Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1[e])</td>
<td>Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1[f])</td>
<td>Automatic Partial OFF (See Section 9.4.1.1[g]) [Full Off complies]</td>
<td>Automatic Full OFF (See Section 9.4.1.1[h])</td>
<td>Scheduled Shutoff (See Section 9.4.1.1[i])</td>
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<td>Automotive (See “Vehicular Maintenance Area”)</td>
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<td>Casino—Gaming Area</td>
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<td></td>
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<tr>
<td>Betting/sportsbook/keno/bingo area</td>
<td>0.82 (8.8)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>ADD2</td>
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<tr>
<td>High-limit game area</td>
<td>1.68 (18.1)</td>
<td>4</td>
<td></td>
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<td>ADD2</td>
</tr>
<tr>
<td>Slot machine/digital gaming area</td>
<td>0.54 (5.8)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ADD2</td>
</tr>
<tr>
<td>Table games area</td>
<td>1.09 (11.7)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ADD2</td>
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Add new informative reference to Appendix E as shown (I-P and SI).

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<tr>
<td>3.2</td>
<td>IES RP-8-18</td>
<td>Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting</td>
</tr>
<tr>
<td>[... ]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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