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# Vehicle Headlamp Aim Angle Test Procedure and Tolerance Research

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**16. Abstract**

The 2021 Infrastructure Investment and Jobs Act's Section 24212, *Headlamps*, required a rulemaking to amend FMVSS No. 108 "to include performance-based standards for vehicle headlamp systems (A) to ensure that headlights are correctly aimed on the road; and (B) requiring those systems to be tested on-vehicle to account for headlight height and lighting performance." This report summarizes research conducted to support development of performance-based standards for vehicle headlighting systems to ensure proper headlamp aim. Lower beam headlamp illuminance was measured through a procedure based on previous NHTSA work to measure lower beam performance with the lamps installed on the vehicle and work to adapt FMVSS No. 108 lower beam photometry to a performance-based approach. Lower beam illuminance was measured as a function of aim angle and on-vehicle mounting height for seven vehicles to document the effects of headlamp aim angle and for an additional two sets of headlamps on test fixtures to examine effects of mounting height. Results showed that test locations close to the cutoff varied more in measured illuminance across the range of aim angles, and test locations further from the cutoff varied more over the range of mounting heights. Laboratory measurements of FMVSS No. 108 lower beam photometry and ISO candela scans were performed to obtain data for comparison with the on-vehicle measurements and to support determination of an on-vehicle aim tolerance. Lab measurements showed similar effects of headlamp aim and mounting height as were seen for the on-vehicle headlamp measurements. Analysis of the combined effects of headlamp aim angle and mounting height showed that when the SAE J599 offsets were applied to the mounting height effects data, glare and roadway visibility were marginally reduced. The average illuminance values calculated for each aim angle at some select headlamp mounting heights showed that the SAE J599 offsets could be increased and achieve both lower glare and higher roadway visibility. The research performed provided data from which an on-vehicle headlamp aim angle tolerance with consideration for headlamp mounting height could be asserted.


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## Executive Summary

This report summarizes research conducted to support NHTSA's response to requirements of the Infrastructure Investment and Jobs Act of 2021 to amend Federal Motor Vehicle Safety Standard (FMVSS) No. 108, *Lamps, reflective devices, and associated equipment* (49 CFR Sec. 571.108, 2024), "to include performance-based standards for vehicle headlamp systems (A) to ensure that headlights are correctly aimed on the road; and (B) requiring those systems to be tested on-vehicle to account for headlight height and lighting performance." This effort focused on developing a test procedure for measuring lower beam headlamp aim angle and gathering data to provide a basis for developing aim angle tolerance values. The research performed provided data for the purpose of developing a headlamp aim angle tolerance that could be used in association with a headlamp aim requirement that incorporates headlamp height.

Currently, headlighting system photometric performance for FMVSS No. 108 (49 CFR Sec. 571.108, 2024) is measured at the equipment level. Single lamps are measured in a test lab using a goniometer, which measures the photometric intensity of test points that are based in polar coordinates with the lamp as the origin.

To measure the lower beam illuminance at these same points through an on-vehicle test procedure, a test method was developed by adapting methods used in previous work by the National Highway Traffic Safety Administration [Mazzae et al., 2019) that sought to develop a lower beam headlighting system visibility confirmation test. In that testing, illuminance sensors were placed at several test locations at the same lateral distance and different longitudinal distances from the front of a test vehicle to measure the illuminance provided by the lower beam headlamps as installed on the vehicle. For the effort documented in this report, the same method of measuring illuminance was used but the test locations were adapted to represent the FMVSS No. 108 lower beam photometry test points. Similar to work done by Flannagan and Sullivan (2001) using geometric transformations, these polar coordinates were turned into cartesian coordinates at which the illuminance sensors were placed. These test locations varied for each vehicle based on the height of the lower beam headlamp's optical center. Although on-vehicle testing measured both the driver-side and passenger-side headlamps simultaneously, one test location for every FMVVS No. 108 test point was used for both lamps. The tested locations were compared to the photometric maximum and minimum requirements of the corresponding FMVSS No. 108 test points, which were converted from intensity values into illuminance values.

Lower beam headlamp illuminance was measured for seven vehicles as a function of headlamp aim angle. The lower beam illuminance was measured for aim angles from -0.7° to +0.7° at every 0.1° as well as -0.76° and +0.76° to match the allowable on-vehicle aim tolerance listed in SAE J599, Lighting inspection code (SAE International, 2015). Testing the aim effects showed that vehicles had a difficult time meeting the photometric values over the range of acceptable aim angles listed in SAE J599. Although some test locations, primarily those further from the cutoff, had minimal variance over the range of aim angles tested, glare locations and some road locations had a large amount of variance over the same range. In particular, 0.86D – 3.5L and 0.5U – 1R to 3R had large amounts of variance over the aim angle tested. The large variance of some test locations would make it difficult to establish an aim tolerance.

Illuminance was measured for two sets of headlamp assemblies to assess the effect of lamp mounting height. Lower beam illuminance was measured for mounting heights from 22 inches to 54 inches at every 2-inch interval to match the allowable mounting height of lower beams for FMVSS compliant vehicles. The results for this testing were more dissimilar between the on-vehicle and lab-based testing. This is most likely due to the issues with the on-vehicle based test procedure. Testing the height effects showed somewhat different results than the aim effects testing. Similar to the aim effects testing, some test locations varied by a large amount. Unlike the aim effects results, the points further from the cutoff,[1] except for the overhead sign test locations, had more variation. Low road visibility test locations, like 4D – 20R and 4D – 20L, and higher glare test locations like those for 1.5U – 1R to 3R/R varied more than those closer to the cutoff.

Overall, the research performed provided data from which an on-vehicle headlamp aim angle tolerance with consideration for headlamp mounting height could be asserted.

[1] FMVSS No. 108 states, "Cutoff means a generally horizontal, visual/optical aiming cue in the lower beam that marks a separation between areas of higher and lower luminance."

# Introduction

## Background

The Infrastructure Investment and Jobs Act of 2021 Section 24212. *Headlamps,* required the Secretary of Transportation to amend FMVSS No. 108, *Lamps, reflective devices, and associated equipment*, "to include performance-based standards for vehicle headlamp systems (A) to ensure that headlamps are correctly aimed on the road; and (B) requiring those systems to be tested on-vehicle to account for headlight height and lighting performance." This report documents research performed to inform a response to this mandate by collecting data useful for developing a test procedure for measuring headlamp aim angle and a headlamp aim angle tolerance that could be used in association with a headlamp aim requirement.

## Headlamp Factors and Glare

Glare has been a concern among drivers for many years. A study conducted by NHTSA in 2004 used an Omnibus Survey of the Bureau of Transportation Statistics and found that around 50 percent of drivers found glare "noticeable but acceptable" and 30 percent of drivers found glare "disturbing" (Singh and Perel, 2004). Similar responses were given for glare from both oncoming and following vehicles.

Starting in 2016 the Insurance Institute of Highway Safety started testing headlighting systems as part of their safety testing and ratings (IIHS, 2024). When this testing began, IIHS noted the poor state of headlamp aim resulting in low visibility or a lot of glare affecting drivers of other vehicles.

NHTSA has previously pursued research to identify the effects of factors, such as headlamp aim and mounting height, on glare and its impact on driver visibility. One such study conducted by the Lighting Research Center at Rensselaer Polytechnic Institute examined the effects of headlamp mounting height on driver glare and detection distance by both simulation and field study (Akashi et al., 2008a). That study showed that although the distance at which a vehicle is detected by other drivers increased with mounting height, discomfort glare (i.e., glare that causes discomfort without necessarily impairing vision) was worse and reaction time also increased. Another study from the Lighting Research Center examined various factors pertaining to headlamp performance, including mis-aim and mounting height (Akashi et al., 2008b). That study showed that higher-mounted headlamps resulted in greater levels of both discomfort and disability glare (i.e., glare that impairs vision without necessarily causing discomfort) than lower-mounted headlamps. It also found that upward mis-aim of headlamps had an even more profound effect than mounting height on both discomfort and disability glare.

## FMVSS No. 108 Headlamp Aim Requirements

FMVSS No. 108 requires that vehicle headlamps have a means of adjusting the vertical aim of the lower beams, but currently does not have on-vehicle headlamp aim angle requirements. However, non-regulatory standards, such as SAE J599 Lighting Inspection Code (SAE International, 2015), have guidelines as to how headlamps should be aimed. SAE J599 describes a visual method for inspecting headlamp aim by shining the lower beam pattern on a wall and

examining the height of the cutoff[2] line, the horizonal line of a beam pattern that represents the greatest transition from low to high brightness vertically. SAE J599 sets vertical aim inspection limits from roughly +0.76° to -0.76° for mechanically aimed headlamps and +0.36° to -0.57° for headlamps that use visual optical aim (VOA). These ranges are for headlamp mounting heights of 22 to 36 inches. This range shifts downward for higher headlamp mounting heights.

Even though FMVSS No. 108 is primarily an equipment standard, it does contain requirements related to headlamp aim for use during laboratory photometry testing. Some of the FMVSS No. 108 lab aiming requirements contained in S10.18, *Headlamp aimability performance requirements* (e.g., the requirements for cutoff), are potentially useful during on-vehicle headlamp aiming. Note that some terms used in S10.18 are defined in FMVSS No. 108 S4, *Definitions*. Each headlamp tested in this study is a VOA headlamp, which are the most commonly available headlamps on vehicles currently available in the U.S. market.

Many laboratory headlamp aiming requirements in FMVSS No. 108 S10.18 do not apply to visually/optically aimable headlamps. Also, this research only involved test vehicles for which the headlighting systems had no means of adjusting the horizontal aim of lower beam. Therefore, only S10.18.9 to S10.18.9.1.5.4 of FMVSS No. 108 are relevant for this research and they specify the following.

1. That each lower beam headlamp must have a cutoff in the beam pattern (S10.18.9.1).
2. The vertical position of the cutoff when the headlamp is correctly aimed for lab testing (S10.18.9.1.1).
3. The maximum vertical gradient of the cutoff when measured in accordance with the specified procedure (S10.18.9.1.2) must be greater than 0.13.
4. The horizontal position of the cutoff (S10.18.9.1.3).
5. The maximum inclination of the cutoff (S10.18.9.1.4).
6. The procedure for measuring the cutoff parameter (S10.18.9.1.5).

All items in this list except for Item 2 depend on the characteristics of a headlamp, not whether a headlamp is mounted for laboratory testing or for on-vehicle testing.

### SAE J599's Guidance on Headlamp Aim

The November, 2015 version of SAE Surface Vehicle Standard J599 has guidance as to how headlamps should be aimed.

In 5.1 of SAE J599, two methods for inspecting headlamp aim are specified: (1) by shining each headlamp's lower beam pattern (one headlamp at a time) on a screen or wall located 7.6 m in front of the headlighting system midpoint (see Figure 1 of SAE J599 for an illustration of the screen's location), or (2) on the view screen of an optical headlamp aiming machine. This work focused on the first SAE headlamp aim inspection method.

[2] FMVSS No. 108 states, "Cutoff means a generally horizontal, visual/optical aiming cue in the lower beam that marks a separation between areas of higher and lower luminance."

Through examination of a headlamp's lower beam pattern shining on a vertical screen, the height of its cutoff line can be determined. The cutoff line is the horizontal line in a beam pattern that represents the most rapid vertical transition from low to high intensity. The term, "cutoff line" in SAE J599 appears to be a modification of the term "cutoff" as defined in S4 of FMVSS No. 108. FMVSS 108 states that cutoff "is a generally horizontal, visual/optical aiming cue in the lower beam that marks a separation between areas of higher and lower luminance." SAE J599 implies that the cutoff should form a line (the "cutoff line") that can be adjusted up or down during the aiming process.

To aim each headlamp vertically, the height of its cutoff line is adjusted to be within a specified zone by means of each headlamp's vertical aiming mechanism. (S10.18.1 of FMVSS No. 108 requires each headlamp to have a vertical aiming mechanism.)

The limits of the cutoff line zone specified in SAE J599 differ depending upon the type of headlamp. Mechanically aimable headlamps (as defined in S4 of FMVSS No. 108) have a larger zone than do VOA headlamps (again, as defined in S4 of FMVSS No. 108; note also that VOA headlamps are referred to as headlamps with Visual/Optical Aiming in SAE J599). All headlamps tested for this effort, and most headlamps on the current U.S market, are VOA headlamps. However, one of the goals of this research was to measure the effects of headlamp vertical aim angle over a large, but reasonable, range of aim angles. Therefore, the larger vertical headlamp aim zone for mechanically aimable headlamps from SAE J599 was chosen to determine the headlamp vertical aim angle range used for this research.

SAE J599 specifies, for mechanically aimable headlamps, that a headlamp's cutoff line be within the vertical aim inspection limits (see 6.1.2 of SAE J599) of ±100 mm from the nominal vertical aim offset. Vertical aim inspection limits of ±100 mm at a distance of 7.6 m equates to an angle of ±0.754°, which, for this report, will be approximated as ±0.76°. Note that as specified by Table 1 of SAE J599, the nominal vertical aim offset differs depending upon the vehicle's headlamp mounting height. For vehicles with a headlamp mounting height from 56 to 90 cm, the nominal vertical aim offset is the vertical height of the optical center of the vehicle's lower beam headlamps.

For vehicles equipped with VOA headlamps and a headlamp mounting height from 56 to 90 cm (which includes all seven test vehicles tested), Table 2 of SAE J599 specifies that a headlamp's cutoff line be within the vertical aim inspection limits of +50 mm to -75 mm from the nominal vertical aim offset. These limits of +50 mm to -75 mm at a distance of 7.6 m equate to an angle range of 0.377° to -0.565°. However, one goal of this report is to measure the effects of headlamp vertical aim angle tolerance over a large but reasonable range of aim angles. Therefore, the larger mechanically aimable headlamps aim angle tolerance of ±0.76° was chosen for this research.

## Approach

This effort sought to study the effects of both headlamp aim angle and mounting height on lower beam headlighting system performance to support the determination of an on-vehicle aim tolerance, or "the amount by which a measurement or calculation might change and still be

acceptable."[3] This was achieved by performing on-vehicle measurements of lower beam illuminance, using FMVSS No. 108 photometric test points. The same lamps were then removed from the test vehicles or fixtures and sent to a photometric test laboratory for comparison and to gather data on headlamp aim in the manner headlamps are currently measured and evaluated.

## Testing Performed

This effort involved measuring FMVSS No. 108 laboratory-based photometry metrics using a production vehicle. Using this test method, seven vehicles were tested and data were collected for a range of headlamp aim angles. The test method also gathered information on lower beam illuminance over a range of mounting heights from two sets of headlamps.

After all on-vehicle testing was complete, the lamps were sent to an ISO-accredited test lab to be measured. Two measurements were conducted for each lamp: an ISO candela scan that captures the intensity of the beam pattern over an area defined by vertical and horizontal angles; and FMVSS No. 108 lower beam photometry. Each lamp was measured while mounted on its own model-specific, supplier-designed test fixture. The data from the lab-based testing served two functions. The lab-based measurements were compared the on-vehicle measurements to assess the accuracy of the on-vehicle test method. The lab-based measurements also could also be used as a second set of data for determining any aim angle or mounting height requirements.

[3] https://dictionary.cambridge.org/us/dictionary/english/tolerance.

# Method

## On-Vehicle Lower Beam Illuminance Measurement Test Approach

### *Measurement Method*

To evaluate the effect of headlamp aim and mounting height on lower beam illuminance, the test procedure from the Voyzey et al. report (in press) report, *On-Vehicle Lower Beam Performance Test Examination*, (was used. Testing for that effort was conducted in parallel with this effort and uses most of the same test data. The test procedure involves positioning a test vehicle on a flat, paved road surface and measuring the lower beam's light output at locations on the surface that correspond to FMVSS No. 108 photometric test points. The exact location of the test locations differed based on the height of the headlamps being tested to measure the same test points that are in polar coordinates for each test vehicle.

Although FMVSS No. 108 measures each headlamp on a given vehicle individually, this effort measured the illuminance produced by having both headlamps for each vehicle lit simultaneously (i.e., the way that headlamps are actually operated on an in-use vehicle).

The light output was measured as illuminance. This effort used illuminance sensors to gather data at the specified test locations. Different sensor heights were used to evaluate different aspects of the beam pattern. Test points that evaluated roadway visibility were close to the ground and test locations that evaluated glare and overhead sign illumination were tested at larger heights. Measurements and ambient readings were recorded over a specific time interval and averaged to give a single value.

### *Measurement Locations*

As stated, current lab-based photometric testing, including what is specified in FMVSS No. 108, denotes measurement locations in terms of polar coordinates. These polar coordinates are listed as a vertical and horizontal angle, which are measured from the axis going through the photometric center of the lamp in the direction of light projection and centered at the photometric center of the lamp. For vertical angles, Up (U) is positive and Down (D) is negative; for horizontal angles, Right (R) is positive and Left (L) is negative. An angle of 0° is denoted as H for vertical angles and V for horizontal angles.

Like most headlamps on the current U.S market, all headlamps tested in this effort used VOA. Furthermore, all headlamps tested were classified as being of type LB2V.[4] Illuminance measurement locations were determined by translating the specified test points in Table XIX-a LB2V of FMVSS No. 108 from lab-based points in polar coordinates to points on the test facility road surface. The transformation of polar coordinates to road coordinates was based on Flannagan and Sullivan (2011). As in that document, points are geometrically translated from polar coordinates to Cartesian locations across a level roadway surface, with some values and

[4] LB2V per Table II of FMVSS No. 108 refers to the photometry requirements in Table XIX-a of FMVSS No. 108 for a lower beam headlamp using visual optical aim for a two-lamp system.

assumptions needed to determine the exact locations of measurement locations. The roadway characteristics represented in this testing were a straight road with a standard lane width of 3.6 m (12 feet), as was used by Flannagan and Sullivan.[5] Appropriate illuminance receptor head heights were determined in order to accommodate physical measurements.

Note that the test area 10U to 90U – 90L to 90R of Table XIX-a of FMVSS No. 108 was not used in the current research. The reasons for not using this test area were:

- To measure illuminance data at measurement locations generated from this row would require mounting photometric measurement instrumentation at a distance above the road surface that creates challenges in test setup and results in reduced measurement quality due to the increased distance between the photometric equipment and the light source needed to test pursuant to the angular coordinates in FMVSS No. 108; and
- NHTSA selected a limited number of measurement locations due to practical considerations and limits. Nonetheless, NHTSA believes the locations selected were adequate to inform this research.

The following assumptions were made to translate the polar coordinates of the FMVSS No. 108 Table XIX-a LB2V test locations into road-based measurement locations.

- For test locations that contribute to overhead sign visibility:
    - Illuminance receptor heads were mounted at a height of 2 m.
        - Most overhead signs are taller. Using a taller height would result in longer test distances. At long test distances, the illuminance values would be small and introduce a larger noise-to-signal ratio. The selected height value is along a trajectory between the headlamps and an overhead sign, but measures the value at a closer distance along that trajectory.
- For test locations that test the glare control of the headlamp:
    - Illuminance receptor heads were mounted at a height of 1.1 m.
        - This height value is based on the glare test point location used in Flannagan and Sullivan (2011), which is based on average driver eye height.[6]
    - Additionally, FMVSS No. 108 lower beam headlamp glare control locations scan across a vertical angle between a start and end horizontal angle. For this research, test subpoints at a few relevant locations were used to judge illuminance levels along a line for these scans:
        - The start point,
        - The intersection with the left or right (as appropriate) edge of a standard highway lane that is 3.6 m wide,

[5] NHTSA's draft NCAP test procedure uses a lane width of 4 m.

[6] Flannagan and Sullivan (2011) stated, "In order to represent the typical locations of oncoming drivers' eyes, we again used data for vehicles of the mid 1990s (Sivak et al., 1996). We considered drivers at the average eye height for passenger cars (1.11 m) and at 2.0 standard deviations above and below average (1.15 and 1.07 m)."

        - The intersection with the center of a left or right (as appropriate) adjacent lane that is 3.6 m wide, and
        - The end point of the scan line.
- For test locations on the horizontal (i.e., a vertical polar coordinate of zero):
    - The test point height used for each vehicle was the height of that vehicle's headlamp's optical center, and
    - A longitudinal test distance of 10 m was used.
- For test locations that measure lower beam headlamp on-road visibility:
    - The illuminance receptor head was placed 0.2 m vertically above the road surface. The illuminance receptor head location was adjusted such that it was in line with the polar coordinates specified for that test location.
    - The 0.2-meter height differs from the approach outlined in Flannagan and Sullivan which sets measurement locations at the road surface level. This is done to accommodate a physical illuminance receptor head instead of the virtual sensor at road level that was suggested by Flannagan and Sullivan.

To calculate the longitudinal and lateral distances from the vehicle at which illuminance receptor heads would be located, the following calculations were made:

1. The absolute two-dimensional distance was calculated by finding where the vertical polar coordinate intersects the plane of the illuminance receptor head height. This was done using the following formula:

$$d_{abs} = \frac{\left|h_{sensor} - h_{optical\ center}\right|}{\tan \theta_{vertical}}$$

   Where $d_{abs}$ is the absolute distance to the location, $h_{sensor}$ is the height of the illuminance receptor head, $h_{optical\ center}$ is the height of the lower beam headlamp optical center, and $\theta_{vertical}$ is the vertical angle of the test point in FMVSS No. 108.

2. The longitudinal distance was calculated using the following formula:

$$d_{long} = d_{abs} * \cos \theta_{horizontal}$$

   Where $d_{long}$ is the longitudinal distance to the location, $d_{abs}$ is the absolute distance to the location, and $\theta_{horizontal}$ is the horizontal angle of the test point in FMVSS No. 108.

3. The lateral distance was calculated using the following formula:

$$d_{lat} = d_{abs} * \sin \theta_{horizontal}$$

   Where $d_{lat}$ is the longitudinal distance to the location, $d_{abs}$ is the absolute distance to the location, and $\theta_{horizontal}$ is the horizontal angle of the test point in FMVSS No. 108.

The lateral and longitudinal origin, or point (0,0), for calculating each translated test point location was the point at the lateral center and forward most point of the vehicle.

Table 1 shows the relationship between each on-vehicle measurement point and the corresponding FMVSS No. 108 test locations. Due to geometric constraints where the test line ended before it reached the right lane edge, Subpoint 7b was not measured for all vehicles.

*Table 1. FMVSS No. 108 Lower Beam Photometric Regulation Test Locations*

| Measurement Location | Test Point Function | Test Point/Line | Up or Down Angle (°) | Right or Left Angle (°) | Subpoint | Location Along Line |
|---|---|---|---|---|---|---|
| 1 | Overhead Sign Visibility | 4U - 8L | 4 | -8 | - | - |
| 2 | | 4U - 8R | 4 | 8 | | |
| 3 | | 2U - 4L | 2 | -4 | | |
| 4 | Glare Control | 1.5U - 1R to 3R & 1.5U 1R to R | 1.5 | 1 | a | Start |
| | | | | 3 | b | End (3R) |
| | | | | variable | c | Right Lane Edge |
| | | | | variable | d | Right Adjacent Lane Center |
| 5 | | 1U - 1.5L to L | 1 | -1.5 | a | Start |
| | | | | variable | b | Left Lane Edge |
| | | | | variable | c | Left Adjacent Lane Center |
| 6 | | 0.5U - 1.5L to L | 0.5 | -1.5 | a | Start |
| | | | | variable | b | Left Lane Edge |
| | | | | variable | c | Left Adjacent Lane Center |
| 7 | | 0.5U - 1R to 3R | 0.5 | 1 | a | Start |
| | | | | variable | b | Right Lane Edge (if applicable) |
| | | | | 3 | c | End |
| 8 | Horizon Line Points | H - 4L | 0 | -4 | - | - |
| 9 | | H - 8L | 0 | -8 | | |
| 10 | Road Visibility | 0.6D - 1.3R | -0.6 | 1.3 | - | - |
| 11 | | 0.86D - V | -0.86 | 0 | | |
| 12 | | 0.86D - 3.5L | -0.86 | -3.5 | | |
| 13 | | 1.5D - 2R | -1.5 | 2 | | |
| 14 | | 2D - 9L | -2 | -9 | | |
| 15 | | 2D - 9R | -2 | 9 | | |
| 16 | | 2D - 15L | -2 | -15 | | |
| 17 | | 2D - 15R | -2 | 15 | | |
| 18 | | 4D - 4R | -4 | 4 | | |
| 19 | | 4D - 20L | -4 | -20 | | |
| 20 | | 4D - 20R | -4 | 20 | | |

A representation of the test locations for a lamp height of 0.62 m is shown in Figure 1.

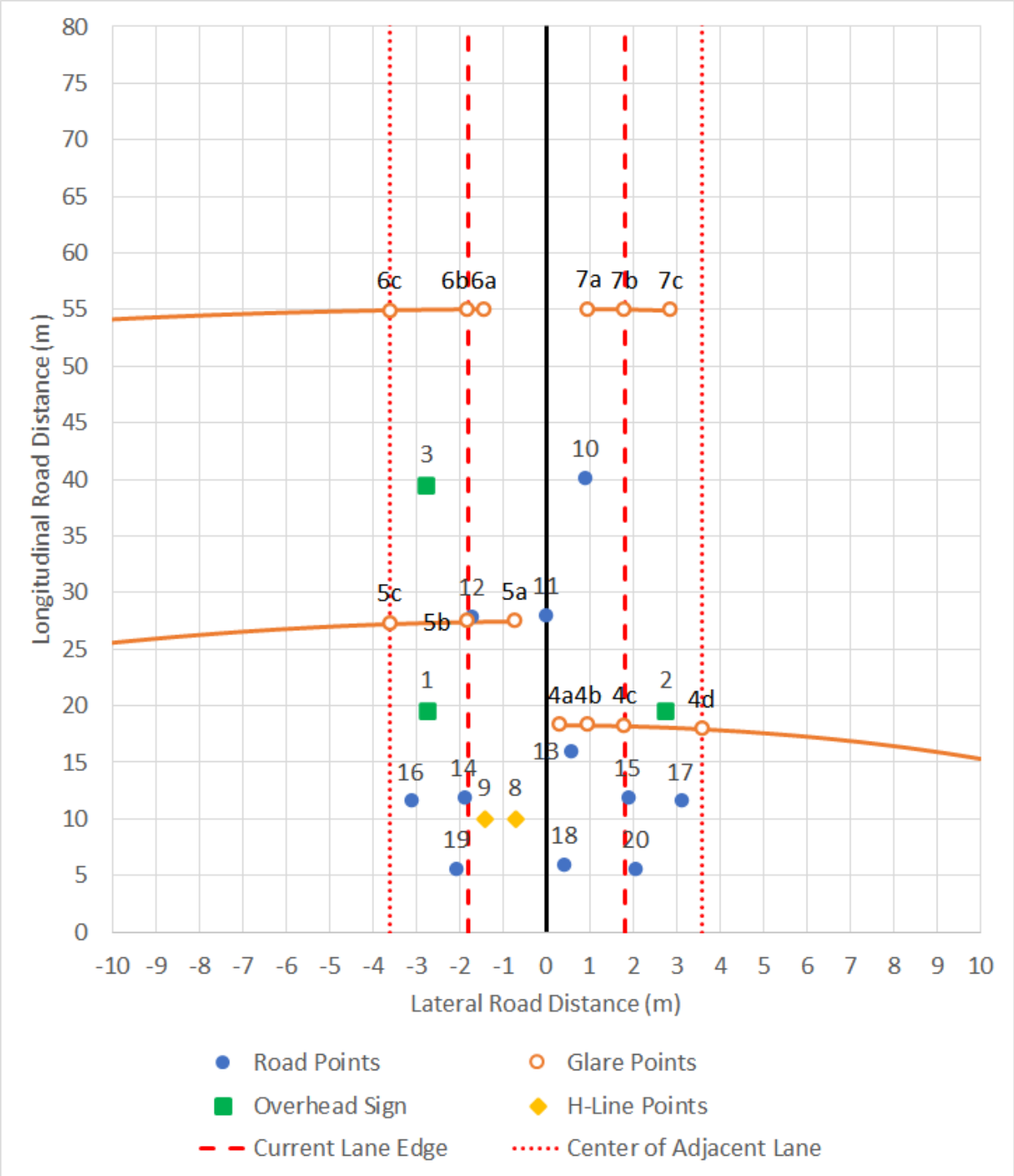


*Figure 1. Example Illuminance Measurement Locations and Added Glare Value Locations*

Illuminance receptor heads were mounted on tripods to position them at the required height vertically above the test surface. The test surface used was flat, level asphalt with dimensions that exceeded 80 m long by 15 m wide. To accommodate such a large area, testing was performed outside on the Vehicle Dynamics Area at Transportation Research Center Inc. All

measurement locations were marked on the test surface to permit repeatable placement of the illuminance receptor heads. Figure 2 shows an example of the test setup including vehicle positioning and illuminance receptor head array locations on the forward roadway surface.

*Figure 2. Illuminance Receptor Head Array and Test Vehicle Setup*

### *Headlamp Vertical Aim Angle*

Headlamp vertical aiming was performed based on the procedures contained in the November 2015 version of SAE J599, *Lighting inspection code* (SAE International, 2015).

Lower beam headlamp vertical aiming is adjusted based on the location of the "cutoff." FMVSS No. 108 defines "cutoff" as "a generally horizontal, visual/optical aiming cue in the lower beam that marks a separation between areas of higher and lower luminance." In other words, the cutoff line of a lower beam headlamp is the light/dark boundary at the top of the light pattern produced by a lower beam headlamp. As specified in SAE J599, the concept of "gradient" of the illuminance produced by the headlamp is used to determine the location of the cutoff line. Since the vehicles tested during this research all had VOR (Visual/Optical – Right) headlamps (see Table 5), Figure 7 of SAE J599 shows how the cutoff line is determined and where the cutoff line is to be located for a properly aimed headlamp.

While Figure 7 of SAE J599 permits a range of locations for a properly aimed headlamp, in the work that follows, a vertical aim angle of 0.00° corresponds to having the cutoff line located at the manufacturer's vertical aim angle specification. As vertical aim angle is increased, the cutoff line moves up. Similarly, as vertical aim angle is decreased, the cutoff line moves down.

Headlamps were aimed vertically for each set of measurements using an imaging photometer. The photometer collects images of the headlamp beam pattern projected on a screen that is 7.6 m away from the front-most point of the vehicle. The image is captured and then analyzed in software that works with the photometer. In the software, the gradient was measured vertically on a line 2° to the right of the vertical line going through the optical center of the lower beam headlamp. The gradient was measured from 1.5° up to 1.5° down at a pitch of 0.02°. The gradient was then calculated for each point by the formula:

$$G_a = \log(x_a) - \log(x_{a+0.1°})$$

Where $G_a$ is the gradient at point "a," $x_a$ is the luminous intensity at point "a," and $x_{a+0.1°}$ is the luminous intensity of the point 0.1° above "a." The maximum gradient and corresponding location are found, and the headlamp adjusted, such that the maximum gradient is at the required aim angle location.

### *Test Equipment*

#### Illuminance Measurement Equipment

A Konica Minolta T-10A[7] illuminance meter was used to measure the amount of light emitted by a vehicle's lower beam headlamps. The T-10A is a multi-function digital illuminance meter with a detachable receptor head. The T-10A has an operating temperature range of 14 to 104° F (-10 to 40° C) and specified operating conditions of 85% or less) relative humidity (at 35°C or colder) with no condensation. Appendix A contains the complete specifications for the Konica Minolta T-10A illuminance meter.

The illuminance meter in Figure 3 can record both single-point (using analog output) and multi-point (using digital output) measurements. The meter can perform single-point measurements instantaneously or record continuous single-point measurements using its analog output. Multi-point measurement requires that the meter be powered using an approved AC adapter and that two or more receptor heads be connected to the meter using adapters (T-A21) and commercially available 10Base-T network cables (category 5 straight cable).

[7] Konica Minolta Sensing Americas Inc., Ramsey, NJ. https://sensing.konicaminolta.us/us/products/t-10a_t-10ma-illuminance-meters/

*Figure 3. Konica Minolta T-10A Illuminance Meter (Konica Minolta US, 2024)*

For this effort, multi-point measurement was performed in which the meter was fitted with a T-A20 main body adaptor, and each receptor head was fitted with a T-A21 receptor head adaptor. Using the T-A21 adaptors, category 5 cables were connected between each receptor head in series and to the meter. Per the meter's instruction manual, the recommended AC adaptor was used to power the meter during multi-point measurement. The AC adaptor was connected to a power invertor and then to a Schumacher PSJ-3612 "Jump Starter and Portable Power Unit" that provided power.[8] The power invertor was powered through the vehicle's cigarette lighter. Custom software was developed in-house at NHTSA's Vehicle Research and Test Center to run on a Windows-based tablet and interface with the illuminance meter to control recording of data. Figure 4 is an image showing how the components were used in the multi-point meter configuration. Illuminance measurements were captured over a specified duration (e.g., 30 seconds) at a rate of 1 Hz.

[8] Schumacher Electric, Fort Worth, TX.


*Figure 4. Illuminance Meter and Additional Receptor Heads Used for Multi-Point Measurement (Konica Minolta US, 2024)*

Model and serial number information for the meter and receptor heads as components used in the testing are shown in Table 2. The table also shows which specific receptor heads were used in each measurement location.

*Table 2. Model and Test Location Information for Illuminance Meter Components*

| Component Label | Serial Number | FMVSS Test Location | Location Label | Height |
|---|---|---|---|---|
| Konica-Minolta T-10A | 20020976 | N/A | N/A | N/A |
| Receptor Head 00 (RH00) | 30022422 | 4U - 8L | 1 | 2 m |
| Receptor Head 01 (RH01) | 30022436 | 4U - 8R | 2 | 2 m |

| Component Label | Serial Number | FMVSS Test Location | Location Label | Height |
|---|---|---|---|---|
| Receptor Head 02 (RH02) | 30022472 | 2U - 4L | 3 | 2 m |
| Receptor Head 03 (RH03) | 30022474 | 1.5U - 1R to 3R/R | 4a | 1.1 m |
| Receptor Head 04 (RH04) | 30022418 | | 4b | 1.1 m |
| Receptor Head 05 (RH05) | 30022473 | | 4c | 1.1 m |
| Receptor Head 06 (RH06) | 30022435 | | 4d | 1.1 m |
| Receptor Head 07 (RH07) | 30022437 | 1U - 1.5L to L | 5a | 1.1 m |
| Receptor Head 08 (RH08) | 30022421 | | 5b | 1.1 m |
| Receptor Head 09 (RH09) | 30022420 | | 5c | 1.1 m |
| Receptor Head 10 (RH10) | 30022432 | 0.5U - 1.5L to L | 6a | 1.1 m |
| Receptor Head 11 (RH11) | 30022419 | | 6b | 1.1 m |
| Receptor Head 12 (RH12) | 30022434 | | 6c | 1.1 m |
| Receptor Head 13 (RH13) | 30015510 | 0.5U - 1R to 3R | 7a | 1.1 m |
| Receptor Head 14 (RH14) | 30011924 | | 7b | 1.1 m |
| Receptor Head 15 (RH15) | 30011928 | | 7c | 1.1 m |
| Receptor Head 16 (RH16) | 30012155 | H - 4L | 8 | Headlamp Mounting Height |
| Receptor Head 17 (RH17) | 30015512 | H - 8L | 9 | Headlamp Mounting Height |
| Receptor Head 18 (RH18) | 30012026 | 0.6D - 1.3R | 10 | 0.2 m |

| Component Label | Serial Number | FMVSS Test Location | Location Label | Height |
|---|---|---|---|---|
| Receptor Head 19 (RH19) | 30015294 | 0.86D - V | 11 | 0.2 m |
| Receptor Head 20 (RH20) | 30012154 | 0.86D - 3.5L | 12 | 0.2 m |
| Receptor Head 21 (RH21) | 30015768 | 1.5D - 2R | 13 | 0.2 m |
| Receptor Head 22 (RH22) | 30015296 | 2D - 9L | 14 | 0.2 m |
| Receptor Head 23 (RH23) | 30013094 | 2D - 9R | 15 | 0.2 m |
| Receptor Head 24 (RH24) | 30011417 | 2D - 15L | 16 | 0.2 m |
| Receptor Head 25 (RH25) | 30011925 | 2D - 15R | 17 | 0.2 m |
| Receptor Head 26 (RH26) | 30022573 | 4D - 4R | 18 | 0.2 m |
| Receptor Head 27 (RH27) | 30022576 | 4D - 20L | 19 | 0.2 m |
| Receptor Head 28 (RH28) | 30022574 | 4D - 20R | 20 | 0.2 m |

### *Test Vehicle Positioning Aids*

Steps were taken to accurately position test vehicles in the center of the designated marked lane created on the test surface. A centerline was created about which all vehicles were laterally centered. The line started at the datum for measuring and was parallel to the longitudinal direction for point marking. Plumb bobs were attached to the center of the front and rear of the vehicle under test. The car was then positioned such that the front plumb bob was at the start of the centerline, and the rear plumb bob was also on the centerline.

### Headlamp Aim Measurement Equipment

To aim the headlamps to the correct aim angle value for each measurement, an imaging photometer was used to measure the cutoff location. The photometer (Figure 5) is a Radiant Vison Systems ProMetric Y Imaging Photometer.[9] This model has a 16-megapixel resolution and uses a CMOS sensor. It is equipped with a lens with an electronic focus and aperture to ensure the correct field of view for measurement. The photometer was connected to a computer

[9] Radiant Vision Systems, Redmond, WA. www.radiantvisionsystems.com/products/imaging-colorimeters-photometers/prometric-y-imaging-photometers

for analysis via a CAT5 ethernet cable and powered via its recommended AC adapter. The corresponding Radiant Vison ProMetrica software was used to analyze measurements and to determine the aim angle of the headlamps to permit angle adjustment.


*Figure 5. Radiant Vision Systems ProMetric Y Imaging Photometer*

The imaging photometer measures illuminance from a surface. The primary surface used for this measurement was a large (9.5-ft wide by 4.75-ft tall) matte-finish, floor-rising projection screen. The large screen had sufficient surface area to be able to capture both headlamps' gradient areas at once. The large screen was deployed by pulling it up from its casing on the ground prior to taking measurements and then lowered and stowed in its casing after each aim adjustment was complete. The large screen would bow in conditions of significant wind speed. Therefore, two smaller, rigid screens (one per headlamp) were used in windy conditions. These smaller screens measured 2-ft wide by 3-ft tall and were large enough to capture a single headlamp's gradient measurement. The smaller screens were mounted on carts with locking wheels and not susceptible to the wind. Markers were placed on the ground to ensure repeatable placement of all screens on the test surface.

*Figure 6. Aim Screen, Large*

*Figure 7. Aim Screen, Small*

### Light Blocking Equipment

Some aspects of the test procedure required blocking the light output from one or both headlamps. For example, in order to aim each headlamp individually, the beam pattern from the headlamp being aimed needed to be isolated from the one not being aimed by blocking the light from the latter. Also, when measuring ambient illumination, the beam pattern of both headlamps needed to be blocked. Lighting blocking was accomplished using thick black curtains hung from a frame placed in front of the test vehicles. The frame extended such that each curtain could be deployed to block the light from the headlamp or moved to the side where it would not block the light.

## *Test Surface*

The draft test procedure specified that the test surface used should be flat, level asphalt with dimensions of at least 80 m long and 15 m wide. For the effort documented in this report, testing was conducted on the Vehicle Dynamics Area facility of the Transportation Research Center.

## *Test Vehicle Preparation*

Each vehicle was prepared for testing by filling the fuel tank and ensuring the test vehicle's tires were set to the vehicle manufacturers recommended cold inflation pressures. The vehicle's hood, trunk, and all doors were closed, and the steering wheel was adjusted to the position where the longitudinal centerlines of all vehicle tires were parallel to the longitudinal centerline of the vehicle. Vehicle battery voltage level was confirmed to be within the nominal operating range (e.g., +11 to +16 V DC). The vehicle was loaded to simulate the weight of the driver only. The weight of the driver was represented by weights placed in the driver's designated seating area, consisting of 45 kg (100 lb) resting on the seat pan and 23 kg (50 lb) resting on the vehicle floorboard.

## *Test Conditions*

The ambient illumination conditions were required be less than 0.200 lux at each of the specified measurement locations with the test vehicle's headlamps off. The orientation of the illuminance sensors was the same for the ambient measurement as for lower beam measurements.

Ambient temperature, humidity, and wind speed information was obtained both from the test facility's official conditions measurement data and from portable weather stations mounted in or on the test vehicles. The test procedure called for ambient temperature to be within the operating range of the measurement equipment but also between 41°F (5°C) and 104°F (40°C) and wind speed less than 22 mph (35 kph). Tests were not performed during periods of inclement weather, in which the test procedure criteria included, but were not limited to, rain, snow, hail, fog, smoke, and/or ash.

## *Test Procedures – On-Vehicle*

### Headlamp Aiming

For test results discussed in this report, the headlamps were aimed to the associated vehicle manufacturer's target aim angle specification. The lower beam headlamp pattern was then measured at the test locations specified in Table 1. The imaging photometer was placed just forward of the center of the vehicle's front bumper, such that the camera could capture both

beam patterns without blocking any of the patterns. This photometer camera location allowed it to remain in place for each headlamp's aim adjustment without interfering with illuminance measurements. To accommodate the static position of the imaging photometer, the gradient locations were calculated with respect to the center of the vehicle. The corresponding gradient locations for each centered camera were calculated using the following formulas:

$$\theta_D = \tan^{-1}\frac{(d * \tan\theta_{VOA}) - {}^{w}/_{2}}{d}$$

$$\theta_P = \tan^{-1}\frac{(d * \tan\theta_{VOA}) + {}^{w}/_{2}}{d}$$

Where $\theta_D$ is the measurement angle to the driver-side lower beam headlamp optical center, $\theta_P$ is the measurement angle to the passenger-side lower beam headlamp optical center, *d* is the distance to the screen, $\theta_{VOA}$ is the gradient measurement angle designated in FMVSS No. 108 for the corresponding headlamp, and *w* is lateral distance between the two lower beam headlamps' optical centers.

The following procedure was performed to ensure that the headlamps were properly aimed:

1. Place the headlamp-aiming screen 7.6 m (25 feet) in front of the vehicle and adjust the screen height to match the headlamp mounting height.
2. Place the imaging photometer in between the vehicle headlamps at the headlamp mounting height.
3. Record an image of the aim screen and calculate the gradient at 2° right of the horizontal lamp location from +1.5° to -1.5° vertically at a 0.02° pitch.
4. Adjust the headlamp aim as needed.
5. Repeat steps 3 and 4 as necessary until the headlamp aim is within +/-0.02° of the required aim.

***Test Procedure – Aim Effects Testing***

Per the draft test procedure, the following steps were carried out to conduct aim effects testing:

1. Confirm suitable ambient conditions for testing.
2. Start the vehicle's engine and use the vehicle's headlamp control to activate the lower beam headlamps to allow both the engine and headlamps to reach normal operating temperature.
3. Aim the headlamps to the desired aim angle by following the procedure in section 3.7.1.
4. Turn the vehicle's lower beam headlamps off or cover the beam pattern and measure and record an ambient reading every 1 second for 5 seconds.
5. Turn the vehicle's lower beam headlamps on or uncover them and measure the illuminance at each receptor head every 1 second for 30 seconds.
6. Repeat steps 3 through 5 for all measured aim angles.

Illuminance measurements were made across a range of headlamp aim conditions; from +0.7° to -0.7° vertically aimed at every 0.1°, as well as +0.76° and -0.76° to match the industry

recommended tolerance listed in SAE J599 (SAE International, 2015), for a total of 17 measurements per vehicle.

Ambient illuminance values obtained at the specified measurement points were subtracted from the corresponding average headlamp illuminance value for each measurement point to obtain a value for illuminance attributable only to the test vehicle's headlamps.

### *Test Procedure – Height Effects Testing*

For testing of the effects of headlamp height, the lamps were initially aimed to a nominal aim angle condition specified by the associated vehicle's OEM, at the nominal mounting height. The height was then adjusted to each specified height and illuminance was measured accordingly. The following steps were carried out to conduct height effects testing:

1. Confirm suitable ambient conditions for testing.
2. Activate the lower beams to allow the headlamps to reach a normal and stable operating temperature.
3. Position the test fixtures accurately on the test surface and properly align to the photometric instrumentation setup.
4. Adjust the headlamps such that the lower beams optical center are 0.62 m off the ground.
5. Aim the headlamps to the target aim specification by following the procedure in 3.7.1.
6. Adjust the headlamps such that the lower beams optical center are at the desired mounting height.
7. Turn the vehicle's lower beam headlamps off or cover the beam pattern and measure and record an ambient reading every 1 second for 5 seconds.
8. Turn the vehicle's lower beam headlamps on or uncover them and measure the illuminance at each receptor head every 1 second for 30 seconds.
9. Repeat steps 6 through 8 for measured mounting heights.

Ambient illuminance values obtained at the specified measurement locations were subtracted from the corresponding average headlamp illuminance value for each measurement point to obtain a value for illuminance attributable only to the test vehicle's headlamps.

### Test Procedures – Lab Testing

NHTSA and TRC collaborated with the vehicle and lamp manufacturers to acquire the appropriate test fixtures needed for the laboratory measurements. Laboratory testing was conducted by Sapphire Technical Solutions using an STS AP-60 goniometer system. A goniometer system is the standard measurement system for automotive lighting. Measurements involve a lamp being positioned such that the lamp's optical center is centered and directly facing the photometer that is a fixed distance away. The goniometer system can rotate horizontally and vertically about a lamp's optical center to measure at any desired angle.

For each set of headlamps and parking lamps, each lamp was tested individually. Results from each set of lamps were combined to a single value for the vehicle.

This testing measured photometric intensity values, in candelas. Using the distance from the forwardmost point on the centerline of each test vehicle to each test point or subpoint, the candela values were converted into illuminance values, measured in lux.

The following table lists the tests that were performed in the lab.

*Table 3. Lab Tests Performed*

| Lamps Tested | Function Tested | Test Performed | Test Details |
|---|---|---|---|
| Headlamps and parking lamps from all seven test vehicles | Lower Beam | FMVSS No. 108 Lower Beam Photometry | Table XIX-a Lower Beam #2V (LB2V) |
| | | ISO Candela Scan | Area bounded by 5U/D and 35R/L at a 0.1° increment in both directions |
| | Front Parking | | |

Any lamp functions that use LEDs were turned on 30 minutes before testing to ensure stability of the light output as per the specifications of SAE J2650 (SAE International, 2021).[10]

The laboratory test data was shared with OEMs of the vehicle models associated with the tested headlamps for confirmation. Specifically, the driver-side lower beam headlamp ISO Candela Scan results were sent to the OEMs to confirm that the beam pattern looked as intended. This confirmed that the mounting of the headlamp to the test fixture was correct.

### *Laboratory Testing Data Analysis Calculations*

FMVSS No. 108 lower beam photometry points were extracted from the ISO candela scan data by finding the vertical and horizontal angles that corresponded to roadway measurement locations. Required angle values were rounded to the nearest 0.1° as this was the resolution for the ISO candela measurements. The vertical and horizontal angles were calculated by the following formulas:

$$\theta_{UD} = \left( 90 - \tan^{-1} \frac{\sqrt{{d_{long}}^2 + (d_{lat} - w)^2}}{h_{RH} - h_{function}} \right)$$

$$\theta_{RL} = \tan^{-1} \frac{d_{lat-w}}{d_{long}}$$

Where $\theta_{UD}$ is the vertical angle, $\theta_{RL}$ is horizontal angle, $d_{long}$ is the longitudinal distance of the test location, $d_{lat}$ is the lateral distance of the test location, w is the lateral location of the lamp, $h_{RH}$ is the height of the receptor head, and $h_{function}$ is the height of the optical center of the function.

After the intensity value was extracted from the ISO candela data, the intensity value was calculated as an illuminance value by the following formula:

$$E_{V=} \frac{I_V}{{d_{long}}^2 + (d_{lat} - w)^2 + \left(h_{RH} - h_{function}\right)^2}$$

[10] SAE J2650 states, "The required photometric minima must be measured after prolonged ON time, 30 minutes.".

Where $E_v$ is the illuminance at the test location and $I_V$ is the luminance intensity from the ISO candela measurement.

The illuminance contribution from the driver-side and passenger-side lower beam headlamps and front park functions were then added together to compare with the on-vehicle measurements.

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## Vehicles Tested

### Test Vehicle and Lamp Set Information

Illuminance was measured for seven vehicles as well as two stimulus lamp fixtures from the FMVSS No. 108 *Adaptive driving beam* (ADB) test procedure. The stimulus lamp fixtures were used exclusively for height effects testing, but the seven test vehicles were each used for both aim and mounting height effects testing. The vehicle model information and headlighting system information are listed in the following tables. The height of each vehicle's lower beam headlamps was determined using the optical axis marking on the headlamp lens (typically a mark on the lens in front of the light source).

*Table 4. Test Vehicle Model and Headlamp Information*

| Model Year | Make | Model | Trim | VIN (First 10 digits) | Mileage |
|---|---|---|---|---|---|
| 2022 | Chevrolet | Equinox | Premier AWD | 2GNAXXEV4N | 80 |
| 2023 | Ford | F-150 | 4x4 Super Crew | 1FTFW1ED1PFA | 158 |
| 2019 | Ford | Fusion | SE Hybrid | 3FA6P0LU5KR | 1959 |
| 2022 | Hyundai | Tucson | Limited | 5NMJECAE0NH | 32 |
| 2022 | Subaru | Outback | Touring | 4S4BTAPC3N | 889 |
| 2022 | Tesla | Model 3 | (NA) | 5YJ3E1EB9NF | 1107 |
| 2022 | Toyota | Camry | SE | 4T1G11AKXNU | 155 |
| 2018 | Ford | F-150 | Stimulus Lamp Fixture from FMVSS No. 108 ADB test procedure | | |
| 2018 | Toyota | Camry | Stimulus Lamp Fixture from FMVSS No. 108 ADB test procedure | | |

*Table 5. Test Vehicle Headlamp Aiming Information*

| Model Year | Make | Model | VOA Type | SAE J599 Aim, Height Offset | Lower Beam Optic Type | Height (to nearest cm) | Width (to nearest cm) | Vehicle Manufacturer Aim Specification |
|---|---|---|---|---|---|---|---|---|
| 2022 | Chevrolet | Equinox | VOR | No Offset | LED Projector | 84 | 147 | 0° +0.38°, -0.57° (SAE J599) |
| 2023 | Ford | F-150 | VOR | No Offset | LED Projector | 88 | 154 | -0.29° +/- 0.29° |
| 2019 | Ford | Fusion | VOR | No Offset | Halogen Projector | 72 | 127 | 29" +/- 3" at 25' (0° +/- 0.57°) |
| 2022 | Hyundai | Tucson | VOR | No Offset | LED Projector | 66 | 145 | 0° +0.11°, -0° |
| 2022 | Subaru | Outback | VOR | No Offset | LED Projector | 81 | 123 | CBI |
| 2022 | Tesla | Model 3 | VOR | No Offset | LED Projector | 70 | 1.50 | 0° +/- 0.2° |
| 2022 | Toyota | Camry | VOR | No Offset | LED Projector | 72 | 146 | 0° +0.38°, -0.57° (SAE J599) |
| 2018 | Ford | F-150 | VOR | N/A | Halogen Reflector | 62 | 1.1 | SAE J599 |
| 2018 | Toyota | Camry | VOR | N/A | LED Projector | 62 | 1.1 | SAE J599 |

## Roadway Test Coordinates

The following table shows the measurement locations for each FMVSS No. 108 test point for on-vehicle testing and calculation of roadway analysis.

*Table 6. Test Locations for Tested Vehicles – Above the Horizon*

| | Coordinate | 1 | 2 | 3 | 4a | 4b | 4c | 4d | 5a | 5b | 5c | 6a | 6b | 6c | 7a | 7b | 7c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2022 Chevrolet Equinox** | **Forward** | 16.50 | 16.50 | 33.28 | **10.12** | 10.11 | 9.96 | 9.46 | 15.18 | 15.07 | 14.75 | 30.35 | 30.31 | 30.15 | 30.36 | - | 30.32 |
| | **Lateral** | -2.32 | 2.32 | -2.33 | 0.18 | 0.53 | 1.80 | 3.60 | -0.40 | -1.80 | -3.60 | -0.79 | -1.80 | -3.60 | 0.53 | - | 1.59 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | - | 1.10 |
| **2023 Ford F-150** | **Forward** | 15.96 | 15.96 | 32.09 | 8.50 | 8.49 | 8.31 | 7.69 | 12.70 | 12.57 | 12.18 | 25.30 | 25.25 | 25.05 | 25.31 | - | 25.27 |
| | **Lateral** | -2.23 | 2.23 | -2.24 | 0.15 | 0.44 | 1.80 | 3.60 | -0.33 | -1.80 | -3.60 | -0.66 | -1.80 | -3.60 | 0.44 | - | 1.32 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | - | 1.10 |
| **2019 Ford Fusion** | **Forward** | 18.17 | 18.17 | 36.55 | 14.46 | 14.44 | 14.35 | 14.46 | 21.63 | 21.57 | 21.34 | 43.17 | 43.15 | 43.03 | 43.18 | 43.15 | 43.13 |
| | **Lateral** | -2.54 | 2.54 | -2.55 | 0.25 | 0.75 | 1.80 | 0.00 | -0.56 | -1.80 | -3.60 | -1.13 | -1.80 | -3.60 | 0.75 | 1.80 | 2.25 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| **2022 Hyundai Tucson** | **Forward** | 19.02 | 19.02 | 38.27 | 16.76 | 16.74 | 16.66 | 16.37 | 25.09 | 25.03 | 24.83 | 50.08 | 50.06 | 49.97 | 50.09 | 50.06 | 50.03 |
| | **Lateral** | -2.66 | 2.66 | -2.67 | 0.29 | 0.87 | 1.80 | 3.60 | -0.65 | -1.80 | -3.60 | -1.31 | -1.80 | -3.60 | 0.87 | 1.80 | 2.62 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| **2022 Subaru Outback** | **Forward** | 16.93 | 16.93 | 34.06 | 11.12 | 11.11 | 10.98 | 10.52 | 16.64 | 16.54 | 16.24 | 33.17 | 33.14 | 32.99 | 33.18 | - | 33.14 |
| | **Lateral** | -2.37 | 2.37 | -2.37 | 0.19 | 0.58 | 1.80 | 3.60 | -0.43 | -1.80 | -3.60 | -0.87 | -1.80 | -3.60 | 0.58 | - | 1.73 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | - | 1.10 |
| **2022 Tesla Model 3** | **Forward** | 18.46 | 18.46 | 37.14 | 15.25 | 15.23 | 15.14 | 14.81 | 22.82 | 22.75 | 22.54 | 45.54 | 45.52 | 45.41 | 45.55 | 45.52 | 45.49 |
| | **Lateral** | -2.58 | 2.58 | -2.59 | 0.26 | 0.79 | 1.80 | 3.60 | -0.59 | -1.80 | -3.60 | -1.19 | -1.80 | -3.60 | 0.79 | 1.80 | 2.38 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| **2022 Toyota Camry** | **Forward** | 18.26 | 18.26 | 36.74 | 14.70 | 14.69 | 14.59 | 14.25 | 22.00 | 21.94 | 21.71 | 43.91 | 43.89 | 43.78 | 43.92 | 43.89 | 43.86 |
| | **Lateral** | -2.55 | 2.55 | -2.56 | 0.25 | 0.76 | 1.80 | 3.60 | -0.57 | -1.80 | -3.60 | -1.15 | -1.80 | -3.60 | 0.76 | 1.80 | 2.29 |
| | **Vertical** | 2.00 | 2.00 | 2.00 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| **ADB Test Fixtures** | **Forward** | 19.64 | 19.64 | 39.52 | 18.43 | 18.41 | 18.34 | 18.07 | 27.59 | 27.54 | 27.36 | 55.08 | 55.07 | 54.98 | 55.09 | 55.07 | 55.03 |
| | **Lateral** | -2.7 | 2.7 | -2.8 | 0.3 | 1 | 1.8 | 3.6 | -0.7 | -1.8 | -3.6 | -1.4 | -1.8 | -3.6 | 1 | 1.8 | 2.9 |
| | **Vertical** | 2 | 2 | 2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |

*Table 7. Test Point Coordinates for Aim Effects Tested Vehicles - Test Locations at or Below the Horizontal*

| | Coordinate | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2022 Chevrolet Equinox** | **Forward** | 10.00 | 10.00 | 60.62 | 42.30 | 42.23 | 24.24 | 17.96 | 17.96 | 17.57 | 17.57 | 9.06 | 8.53 | 8.53 |
| | **Lateral** | -0.70 | -1.41 | 1.38 | 0.00 | -2.58 | 0.85 | -2.84 | 2.84 | -4.71 | 4.71 | 0.63 | -3.11 | 3.11 |
| | **Vertical** | 0.84 | 0.84 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2023 Ford F-150** | **Forward** | 10.00 | 10.00 | 64.92 | 45.30 | 45.22 | 25.95 | 19.23 | 19.23 | 18.81 | 18.81 | 9.70 | 9.14 | 9.14 |
| | **Lateral** | -0.71 | -1.42 | 1.47 | 0.00 | -2.77 | 0.91 | -3.05 | 3.05 | -5.04 | 5.04 | 0.68 | -3.33 | 3.33 |
| | **Vertical** | 0.88 | 0. 88 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2019 Ford Fusion** | **Forward** | 10.00 | 10.00 | 50.02 | 34.91 | 34.84 | 20.00 | 14.82 | 14.82 | 14.49 | 14.49 | 7.48 | 7.04 | 7.04 |
| | **Lateral** | -0.71 | -1.42 | 1.14 | 0.00 | -2.13 | 0.70 | -2.35 | 2.35 | -3.88 | 3.88 | 0.52 | -2.56 | 2.56 |
| | **Vertical** | 0.72 | 0.72 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2022 Hyundai Tucson** | **Forward** | 10.00 | 10.00 | 44.27 | 30.89 | 30.83 | 17.70 | 13.12 | 13.12 | 12.83 | 12.83 | 6.62 | 6.23 | 6.23 |
| | **Lateral** | -0.71 | -1.42 | 1.00 | 0.00 | -1.89 | 0.62 | -2.08 | 2.08 | -3.44 | 3.44 | 0.46 | -2.27 | 2.27 |
| | **Vertical** | 0.66 | 0.66 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2022 Subaru Outback** | **Forward** | 10.00 | 10.00 | 58.36 | 40.72 | 40.65 | 23.33 | 17.29 | 17.29 | 16.91 | 16.91 | 8.72 | 8.21 | 8.21 |
| | **Lateral** | -0.71 | -1.42 | 1.32 | 0.00 | -2.49 | 0.81 | -2.74 | 2.74 | -4.53 | 4.53 | 0.61 | -2.99 | 2.99 |
| | **Vertical** | 0.81 | 0.81 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2022 Tesla Model 3** | **Forward** | 10.00 | 10.00 | 48.05 | 33.53 | 33.47 | 19.21 | 14.24 | 14.24 | 13.92 | 13.92 | 7.18 | 6.76 | 6.76 |
| | **Lateral** | -0.71 | -1.42 | 1.09 | 0.00 | -2.05 | 0.67 | -2.25 | 2.25 | -3.73 | 3.73 | 0.50 | -2.46 | 2.46 |
| | **Vertical** | 0.7 | 0.7 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **2022 Toyota Camry** | **Forward** | 10.10 | 10.10 | 49.41 | 34.48 | 34.41 | 19.75 | 14.64 | 14.64 | 14.32 | 14.32 | 7.38 | 6.95 | 6.95 |
| | **Lateral** | -0.71 | -1.42 | 1.12 | 0.00 | -2.10 | 0.69 | -2.32 | 2.32 | -3.84 | 3.84 | 0.52 | -2.53 | 2.53 |
| | **Vertical** | 0.72 | 0.72 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| **ADB Test Fixtures** | **Forward** | 10.1 | 10.1 | 40.1 | 27.98 | 27.93 | 16.03 | 11.88 | 11.88 | 11.62 | 11.62 | 5.99 | 5.64 | 5.64 |
| | **Lateral** | -0.7 | -1.4 | 0.91 | 0 | -1.71 | 0.56 | -1.88 | 1.88 | -3.11 | 3.11 | 0.42 | -2.05 | 2.05 |
| | **Vertical** | 0.62 | 0.62 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

## Test Vehicle and Lamp Fixture Images

The following are images of the front ends of each vehicle tested.

## 2022 Chevrolet Equinox Limited

A photograph of the 2022 Chevrolet Equinox Limited is shown in Figure 8.

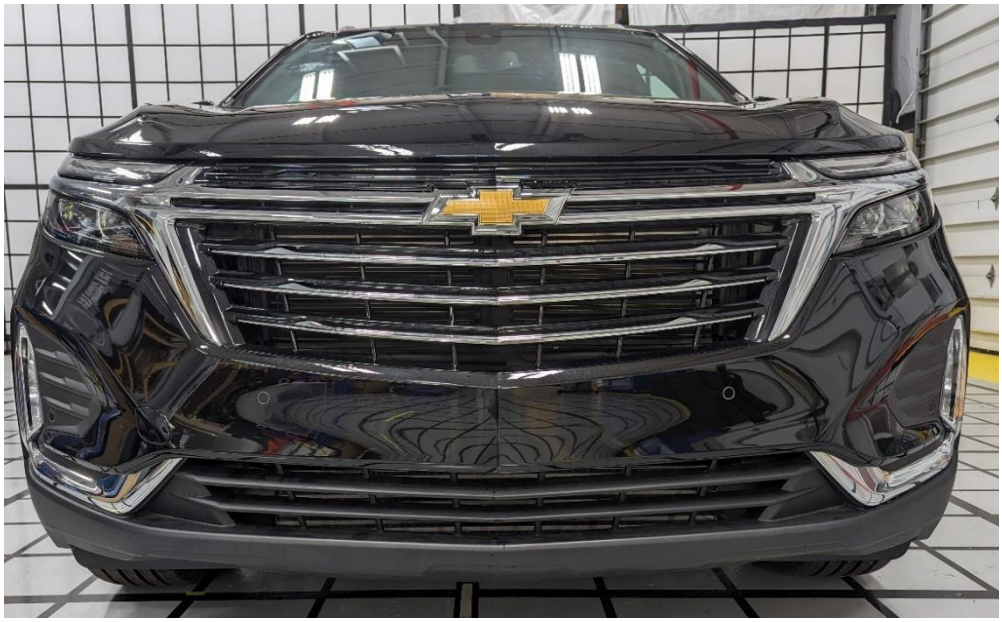

*Figure 8. The 2022 Chevrolet Equinox Limited – Front*

### 2023 Ford F-150 4x4

A photograph of the 2023 Ford F-150 4x4 is shown in Figure 9.


*Figure 9. The 2023 Ford F-150 4x4 – Front*

### 2019 Ford Fusion Hybrid

A photograph of the 2019 Ford Fusion Hybrid is shown in Figure 10.


*Figure 10. The 2019 Ford Fusion Hybrid – Front*

### 2022 Hyundai Tucson Limited

A photograph of the 2022 Hyundai Tucson Limited is shown in Figure 11.

*Figure 11. The 2022 Hyundai Tucson Limited – Front*

### 2022 Subaru Outback Touring

A photograph of the 2022 Subaru Outback Touring is shown in Figure 12.

*Figure 12. The 2022 Subaru Outback Touring – Front*

### 2022 Tesla Model 3

A photograph of the 2022 Tesla Model 3 is shown in Figure 13.


*Figure 13. The 2022 Tesla Model 3 – Front*

### 2022 Toyota Camry SE

A photograph of the 2022 Toyota Camry SE is shown in Figure 14.

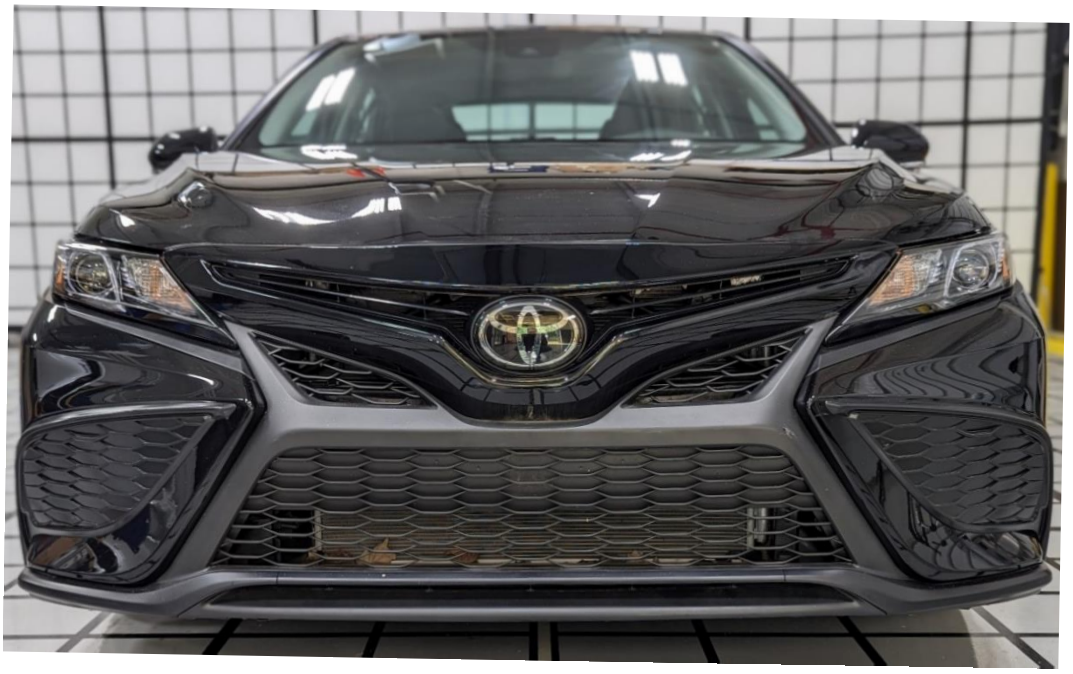

*Figure 14. The 2022 Toyota Camry SE – Front*

### Ford F-150 Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam Test Procedure

A photograph of the Ford F-150 Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam test procedure is shown in Figure 15.

*Figure 15. The Ford F-150 Headlamps on Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam Test Procedure*

### Toyota Camry Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam Test Procedure

A photograph of the Toyota Camry Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam test procedure is shown in Figure 16.

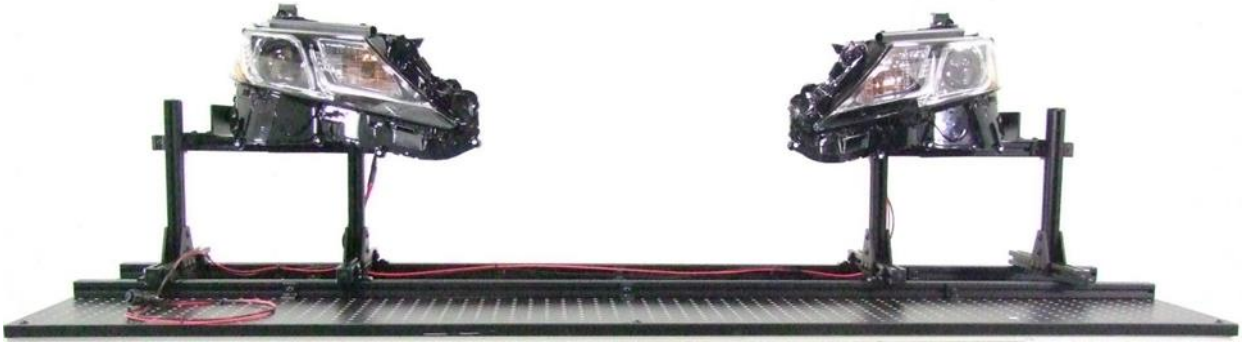

*Figure 16. The Toyota Camry Headlamps on Stimulus Lamp Fixture from FMVSS No. 108 Adaptive Driving Beam Test Procedure*

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## Effects of Headlamp Mounting Height on Illuminance

This section presents the results showing the effects of headlamp mounting height on lower beam illuminance measured via laboratory methods. On-vehicle measurements were performed for height effects testing; however, as shown in the Voyzey et al. (in press) report, *On-Vehicle Lower Beam Performance Test Examination*, those tests performed poorly in accurately measuring headlamp illuminance and in repeatability of test results, particularly when examining mounting height effects. For this reason, those results were not considered for this effort. From the lab testing results, illuminance as a function of lamp height was calculated two ways: with no offset and with the recommended aim offsets for mounting height in SAE J599.

### Effects of Headlamp Mounting Height on Illuminance Results – No Aim Angle Offsets

This section presents the results of testing to assess the effect of headlamp mounting height on illuminance in which the lower beam headlamp mounting height was calculated over a range of 22 inches to 54 inches in 2-inch increments. A complete set of illuminance values was calculated at each of the 17 mounting height increments for each vehicle. For the sake of space concerns, only the minimum, nominal, and maximum mounting heights are shown in the following tables. The data for all seven vehicles at each of the 17 mounting height increments can be found in Appendix B of this report.

*Table 8. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Mounting Heights – Measurement Locations Above the Horizon*

| | Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **2022 Chevrolet Equinox** | **54.00** | 1.6 | 1.2 | 0.3 | 407.9 | 405.0 | 301.2 | 105.6 | 203.8 | 113.3 | 79.2 | 36.8 | 22.2 | 16.4 | 55.1 | - | 55.4 |
| | **32.88** | 0.7 | 0.7 | 0.4 | 3.3 | 3.9 | 2.6 | 7.3 | 1.8 | 1.0 | 2.3 | 0.5 | 0.4 | 0.6 | 0.7 | - | 0.7 |
| | **22.00** | 0.6 | 0.5 | 0.4 | 6.2 | 6.2 | 3.2 | 1.0 | 5.1 | 1.6 | 0.8 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.5 |
| **2023 Ford F-150** | **54.00** | 2.1 | 2.9 | 0.7 | 490.1 | 525.4 | 252.9 | 69.9 | 326.1 | 170.9 | 65.7 | 73.8 | 47.0 | 35.2 | 113.4 | - | 114.7 |
| | **34.65** | 2.3 | 3.4 | 0.6 | 9.6 | 9.6 | 8.8 | 4.1 | 6.1 | 3.4 | 2.3 | 2.7 | 1.4 | 1.2 | 3.7 | - | 4.4 |
| | **22.00** | - | - | 0.7 | 13.7 | 13.2 | 10.5 | 3.6 | 5.5 | 3.5 | 2.1 | 1.5 | 1.1 | 0.8 | 1.8 | - | 1.8 |
| **2019 Ford Fusion** | **54.00** | 0.7 | 0.8 | 0.3 | 107.4 | 129.0 | 43.3 | 99.9 | 49.8 | 24.1 | 9.5 | 7.5 | 5.8 | 4.2 | 9.2 | 7.0 | 5.9 |
| | **29.13** | 0.5 | 0.7 | 0.3 | 2.8 | 2.5 | 1.5 | 2.9 | 1.3 | 0.9 | 0.7 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| | **22.00** | 0.5 | 0.6 | 0.3 | 2.6 | 2.2 | 1.5 | 2.6 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |
| **2022 Hyundai Tucson** | **54.00** | 1.7 | 2.0 | 0.6 | 280.1 | 273.2 | 228.6 | 127.1 | 80.3 | 65.9 | 67.5 | 12.1 | 7.5 | 9.0 | 24.6 | 24.1 | 22.9 |
| | **25.98** | 0.9 | 1.3 | 0.5 | 3.2 | 3.1 | 2.6 | 1.0 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| | **22.00** | 1.0 | 1.1 | 0.5 | 3.0 | 2.8 | 2.6 | 0.9 | 1.3 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **2022 Subaru Outback** | **54.00** | 1.5 | 1.8 | 0.7 | 489.9 | 444.1 | 301.7 | 113.0 | 242.7 | 126.3 | 65.7 | 45.1 | 36.6 | 23.1 | 72.4 | - | 61.9 |
| | **31.89** | 0.6 | 1.0 | 0.6 | 5.4 | 5.6 | 4.3 | 0.6 | 2.9 | 2.2 | 1.1 | 1.2 | 1.0 | 0.6 | 1.6 | - | 1.5 |
| | **22.00** | 0.3 | 0.7 | 0.5 | 4.5 | 4.5 | 3.6 | 0.4 | 2.4 | 2.3 | 0.9 | 0.7 | 0.7 | 0.6 | 0.9 | - | 0.9 |
| **2022 Tesla Model 3** | **54.00** | 0.6 | 2.3 | 0.4 | 356.5 | 294.9 | 333.6 | 232.7 | 66.6 | 81.2 | 47.7 | 10.2 | 11.5 | 11.0 | 8.7 | 10.3 | 13.4 |
| | **27.17** | 0.5 | 0.6 | 0.2 | 3.6 | 5.0 | 4.1 | 2.4 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| | **22.00** | 0.6 | 0.6 | 0.2 | 2.8 | 4.0 | 3.3 | 1.9 | 1.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **2022 Toyota Camry** | **54.00** | 1.6 | 1.8 | 0.5 | 303.0 | 285.3 | 202.2 | 57.8 | 117.5 | 52.4 | 33.6 | 20.9 | 12.1 | 5.9 | 48.1 | 48.4 | 46.4 |
| | **28.25** | 1.0 | 1.1 | 0.5 | 4.2 | 4.3 | 3.3 | 1.6 | 2.0 | 1.5 | 1.2 | 0.9 | 0.7 | 0.6 | 1.6 | 1.7 | 1.8 |
| | **22.00** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |
| **2018 Ford F-150 (ADB)** | **54.00** | 1.2 | 1.1 | 0.51 | 142.4 | 158.0 | 94.7 | 12.9 | 37.5 | 18.7 | 9.1 | 5.7 | 5.0 | 2.8 | 12.6 | 13.5 | 11.6 |
| | **24.41** | 0.7 | 0.7 | 0.4 | 2.3 | 2.4 | 2.0 | 1.2 | 1.1 | 1.0 | 0.9 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| | **22.00** | 0.7 | 0.6 | 0.4 | 2.3 | 2.3 | 1.9 | 1.1 | 1.1 | 0.9 | 0.9 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.5 |
| **2018 Toyota Camry (ADB)** | **54.00** | 0.9 | 1.0 | 0.2 | 248.5 | 218.8 | 134.2 | 49.8 | 70.6 | 22.3 | 25.3 | 8.2 | 6.5 | 3.6 | 29.0 | 26.3 | 21.4 |
| | **24.41** | 0.7 | 0.7 | 0.3 | 1.6 | 1.7 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.0 |
| | **22.00** | 0.6 | 0.7 | 0.3 | 1.5 | 1.6 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 1.1 | 1.0 | 0.9 |
| **Minimum** | | **0.3** | **0.5** | **0.2** | **1.5** | **1.6** | **1.4** | **0.4** | **0.7** | **0.4** | **0.4** | **0.4** | **0.3** | **0.2** | **0.4** | **0.4** | **0.3** |
| **Maximum** | | **2.3** | **3.4** | **0.7** | **490.1** | **525.4** | **333.6** | **232.7** | **326.1** | **170.9** | **79.2** | **73.8** | **47.0** | **35.2** | **113.4** | **48.4** | **114.7** |
| **Average** | | **1.0** | **1.4** | **0.4** | **92.6** | **95.1** | **67.9** | **26.7** | **37.4** | **17.4** | **11.3** | **6.5** | **3.9** | **3.3** | **11.8** | **6.8** | **11.9** |

*Table 9. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Mounting Heights – Measurement Locations at or Below the Horizon*

| | Height | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (inches) | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **2022 Chevrolet Equinox** | **54.00** | 195.8 | 173.1 | 16.5 | 29.1 | 21.6 | 65.4 | 60.8 | 67.9 | 46.8 | 47.7 | 14.6 | 7.7 | 3.9 |
| | **32.88** | 430.8 | 254.5 | 15.4 | 32.1 | 18.2 | 90.8 | 79.6 | 95.7 | 62.0 | 65.4 | 277.4 | 126.6 | 121.6 |
| | **22.00** | 13.3 | 23.8 | 11.9 | 26.0 | 8.8 | 98.2 | 81.5 | 99.8 | 48.8 | 62.2 | 431.9 | 159.1 | 163.4 |
| **2023 Ford F-150** | **54.00** | 120.2 | 90.9 | 18.5 | 30.0 | 23.8 | 41.6 | 27.5 | 33.5 | 16.2 | 19.2 | 32.2 | 11.4 | 12.9 |
| | **34.65** | 440.0 | 282.6 | 19.3 | 37.2 | 15.9 | 84.9 | 50.7 | 54.5 | 25.7 | 26.8 | 148.3 | 49.0 | 48.6 |
| | **22.00** | 29.8 | 7.8 | 16.3 | 32.3 | 6.5 | 114.4 | 66.4 | 79.2 | 33.2 | 28.0 | 307.6 | 75.7 | 80.3 |
| **2019 Ford Fusion** | **54.00** | 60.9 | 32.6 | 13.7 | 25.0 | 12.9 | 38.3 | 9.4 | 11.7 | 4.9 | 6.0 | 30.6 | 10.5 | 11.2 |
| | **29.13** | 182.9 | 74.9 | 10.4 | 27.0 | 12.6 | 71.8 | 18.0 | 23.2 | 7.5 | 9.3 | 131.7 | 12.8 | 16.5 |
| | **22.00** | 14.5 | 12.7 | 7.5 | 21.3 | 10.2 | 71.5 | 23.0 | 30.0 | 10.1 | 10.9 | 244.2 | 15.8 | 19.6 |
| **2022 Hyundai Tucson** | **54.00** | 159.7 | 130.8 | 37.6 | 57.4 | 50.1 | 80.1 | 42.8 | 51.2 | 28.6 | 29.4 | 29.3 | 10.9 | 11.1 |
| | **25.98** | 348.9 | 70.0 | 41.4 | 86.4 | 66.2 | 223.5 | 189.5 | 225.2 | 102.8 | 129.7 | 476.1 | 143.2 | 195.2 |
| | **22.00** | 15.3 | 7.0 | 38.2 | 80.2 | 53.9 | 246.3 | 215.9 | 254.4 | 111.0 | 140.4 | 664.4 | 188.0 | 260.2 |
| **2022 Subaru Outback** | **54.00** | 144.6 | 120.3 | 23.1 | 37.1 | 30.7 | 57.7 | 46.0 | 58.1 | 31.1 | 37.9 | 32.3 | 10.8 | 11.9 |
| | **31.89** | 534.0 | 286.2 | 25.2 | 52.1 | 36.2 | 116.1 | 75.4 | 103.9 | 46.7 | 62.4 | 248.7 | 72.8 | 88.0 |
| | **22.00** | 17.5 | 5.9 | 20.6 | 50.2 | 24.1 | 140.9 | 87.8 | 125.0 | 46.9 | 66.4 | 471.2 | 106.3 | 145.1 |
| **2022 Tesla Model 3** | **54.00** | 133.8 | 131.8 | 21.5 | 30.3 | 31.5 | 44.7 | 54.7 | 50.8 | 37.5 | 32.6 | 29.1 | 11.1 | 11.3 |
| | **27.17** | 122.7 | 237.5 | 14.9 | 46.6 | 50.3 | 177.5 | 125.1 | 156.5 | 69.7 | 94.0 | 267.9 | 130.4 | 109.9 |
| | **22.00** | 7.9 | 5.4 | 9.8 | 35.7 | 38.3 | 213.0 | 189.8 | 323.9 | 78.6 | 207.8 | 414.0 | 185.0 | 176.7 |
| **2022 Toyota Camry** | **54.00** | 117.4 | 106.9 | 23.8 | 32.9 | 27.3 | 47.0 | 42.3 | 43.1 | 28.4 | 29.4 | 29.8 | 10.9 | 11.4 |
| | **28.25** | 494.4 | 113.5 | 39.7 | 67.9 | 29.8 | 126.8 | 85.1 | 96.6 | 55.0 | 56.2 | 238.6 | 95.9 | 95.9 |
| | **22.00** | 25.7 | 11.0 | 39.4 | 71.8 | 20.3 | 179.9 | 88.1 | 114.8 | 53.0 | 53.4 | 387.9 | 131.0 | 130.2 |
| **2018 Ford F-150 (ADB)** | **54.00** | 67.1 | 56.0 | 28.3 | 33.2 | 21.1 | 29.7 | 23.7 | 23.5 | 18.3 | 15.8 | 7.0 | 2.9 | 3.5 |
| | **24.41** | 57.8 | 25.1 | 35.7 | 60.6 | 24.9 | 168.1 | 74.4 | 78.2 | 40.4 | 35.5 | 202.3 | 92.8 | 81.0 |
| | **22.00** | 20.9 | 13.3 | 33.0 | 57.7 | 23.3 | 179.9 | 72.9 | 79.4 | 38.9 | 33.7 | 254.5 | 110.8 | 95.7 |
| **2018 Toyota Camry (ADB)** | **54.00** | 89.5 | 81.6 | 41.1 | 53.0 | 43.8 | 39.8 | 28.6 | 31.12 | 19.6 | 22.2 | 29.3 | 10.4 | 10.8 |
| | **24.41** | 68.3 | 33.0 | 61.1 | 115.6 | 37.1 | 250.23 | 146.0 | 167.1 | 77.7 | 76.2 | 308.6 | 120.9 | 126.5 |
| | **22.00** | **19.8** | 10.0 | 60.78 | 116.0 | 29.8 | 270.1 | 154.3 | 179.2 | 82.5 | 80.9 | 413.8 | 140.3 | 146.1 |
| **Minimum** | | **7.9** | **5.4** | **7.5** | **21.3** | **6.5** | **29.7** | **9.4** | **11.7** | **4.9** | **6.0** | **7.0** | **2.9** | **3.5** |
| **Maximum** | | **534.0** | **286.2** | **61.1** | **116.0** | **66.2** | **270.1** | **215.9** | **323.9** | **111.0** | **207.8** | **664.4** | **188.0** | **260.2** |
| **Average** | | **240.9** | **157.6** | **28.1** | **49.6** | **33.1** | **98.9** | **69.5** | **81.8** | **42.9** | **48.5** | **137.0** | **48.7** | **51.7** |

A general trend observed during testing was that there is a wider range of illuminance values for measurement locations closer to the test vehicle. Based on the geometry of the performance evaluation, the change in vertical angle observed is smaller for the same change in mounting height at further distances than closer distances. Each vehicle performs differently based on its geometry and beam pattern, but this is generally the trend.

Due to this, visibility far down the roadway does not vary that much as the mounting height changes. Looking at the results for measurement locations 10, 11, and 12 of Table 9, there is only a small amount of variation between the illuminance at a 22-inch mounting height and a 54-inch mounting height, roughly no more than 20 lux. The opposite is true of measurement locations closer to the vehicle such as measurement locations 18, 19, and 20 of Table 9. At these locations, illuminance is much higher, generally by more than 100 lux, at a 22-inch mounting height compared to a 54-inch mounting height. The exception being the Ford Fusion which did not vary in illuminance much at measurement locations 19 and 20.

The glare control measurement locations follow the same trend, except there is a bigger difference between lower and higher mounting heights at measurement locations further down the roadway compared to the visibility measurement locations. Measurement locations closer to the vehicle, such as 4a and 5a, had large differences in illuminance, all 100 lux or more, between the 22-inch and 54-inch mounting heights. Glare control measurement locations further from the vehicle, such as 6a and 7a, did vary less than those closer to the vehicle, but still varied a significant amount. Most vehicles saw 1 lux or less at the lowest mounting height for these locations but increased to anywhere from 5 lux to over 100 lux.

From these observations the conclusion can be drawn that mounting height has a significant effect on glare control and, to a lesser extent, an effect on roadway visibility.

## Headlamp Aim Angle Assessment

This section presents the results of headlamp aim angle testing using both on-vehicle and laboratory measurement methods.

### On-Vehicle Test Results

This section presents the results of aim effects testing in which the lower beam headlamp vertical aim angle was adjusted over a range of -0.70° to +0.70° in 0.10° increments, as well as being tested at -0.76° and +0.76° (i.e., at 17 vertical aim angles). A complete set of illuminance measurements was made at each of the 17 vertical aim angle increments for each vehicle. The following tables present on-vehicle measured illuminance data for maximum, nominal, and minimum aim angles. The on-vehicle measured illuminance data for all seven vehicles at each of the 17 vertical aim angle increments can be found in Appendix C. (Note that Appendix C contains the average values from repeatability testing that was performed for the 2022 Toyota Camry.)

*Table 10. On-Vehicle Tested Illuminance Data for Maximum, Nominal, and Minimum Aim Angles – Test Locations Above the Horizon*

| | Aim Angle (degrees) | Measurement Location Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **2022 Chevrolet Equinox** | **0.76** | 2.3 | 2.0 | 0.6 | 6.5 | 9.0 | 22.9 | 20.2 | 5.4 | 4.0 | 10.0 | 15.1 | 9.6 | 4.1 | 19.7 | - | 17.8 |
| | **0.00** | 1.8 | 1.9 | 1.1 | 5.8 | 6.7 | 5.8 | 9.9 | 2.6 | 2.1 | 2.7 | 1.3 | 1.0 | 0.8 | 1.1 | - | 1.2 |
| | **-0.76** | 1.7 | 1.6 | 1.2 | 8.5 | 12.1 | 4.2 | 5.7 | 2.7 | 2.2 | 2.3 | 1.2 | 0.9 | 0.9 | 0.9 | - | 0.8 |
| **2023 Ford F-150** | **0.76** | 3.9 | 3.8 | 1.3 | 60.9 | 74.3 | 49.7 | 20.8 | 144.0 | 13.3 | 18.7 | 73.6 | 51.4 | 7.4 | 50.8 | - | 73.7 |
| | **0.00** | 3.8 | 3.8 | 1.3 | 15.5 | 17.9 | 17.4 | 9.8 | 10.4 | 6.2 | 3.7 | 5.9 | 3.4 | 1.8 | 5.0 | - | 5.8 |
| | **-0.76** | 3.2 | 3.5 | 1.6 | 13.6 | 14.6 | 10.5 | 6.2 | 8.3 | 5.6 | 3.9 | 2.6 | 1.9 | 1.6 | 1.9 | - | 2.2 |
| **2019 Ford Fusion** | **0.76** | 1.4 | 0.8 | 0.7 | 4.8 | 3.3 | 10.2 | 12.6 | 7.1 | 9.7 | 6.0 | 8.5 | 5.7 | 6.0 | 5.7 | 4.9 | 4.7 |
| | **0.00** | 1.4 | 0.8 | 0.7 | 3.5 | 2.8 | 2.5 | 8.9 | 2.5 | 2.1 | 2.3 | 1.1 | 0.7 | 0.8 | 0.6 | 0.5 | 0.4 |
| | **-0.76** | 1.4 | 0.8 | 0.6 | 3.3 | 2.9 | 1.7 | 2.1 | 2.2 | 1.9 | 1.0 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 |
| **2022 Hyundai Tucson** | **0.76** | 2.0 | 1.3 | 0.8 | 5.4 | 4.9 | 3.5 | 1.3 | 5.9 | 5.9 | 1.9 | 17.3 | 17.4 | 9.6 | 16.4 | 14.5 | 13.4 |
| | **0.00** | 1.8 | 1.2 | 0.8 | 4.1 | 4.0 | 2.8 | 1.1 | 2.4 | 2.1 | 1.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.8 | 0.7 |
| | **-0.76** | 1.7 | 1.2 | 0.7 | 4.3 | 3.9 | 2.6 | 1.1 | 2.1 | 1.8 | 1.8 | 0.6 | 0.6 | 0.4 | 0.6 | 0.5 | 0.5 |
| **2022 Subaru Outback** | **0.76** | 2.2 | 1.7 | 1.0 | 17.0 | 16.5 | 7.6 | 2.7 | 21.0 | 6.0 | 3.1 | 80.3 | 48.9 | 9.2 | 37.1 | - | 25.3 |
| | **0.00** | 1.7 | 1.3 | 1.0 | 8.5 | 7.4 | 4.5 | 1.6 | 4.6 | 3.7 | 2.2 | 2.6 | 1.9 | 1.1 | 2.8 | - | 1.3 |
| | **-0.76** | 1.4 | 1.1 | 0.8 | 7.8 | 6.6 | 4.5 | 1.6 | 4.3 | 3.8 | 2.1 | 1.3 | 1.3 | 1.0 | 1.3 | - | 0.8 |
| **2022 Tesla Model 3** | **0.76** | 1.4 | 1.4 | 1.1 | 6.9 | 6.0 | 6.2 | 10.8 | 13.4 | 6.1 | 2.5 | 23.8 | 22.9 | 7.6 | 15.7 | 24.1 | 24.0 |
| | **0.00** | 1.4 | 1.3 | 1.0 | 4.8 | 4.4 | 3.4 | 4.2 | 3.0 | 2.5 | 1.8 | 1.2 | 0.9 | 0.6 | 0.9 | 1.1 | 1.1 |
| | **-0.76** | 1.5 | 1.4 | 0.5 | 4.2 | 4.2 | 3.0 | 3.2 | 3.2 | 2.9 | 1.9 | 0.9 | 0.7 | 0.5 | 0.7 | 0.7 | 0.5 |
| **2022 Toyota Camry (average)** | **0.76** | 1.8 | 1.4 | 0.7 | 8.5 | 7.5 | 4.8 | 2.4 | 11.2 | 4.7 | 2.4 | 31.6 | 23.0 | 4.6 | 33.1 | 29.1 | 26.2 |
| | **0.00** | 1.3 | 1.1 | 0.8 | 4.7 | 4.3 | 3.2 | 1.7 | 2.7 | 2.1 | 1.6 | 1.4 | 1.3 | 0.7 | 1.5 | 1.5 | 1.4 |
| | **-0.76** | 1.1 | 0.9 | 0.7 | 4.6 | 4.1 | 3.2 | 1.7 | 2.5 | 2.2 | 1.5 | 0.7 | 0.7 | 0.5 | 0.8 | 0.7 | 0.6 |
| **Minimum** | | **1.1** | **0.8** | **0.5** | **3.3** | **2.8** | **1.7** | **1.1** | **2.1** | **1.8** | **1.0** | **0.6** | **0.4** | **0.4** | **0.4** | **0.4** | **0.3** |
| **Maximum** | | **3.9** | **4.0** | **1.6** | **60.9** | **74.3** | **49.7** | **20.8** | **144.0** | **13.3** | **18.7** | **80.3** | **51.4** | **9.6** | **51.2** | **29.1** | **73.7** |
| **Average** | | **1.9** | **1.6** | **0.9** | **8.0** | **8.4** | **7.1** | **5.8** | **7.2** | **3.6** | **2.8** | **8.1** | **5.4** | **1.8** | **6.7** | **3.8** | **6.3** |

*Table 11. On-Vehicle Tested Illuminance Data for Maximum, Nominal, and Minimum Aim Angles – Test Locations at or Below the Horizon*

| | Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **2022 Chevrolet Equinox** | **0.76** | 389.0 | 294.7 | 15.0 | 28.7 | 28.0 | 56.8 | 81.9 | 78.1 | 64.4 | 45.6 | 200.9 | 120.0 | 86.2 |
| | **0.00** | 85.0 | 33.0 | 14.4 | 31.2 | 29.0 | 66.8 | 87.7 | 84.8 | 68.3 | 49.4 | 270.3 | 143.3 | 101.9 |
| | **-0.76** | 7.4 | 5.6 | 0.8 | 6.5 | 2.0 | 70.8 | 79.0 | 86.5 | 66.1 | 45.8 | 353.0 | 170.0 | 120.3 |
| **2023 Ford F-150** | **0.76** | 565.9 | 259.1 | 16.1 | 17.1 | 30.8 | 45.7 | 50.5 | 38.7 | 29.4 | 23.8 | 137.8 | 47.2 | 38.1 |
| | **0.00** | 205.4 | 16.3 | 18.5 | 26.3 | 28.9 | 84.7 | 75.0 | 47.7 | 37.3 | 24.6 | 124.9 | 59.8 | 48.2 |
| | **-0.76** | 14.8 | 9.7 | 3.0 | 14.0 | 5.0 | 105.7 | 77.7 | 56.0 | 43.2 | 24.3 | 150.9 | 71.1 | 62.1 |
| **2019 Ford Fusion** | **0.76** | 160.9 | 135.6 | 8.5 | 25.3 | 28.7 | 49.1 | 36.3 | 15.4 | 11.4 | 7.6 | 109.8 | 21.3 | 16.8 |
| | **0.00** | 64.6 | 42.4 | 6.7 | 24.0 | 25.9 | 53.2 | 42.9 | 19.9 | 13.5 | 9.3 | 147.8 | 23.4 | 17.3 |
| | **-0.76** | 8.9 | 15.9 | 0.5 | 4.5 | 5.2 | 43.6 | 40.8 | 23.3 | 16.8 | 10.9 | 225.7 | 28.2 | 18.4 |
| **2022 Hyundai Tucson** | **0.76** | 667.1 | 503.2 | 37.4 | 73.7 | 74.5 | 163.7 | 175.2 | 152.5 | 114.5 | 85.2 | 324.0 | 141.1 | 124.7 |
| | **0.00** | 99.2 | 45.0 | 32.8 | 79.5 | 55.9 | 210.0 | 227.2 | 190.9 | 135.9 | 97.5 | 447.6 | 186.4 | 156.4 |
| | **-0.76** | 14.0 | 10.0 | 1.8 | 13.3 | 10.8 | 196.3 | 227.1 | 216.4 | 146.2 | 102.5 | 569.9 | 231.2 | 196.4 |
| **2022 Subaru Outback** | **0.76** | 585.7 | 153.7 | 19.0 | 35.1 | 30.5 | 57.3 | 63.2 | 52.4 | 47.8 | 30.6 | 136.4 | 68.6 | 43.7 |
| | **0.00** | 378.3 | 36.2 | 23.2 | 58.1 | 41.6 | 69.4 | 71.9 | 54.4 | 48.2 | 31.2 | 162.4 | 86.2 | 51.6 |
| | **-0.76** | 16.9 | 9.9 | 1.4 | 10.7 | 5.2 | 135.5 | 83.4 | 57.2 | 43.8 | 29.3 | 217.8 | 103.8 | 61.6 |
| **2022 Tesla Model 3** | **0.76** | 698.5 | 484.3 | 26.6 | 68.5 | 56.6 | 88.0 | 71.5 | 87.4 | 83.9 | 54.9 | 193.8 | 128.1 | 77.6 |
| | **0.00** | 98.2 | 45.3 | 27.2 | 81.3 | 74.8 | 179.8 | 91.4 | 116.1 | 126.5 | 69.8 | 257.2 | 167.6 | 96.8 |
| | **-0.76** | 11.7 | 7.3 | 3.1 | 17.8 | 17.7 | 193.8 | 137.0 | 224.7 | 165.4 | 101.7 | 340.4 | 202.4 | 135.6 |
| **2022 Toyota Camry (average)** | **0.76** | 558.7 | 263.5 | 28.0 | 48.8 | 43.1 | 85.6 | 95.0 | 70.8 | 63.5 | 41.4 | 172.7 | 97.8 | 70.8 |
| | **0.00** | 111.0 | 22.2 | 31.7 | 74.9 | 47.4 | 136.1 | 112.2 | 74.9 | 60.9 | 40.7 | 233.5 | 120.1 | 85.2 |
| | **-0.76** | 13.3 | 8.0 | 3.1 | 16.0 | 6.8 | 188.2 | 95.8 | 86.5 | 55.6 | 40.0 | 323.9 | 141.2 | 103.1 |
| **Minimum** | | **7.2** | **5.6** | **0.5** | **4.5** | **2.0** | **43.6** | **36.3** | **15.4** | **11.4** | **7.6** | **109.8** | **21.3** | **16.7** |
| **Maximum** | | **698.5** | **503.2** | **39.0** | **87.2** | **81.6** | **224.1** | **251.1** | **224.7** | **175.0** | **102.7** | **569.9** | **231.2** | **196.4** |
| **Average** | | **208.9** | **90.3** | **16.8** | **42.4** | **35.3** | **112.0** | **98.5** | **86.3** | **70.1** | **45.9** | **239.4** | **112.1** | **80.8** |

Table 9 and Table 10 show that headlamp vertical aim angle had a very large effect on on-vehicle measured illuminance levels at test points and subpoints.

For example, looking at one of the Glare Control subpoints, Subpoint 6a, Table 10 shows that the on-vehicle measured illuminance varied from 0.6 to 80.3 lux, depending upon the test vehicle and the vertical aim angle. Looking at one test vehicle, the 2023 Ford F-150 (this can be seen in the detailed data in Appendix C), the on-vehicle measured illuminance varied from 2.6 to 73.6 lux, depending upon the vertical aim angle for this test point. This variability will have a major impact on the glare produced by lower beam headlamps.

Measurement location 10 is the test point on the road that is the furthest in front of the vehicle. So, the illuminance level at this location is very important for drivers' long range on-road visibility when driving with lower beam headlamps. Table 10 shows that the measured illuminance varied from 0.5 to 39.0 lux, depending upon the vertical aim angle. Looking at another test vehicle, the 2022 Hyundai Tucson, the measured illuminance varied from 1.8 to 39.0 lux, depending upon the vertical aim angle. This variability could have a major impact on drivers' long range on-road visibility when driving with lower beam headlamps.

The maximum on-vehicle measured illuminance for a given test location also varied from vehicle to vehicle. For example, at Subpoint 7a (0.5U – 1R), the maximum measured on-vehicle measured illuminance was 50.8 lux for the 2023 Ford F-150 and 5.7 lux for the 2019 Ford Fusion These vehicles from the same manufacturer performed quite differently.

Other test locations, such as the Overhead Sign Visibility test points showed less variation across vertical aim angles. The Overhead Sign Visibility test points (measurement locations 1, 2, and 3) have much lower on-vehicle measured illuminance ranges (2.9, 3.2, and 1.0 lux, respectively).

## Lab Testing Results

This section presents the lab results of aim effects testing for lower beam headlamp vertical aim angles over a range of -0.70° to +0.70° in 0.10° increments and at -0.76° and +0.76° (i.e., at 17 vertical aim angles. The illuminance data calculated from lab measurements for all seven vehicles at each of the 17 vertical aim angle increments can be found in Appendix D.

*Table 12. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Aim Angles – Test Locations Above the Horizon*

| | Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **2022 Chevrolet Equinox** | **0.76** | 1.4 | 2.4 | 0.4 | 5.5 | 6.0 | 16.9 | 20.7 | 7.0 | 13.4 | 13.0 | 17.8 | 10.4 | 11.7 | 38.0 | - | 42.2 |
| | **0.00** | 1.4 | 1.3 | 0.6 | 5.0 | 5.4 | 4.2 | 9.5 | 2.6 | 1.9 | 3.4 | 0.7 | 0.7 | 0.9 | 1.0 | - | 1.0 |
| | **-0.76** | 1.2 | 1.1 | 0.6 | 6.7 | 7.9 | 4.1 | 4.6 | 3.1 | 1.9 | 1.5 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **2023 Ford F-150** | **0.76** | 3.0 | 3.8 | 0.8 | 17.1 | 17.3 | 25.7 | 8.8 | 41.6 | 6.4 | 4.5 | 55.8 | 17.9 | 14.3 | 58.4 | - | 84.0 |
| | **0.00** | 2.7 | 3.8 | 0.7 | 11.3 | 11.1 | 10.3 | 4.3 | 6.7 | 3.8 | 2.5 | 3.0 | 1.6 | 1.2 | 3.4 | - | 4.0 |
| | **-0.76** | 2.0 | 3.3 | 0.8 | 11.1 | 11.1 | 9.3 | 4.1 | 5.5 | 3.4 | 2.1 | 1.6 | 1.2 | 0.9 | 1.7 | - | 1.9 |
| **2019 Ford Fusion** | **0.76** | 0.8 | 1.0 | 0.4 | 3.7 | 3.4 | 2.5 | 3.2 | 5.0 | 4.1 | 3.2 | 6.2 | 5.2 | 3.5 | 7.7 | 6.7 | 6.1 |
| | **0.00** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 2.8 | 1.4 | 1.1 | 0.7 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 | 0.5 |
| | **-0.76** | 0.6 | 0.8 | 0.3 | 3.0 | 2.6 | 1.9 | 2.6 | 1.2 | 1.0 | 0.5 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.4 |
| **2022 Hyundai Tucson** | **0.76** | 1.4 | 1.7 | 0.7 | 4.6 | 4.8 | 3.9 | 2.4 | 5.0 | 2.2 | 2.1 | 11.1 | 8.2 | 9.1 | 23.1 | 23.9 | 23.0 |
| | **0.00** | 1.2 | 1.6 | 0.6 | 3.7 | 3.6 | 3.1 | 1.9 | 2.0 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| | **-0.76** | 1.0 | 1.1 | 0.6 | 3.7 | 3.8 | 3.6 | 1.6 | 1.6 | 1.5 | 1.1 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 |
| **2022 Subaru Outback** | **0.76** | 1.9 | 2.0 | 0.7 | 12.1 | 12.8 | 7.7 | 2.6 | 16.3 | 6.1 | 4.5 | 34.2 | 12.3 | 8.4 | 73.7 | - | 74.4 |
| | **0.00** | 1.4 | 1.4 | 0.7 | 7.8 | 7.8 | 5.4 | 2.4 | 3.8 | 2.8 | 1.9 | 1.6 | 1.0 | 1.0 | 2.3 | - | 2.5 |
| | **-0.76** | 1.0 | 0.9 | 0.6 | 7.3 | 7.1 | 5.1 | 2.2 | 3.4 | 2.5 | 1.6 | 0.9 | 0.8 | 0.7 | 1.0 | - | 1.0 |
| **2022 Tesla Model 3** | **0.76** | 0.8 | 1.2 | 0.3 | 3.5 | 3.9 | 5.3 | 5.1 | 2.2 | 1.6 | 1.7 | 5.6 | 4.9 | 3.6 | 6.9 | 6.2 | 5.4 |
| | **0.00** | 0.8 | 1.0 | 0.3 | 3.9 | 4.0 | 5.6 | 4.6 | 1.1 | 0.9 | 0.7 | 0.4 | 0.4 | 0.3 | 0.4 | 0.5 | 0.5 |
| | **-0.76** | 1.0 | 1.1 | 0.3 | 2.7 | 2.7 | 3.6 | 3.1 | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.2 | 0.3 | 0.5 | 0.5 |
| **2022 Toyota Camry (average)** | **0.76** | 1.3 | 1.6 | 0.6 | 6.0 | 5.3 | 6.1 | 3.5 | 12.7 | 6.5 | 3.2 | 23.7 | 17.7 | 5.6 | 41.0 | 43.5 | 43.2 |
| | **0.00** | 1.0 | 1.1 | 0.6 | 3.6 | 3.5 | 3.5 | 2.0 | 2.1 | 1.7 | 1.2 | 1.0 | 0.9 | 0.6 | 1.6 | 1.7 | 1.7 |
| | **-0.76** | 0.6 | 0.7 | 0.5 | 3.4 | 3.4 | 3.1 | 1.8 | 1.7 | 1.5 | 1.1 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 |
| **Minimum** | | **0.6** | **0.7** | **0.3** | **2.7** | **2.6** | **1.9** | **1.6** | **0.9** | **0.7** | **0.5** | **0.3** | **0.3** | **0.2** | **0.3** | **0.4** | **0.4** |
| **Maximum** | | **3.0** | **4.1** | **0.8** | **17.1** | **17.3** | **25.7** | **20.7** | **41.6** | **13.4** | **13.0** | **55.8** | **17.9** | **14.3** | **73.7** | **43.5** | **84.0** |
| **Average** | | **1.3** | **1.6** | **0.5** | **5.8** | **5.8** | **5.7** | **4.2** | **4.1** | **2.5** | **2.1** | **4.4** | **2.2** | **1.8** | **7.1** | **4.1** | **7.9** |

*Table 13. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Aim Angles – Test Locations at or Below the Horizon*

| | Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **2022 Chevrolet Equinox** | **0.76** | 415.9 | 192.5 | 15.7 | 29.1 | 21.7 | 74.3 | 71.8 | 85.7 | 56.3 | 59.5 | 182.5 | 92.8 | 91.1 |
| | **0.00** | 67.4 | 58.7 | 15.6 | 32.7 | 20.0 | 90.3 | 79.1 | 95.8 | 62.0 | 66.1 | 263.6 | 123.6 | 117.9 |
| | **-0.76** | 6.0 | 6.8 | 0.7 | 5.5 | 1.8 | 96.9 | 83.7 | 100.3 | 54.3 | 65.4 | 343.2 | 145.0 | 141.7 |
| **2023 Ford F-150** | **0.76** | 493.8 | 145.1 | 15.1 | 27.2 | 22.7 | 47.0 | 32.6 | 49.1 | 20.0 | 28.1 | 89.8 | 32.8 | 47.0 |
| | **0.00** | 164.0 | 16.1 | 18.9 | 33.2 | 18.1 | 85.1 | 45.8 | 61.2 | 23.8 | 32.6 | 115.4 | 40.8 | 59.7 |
| | **-0.76** | 11.1 | 6.2 | 2.3 | 14.7 | 1.7 | 95.7 | 61.2 | 101.6 | 28.0 | 35.9 | 167.8 | 50.8 | 79.6 |
| **2019 Ford Fusion** | **0.76** | 171.8 | 72.1 | 13.8 | 23.8 | 12.1 | 51.4 | 13.6 | 34.0 | 6.0 | 9.7 | 49.2 | 11.4 | 21.7 |
| | **0.00** | 40.6 | 19.4 | 10.2 | 22.8 | 11.7 | 56.8 | 17.5 | 41.0 | 7.7 | 12.4 | 62.1 | 12.3 | 23.6 |
| | **-0.76** | 6.9 | 6.1 | 0.9 | 5.7 | 3.9 | 47.3 | 22.3 | 41.9 | 9.9 | 14.5 | 76.1 | 14.2 | 28.1 |
| **2022 Hyundai Tucson** | **0.76** | 550.0 | 333.5 | 39.1 | 71.6 | 59.0 | 157.6 | 134.0 | 184.3 | 75.1 | 124.5 | 282.2 | 95.7 | 213.6 |
| | **0.00** | 77.3 | 14.8 | 41.2 | 68.4 | 61.4 | 210.3 | 177.6 | 255.4 | 91.2 | 160.3 | 388.2 | 123.5 | 286.5 |
| | **-0.76** | 8.9 | 6.4 | 2.1 | 15.4 | 9.3 | 160.6 | 222.3 | 319.2 | 99.7 | 187.9 | 522.6 | 157.9 | 381.9 |
| **2022 Subaru Outback** | **0.76** | 452.3 | 181.5 | 16.5 | 27.9 | 22.4 | 59.9 | 52.5 | 60.9 | 34.1 | 39.5 | 133.3 | 46.9 | 64.9 |
| | **0.00** | 92.1 | 33.8 | 29.3 | 44.3 | 19.7 | 91.3 | 57.2 | 78.0 | 38.0 | 43.3 | 179.2 | 57.7 | 81.7 |
| | **-0.76** | 9.9 | 6.7 | 2.1 | 24.6 | 3.2 | 155.4 | 58.2 | 102.9 | 35.1 | 42.4 | 238.6 | 72.7 | 101.8 |
| **2022 Tesla Model 3** | **0.76** | 353.5 | 226.2 | 28.0 | 44.3 | 35.0 | 80.0 | 72.9 | 107.6 | 50.9 | 91.1 | 217.7 | 85.0 | 111.1 |
| | **0.00** | 27.6 | 25.6 | 19.1 | 46.1 | 29.9 | 107.0 | 81.2 | 166.8 | 52.0 | 139.2 | 283.9 | 117.7 | 154.9 |
| | **-0.76** | 4.9 | 4.5 | 0.7 | 7.6 | 4.6 | 88.4 | 102.3 | 284.8 | 44.0 | 316.6 | 374.8 | 158.2 | 200.8 |
| **2022 Toyota Camry** | **0.76** | 391.0 | 6.5 | 22.5 | 39.3 | 30.6 | 70.1 | 76.9 | 80.7 | 51.6 | 50.6 | 135.6 | 82.0 | 89.2 |
| | **0.00** | 223.7 | 175.3 | 37.6 | 58.5 | 40.7 | 104.4 | 101.1 | 116.6 | 58.1 | 60.1 | 187.7 | 122.9 | 123.0 |
| | **-0.76** | 66.9 | 60.9 | 3.8 | 29.0 | 9.2 | 134.3 | 119.5 | 177.3 | 54.3 | 59.5 | 238.5 | 153.1 | 148.5 |
| **Minimum** | | **4.9** | **4.5** | **0.7** | **5.5** | **1.7** | **47.0** | **13.6** | **33.8** | **6.0** | **9.7** | **49.2** | **11.3** | **21.7** |
| **Maximum** | | **550.0** | **333.5** | **43.2** | **78.5** | **66.6** | **220.0** | **222.3** | **319.2** | **99.7** | **316.6** | **522.6** | **158.2** | **381.9** |
| **Average** | | **166.3** | **57.7** | **18.6** | **36.9** | **23.3** | **102.0** | **80.4** | **120.4** | **46.2** | **76.7** | **214.2** | **85.8** | **122.0** |

Table 12 and Table 13 show that headlamp vertical aim angle had a very large effect on the laboratory-measured illuminance levels at test points and subpoints.

For example, looking at one of the Glare Control measurement locations, 7a, in Table 12 shows that the laboratory-measured illuminance varied from 0.3 to 73.7 lux, depending upon the test vehicle and the vertical aim angle. Looking at one test vehicle, the 2022 Subaru Outback, the lab illuminance varied from 1.0 to 73.7 lux, depending upon the aim angle. This variability would have a major impact on the glare produced by lower beam headlamps.

Measurement Location 10 was the measurement location on the road that was located the longest distance forward of the vehicle. As such, the illuminance level at measurement location 10 would be very important for drivers' long range visibility when driving with lower beam headlamps. Table 13 shows that the laboratory-measured illuminance varied from 0.7 to 43.2 lux, depending upon the vertical aim angle. Looking at another test vehicle, the 2022 Chevrolet Equinox, the lab illuminance varied from 0.7 to 15.7 lux, depending upon the vertical aim angle. This variability could have a major impact on drivers' long range visibility when driving with lower beam headlamps.

The maximum on-vehicle measured illuminance for a given test location also varied from vehicle to vehicle. For example, at measurement location 7a (0.5U – 1R), the maximum on-vehicle measured illuminance was 58.4 lux for the Ford F-150 and 7.7 lux for the 2019 Ford Fusion. These vehicles are from the same manufacturer, but performed quite differently.

Other test locations, such as the Overhead Sign Visibility test points showed less variation across vertical aim angles. The Overhead Sign Visibility test points (measurement locations 1, 2, and 3) measured in the laboratory showed much lower illuminance ranges (0.5, 0.7, and 0.1 lux, respectively).

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## Further Headlamp Aim Angle and Mounting Height Analysis and Discussion

This section uses the data from the lab testing to investigate the combined effect of headlamp aim angle and mounting height effects more directly. A very large amount of headlamp aim angle and mounting height combinations can be calculated for the measurement locations analyzed in this report. However, for the sake of being concise, a few trends were examined using the SAE J599 aim offsets as a basis.

### Headlamp Mounting Height Effects Results – SAE J599 Offsets

This section presents the results of mounting height effects testing in which the lower beam headlamp mounting height was calculated over a range of 22 inches to 54 inches in 2-inch increments. A complete set of illuminance values was calculated at each of the 17 mounting height increments for each vehicle and lamp set. The data for all seven vehicles at each of the 17 mounting height increments can be found in Appendix E of this report. The results in this section have the SAE J599 aim offsets for mounting height factored into the calculations. The following table shows the offsets found in SAE J599.

*Table 14. SAE J599 – "VOA Headlamp Vertical Low Beam Aim Criteria"*

| Headlamp Mounting Height (H) [in] | Nominal Vertical Aim Offset Below H |
|---|---|
| 22 to 36 | No Offset |
| 36 to 48 | 2 in (0.38°) Below H |
| 48 to 54 | 2.5 in (0.48°) Below H |

Due to the vertical and horizontal limits used for the ISO candela measurement, some values, particularly at measurement locations associated with lower angles at high headlamp mounting heights, were not able to be calculated because the location in the beam pattern was outside the measured area. In the following tables, these measurement location and mounting height combinations are indicated by dashes.

*Table 15. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Mounting Height With SAE J599 Offsets – Test Locations Above the Horizon*

| | Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **2022 Chevrolet Equinox** | **54.00** | 0.9 | 1.8 | 0.3 | 419.1 | 431.2 | 301.3 | 92.7 | 162.3 | 66.0 | 45.4 | 3.4 | 2.7 | 5.9 | 9.6 | - | 13.2 |
| | **32.88** | 0.7 | 0.7 | 0.4 | 3.3 | 3.9 | 2.6 | 7.3 | 1.8 | 1.0 | 2.3 | 0.5 | 0.4 | 0.6 | 0.7 | - | 0.7 |
| | **22.00** | 0.6 | 0.5 | 0.4 | 6.2 | 6.2 | 3.2 | 1.0 | 5.1 | 1.6 | 0.8 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.5 |
| **2023 Ford F-150** | **54.00** | 2.3 | 3.0 | 0.6 | 565.6 | 580.8 | 312.8 | 68.1 | 336.4 | 117.3 | 61.2 | 41.9 | 7.6 | 7.1 | 61.7 | - | 82.6 |
| | **34.65** | 2.3 | 3.4 | 0.6 | 9.6 | 9.6 | 8.8 | 4.1 | 6.1 | 3.4 | 2.3 | 2.7 | 1.4 | 1.2 | 3.7 | - | 4.4 |
| | **22.00** | - | - | 0.7 | 13.7 | 13.2 | 10.5 | 3.6 | 5.5 | 3.5 | 2.1 | 1.5 | 1.1 | 0.8 | 1.8 | - | 1.8 |
| **2019 Ford Fusion** | **54.00** | 0.6 | 0.8 | 0.3 | 73.9 | 93.3 | 40.4 | 71.5 | 19.9 | 12.9 | 8.4 | 1.2 | 1.0 | 0.8 | 1.6 | 1.2 | 1.0 |
| | **29.13** | 0.5 | 0.7 | 0.3 | 2.8 | 2.5 | 1.5 | 2.9 | 1.3 | 0.9 | 0.7 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| | **22.00** | 0.5 | 0.6 | 0.3 | 2.6 | 2.2 | 1.5 | 2.6 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |
| **2022 Hyundai Tucson** | **54.00** | 1.8 | 2.2 | 0.5 | 201.5 | 237.5 | 186.7 | 84.9 | 28.8 | 19.0 | 21.0 | 1.2 | 0.9 | 0.6 | 1.9 | 1.9 | 1.8 |
| | **25.98** | 0.9 | 1.3 | 0.5 | 3.2 | 3.1 | 2.6 | 1.0 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| | **22.00** | 1.0 | 1.1 | 0.5 | 3.0 | 2.8 | 2.6 | 0.9 | 1.3 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **2022 Subaru Outback** | **54.00** | 1.7 | 1.8 | 0.6 | 546.4 | 508.3 | 213.3 | 52.6 | 194.9 | 48.5 | 35.6 | 9.3 | 2.8 | 3.7 | 21.2 | - | 21.3 |
| | **31.89** | 0.6 | 1.0 | 0.6 | 5.4 | 5.6 | 4.3 | 0.6 | 2.9 | 2.2 | 1.1 | 1.2 | 1.0 | 0.6 | 1.6 | - | 1.5 |
| | **22.00** | 0.3 | 0.7 | 0.5 | 4.5 | 4.5 | 3.6 | 0.4 | 2.4 | 2.3 | 0.9 | 0.7 | 0.7 | 0.6 | 0.9 | - | 0.9 |
| **2022 Tesla Model 3** | **54.00** | 0.5 | 1.5 | 0.3 | 230.8 | 188.4 | 225.2 | 164.9 | 18.9 | 23.7 | 13.2 | 0.8 | 0.9 | 1.1 | 0.8 | 0.9 | 1.1 |
| | **27.17** | 0.5 | 0.6 | 0.2 | 3.6 | 5.0 | 4.1 | 2.4 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| | **22.00** | 0.6 | 0.6 | 0.2 | 2.8 | 4.0 | 3.3 | 1.9 | 1.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **2022 Toyota Camry** | **54.00** | 1.6 | 1.8 | 0.5 | 330.9 | 353.1 | 237.5 | 52.0 | 82.9 | 17.2 | 18.9 | 2.5 | 1.7 | 1.5 | 7.1 | 8.3 | 8.7 |
| | **28.25** | 1.0 | 1.1 | 0.5 | 4.2 | 4.3 | 3.3 | 1.6 | 2.0 | 1.5 | 1.2 | 0.9 | 0.7 | 0.6 | 1.6 | 1.7 | 1.8 |
| | **22.00** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |
| **2018 Ford F-150 (ADB)** | **54.00** | 1.1 | 1.1 | 0.4 | 101.3 | 102.0 | 53.7 | 7.6 | 16.1 | 7.5 | 4.5 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| | **24.41** | 0.7 | 0.7 | 0.4 | 2.3 | 2.4 | 1.0 | 1.8 | 1.1 | 1.0 | 0.9 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| | **22.00** | 0.7 | 0.7 | 0.4 | 2.3 | 2.3 | 1.9 | 1.1 | 1.1 | 0.9 | 0.9 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.5 |
| **2018 Toyota Camry (ADB)** | **54.00** | 1.1 | 1.1 | 0.2 | 213.0 | 212.0 | 125.4 | 43.9 | 23.8 | 10.1 | 8.6 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| | **24.41** | 0.7 | 0.7 | 0.3 | 1.6 | 1.7 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.0 |
| | **22.00** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 1.1 | 1.0 | 0.9 |
| **Minimum** | | **0.3** | **0.5** | **0.2** | **1.5** | **1.6** | **1** | **0.4** | **0.7** | **0.4** | **0.4** | **0.4** | **0.3** | **0.2** | **0.4** | **0.4** | **0.3** |
| **Maximum** | | **2.3** | **3.4** | **0.7** | **565.6** | **580.8** | **312.8** | **164.9** | **336.4** | **117.3** | **61.2** | **41.9** | **7.6** | **7.1** | **61.7** | **8.3** | **82.6** |
| **Average** | | **1.0** | **1.3** | **0.4** | **59.4** | **62.6** | **41.8** | **14.2** | **17.9** | **6.4** | **4.6** | **1.6** | **0.8** | **0.8** | **2.7** | **1.3** | **3.2** |

*Table 16. Lab Tested Illuminance Data for Maximum, Nominal, and Minimum Mounting Height With SAE J599 Offsets – Test Locations at or Below the Horizon*

| | Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **2022 Chevrolet Equinox** | **54.00** | 234.0 | 203.9 | 15.8 | 32.0 | 21.4 | 73.9 | 67.3 | 78.1 | 52.0 | 53.8 | - | - | - |
| | **32.88** | 430.8 | 254.5 | 15.4 | 32.1 | 18.2 | 90.8 | 79.6 | 95.7 | 62.0 | 65.4 | 277.4 | 126.6 | 121.6 |
| | **22.00** | 13.3 | 23.8 | 11.9 | 26.0 | 8.8 | 98.2 | 81.5 | 99.8 | 48.8 | 62.2 | 431.9 | 159.1 | 163.4 |
| **2023 Ford F-150** | **54.00** | 145.7 | 117.8 | 18.9 | 36.1 | 19.1 | 47.0 | 31.6 | 39.2 | 19.3 | 22.6 | - | - | - |
| | **34.65** | 440.0 | 282.6 | 19.3 | 37.2 | 15.9 | 84.9 | 50.7 | 54.5 | 25.7 | 26.8 | 148.3 | 49.0 | 48.6 |
| | **22.00** | 29.8 | 7.8 | 16.3 | 32.3 | 6.5 | 114.4 | 66.4 | 79.2 | 33.2 | 28.0 | 307.6 | 75.7 | 80.3 |
| **2019 Ford Fusion** | **54.00** | 89.7 | 43.9 | 12.0 | 27.7 | 13.9 | 41.7 | 11.4 | 13.5 | 5.5 | 6.5 | - | - | - |
| | **29.13** | 182.9 | 74.9 | 10.4 | 27.0 | 12.6 | 71.8 | 18.0 | 23.2 | 7.5 | 9.3 | 131.7 | 12.8 | 16.5 |
| | **22.00** | 14.5 | 12.7 | 7.5 | 21.3 | 10.2 | 71.5 | 23.0 | 30.0 | 10.1 | 10.9 | 244.2 | 15.8 | 19.6 |
| **2022 Hyundai Tucson** | **54.00** | 203.6 | 164.0 | 43.1 | 71.2 | 61.6 | 97.9 | 64.4 | 87.5 | 46.3 | 55.1 | - | - | - |
| | **25.98** | 348.9 | 70.0 | 41.4 | 86.4 | 66.2 | 223.5 | 189.5 | 225.2 | 102.8 | 129.7 | 476.1 | 143.2 | 195.2 |
| | **22.00** | 15.3 | 7.0 | 38.2 | 80.2 | 53.9 | 246.3 | 215.9 | 254.4 | 111.0 | 140.4 | 664.4 | 188.0 | 260.2 |
| **2022 Subaru Outback** | **54.00** | 146.5 | 131.9 | 29.2 | 37.1 | 25.4 | 57.8 | 48.8 | 46.3 | 31.7 | 30.0 | - | - | - |
| | **31.89** | 534.0 | 286.2 | 25.2 | 52.1 | 36.2 | 116.1 | 75.4 | 103.9 | 46.7 | 62.4 | 248.7 | 72.8 | 88.0 |
| | **22.00** | 17.5 | 5.9 | 20.6 | 50.2 | 24.1 | 140.9 | 87.8 | 125.0 | 46.9 | 66.4 | 471.2 | 106.3 | 145.1 |
| **2022 Tesla Model 3** | **54.00** | 154.5 | 151.7 | 20.6 | 45.0 | 48.4 | 54.4 | 65.8 | 61.7 | 42.8 | 38.3 | - | - | - |
| | **27.17** | 122.7 | 237.5 | 14.9 | 46.6 | 50.3 | 177.5 | 125.1 | 156.5 | 69.7 | 94.0 | 267.9 | 130.4 | 109.9 |
| | **22.00** | 7.9 | 5.4 | 9.8 | 35.7 | 38.3 | 213.0 | 189.8 | 323.9 | 78.6 | 207.8 | 414.0 | 185.0 | 176.7 |
| **2022 Toyota Camry** | **54.00** | 142.5 | 128.4 | 35.5 | 42.8 | 34.5 | 60.6 | 52.7 | 53.2 | 34.2 | 35.0 | - | - | - |
| | **28.25** | 494.4 | 113.5 | 39.7 | 67.9 | 29.8 | 126.8 | 85.1 | 96.6 | 55.0 | 56.2 | 238.6 | 95.9 | 95.9 |
| | **22.00** | 25.7 | 11.0 | 39.4 | 71.8 | 20.3 | 179.9 | 88.1 | 114.8 | 53.0 | 53.4 | 387.9 | 131.0 | 130.2 |
| **2018 Ford F-150 (ADB)** | **54.00** | 82.2 | 66.7 | 36.9 | 44.08 | 26.2 | 37.4 | 29.1 | 28.48 | 22.1 | 19.4 | 7.9 | 3.20 | 3.83 |
| | **24.41** | 57.8 | 25.1 | 35.7 | 60.6 | 24.9 | 168.1 | 74.4 | 78.2 | 40.4 | 35.5 | 202.3 | 92.8 | 81.0 |
| | **22.00** | 20.9 | 13.3 | 33.0 | 57.7 | 23.3 | 179.9 | 72.9 | 79.4 | 38.9 | 33.7 | 254.5 | 110.8 | 95.7 |
| **2018 Toyota Camry (ADB)** | **54.00** | 120.6 | 104.1 | 51.6 | 71.0 | 52.7 | 56.5 | 36.6 | 40.4 | 25.2 | 28.8 | 31.7 | 11.3 | 11.3 |
| | **24.41** | 68.3 | 33.0 | 61.1 | 115.6 | 37.1 | 250.3 | 146.0 | 167.1 | 77.7 | 76.2 | 308.6 | 120.9 | 126.5 |
| | **22.00** | 19.8 | 10.0 | 60.8 | 116.0 | 29.8 | 270.1 | 154.3 | 179.2 | 82.5 | 80.9 | 413.8 | 140.3 | 146.1 |
| **Minimum** | | **7.9** | **5.4** | **7.5** | **21.3** | **6.5** | **37.4** | **11.4** | **13.5** | **5.5** | **6.5** | **7.9** | **3.2** | **3.83** |
| **Maximum** | | **534** | **286.2** | **61.1** | **116.0** | **66.2** | **270.1** | **215.9** | **323.9** | **111.0** | **207.8** | **664.4** | **188.0** | **260.2** |
| **Average** | | **260.0** | **169.4** | **29.1** | **53.9** | **33.2** | **107.4** | **73.6** | **85.4** | **45.1** | **50.3** | **190.1** | **65.8** | **69.5** |

The preceding tables, compared to Tables 12 and 13 of this report, show the changes in lower beam illuminance when the recommended SAE J599 aim offsets are applied. It can be observed that glare control measurement locations drop in illuminance and road visibility measurement locations increase in illuminance by some meaningful amount. The following figures further demonstrate these effects for a selection of relevant measurement locations.

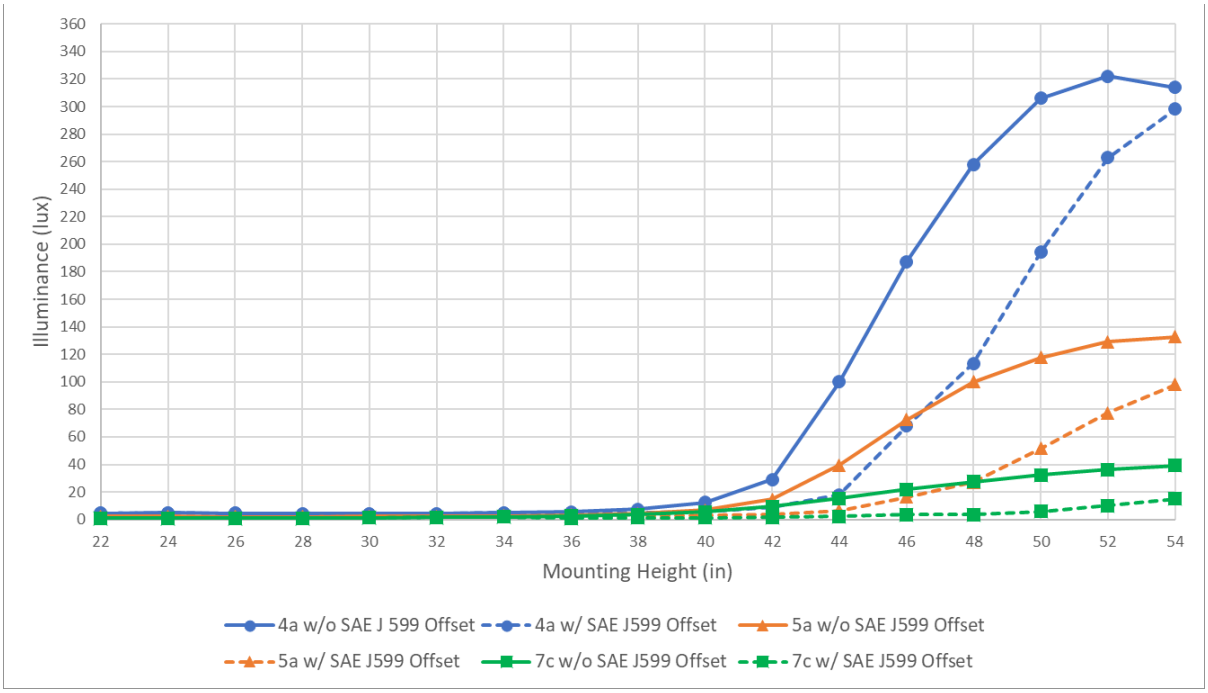


*Figure 17. Average Illuminance of Tested Vehicles – Glare Points*

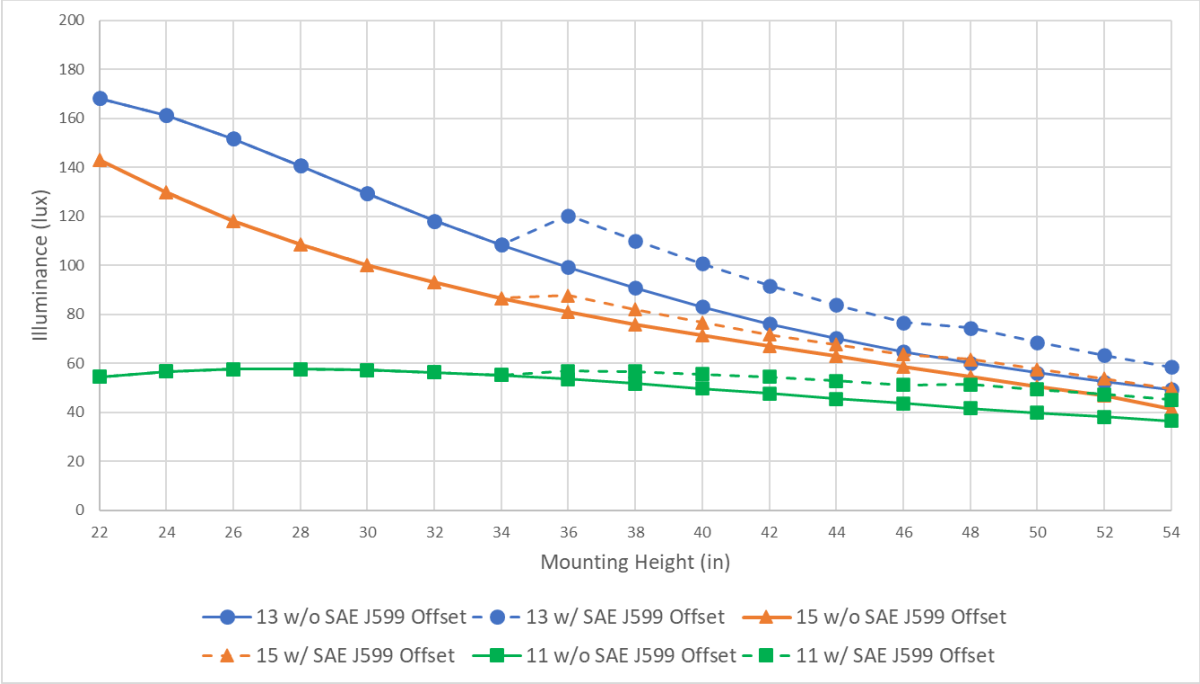


*Figure 18. Average Illuminance of Tested Vehicles – Visibility Points*

The preceding figures show the average illuminance of all tested vehicles at every mounting height for a selection of measurement locations. Figure 3 shows the effects of the SAE J599 offsets on glare control locations. The offsets significantly reduce glare, particularly for mounting heights over 40 inches, at which mounting height starts to cause a drastic increase in glare values. Table 4 shows similar results for the effect of the SAE J599 offsets on roadway visibility measurement locations, but with a lesser effect. There is a slight increase in illuminance for the shown measurement locations at mounting heights where offsets are applied, but the effect is not as significant as with the glare measurement locations. This demonstrates why an aim offset for mounting height is beneficial, particularly to ensure that larger vehicles do not glare oncoming or preceding drivers in smaller vehicles.

### Combined Effects of Headlamp Aim Angle and Mounting Height Variation

To look at the combined effects of varying headlamp aim angle and mounting height, values from the laboratory measurement data were calculated. Doing this in a fully comprehensive manner, that is for each headlamp aim angle and mounting height combination, would involve many calculations by varying both variables for each measurement location and test vehicle. To keep the calculations and analysis reasonable, for this section, the full range of headlamp aim angles were calculated at several key mounting heights for each vehicle, these heights being the limits of aim offsets as suggested in SAE J599. The values for each headlamp aim angle and mounting height were then averaged for all vehicles in order to identify trends in performance based on the two variables. For this analysis, no offsets were applied to the data, either those listed in SAE J599 or otherwise. The complete list of calculated data can be found in Appendix F. The same measurement locations as those analyzed in section 6.1 of this report were again chosen to be looked at more closely to see trends in headlamp performance. The following figures show the average illuminance from every test vehicle at every headlamp aim angle for a selection of mounting heights. It should be noted that due to the constraints of area of the beam pattern measured in the lab, data for some aim angle and mounting height combinations were not calculatable for several vehicles. For the measurement locations analyzed here, only measurement location 15 did not average data for all vehicle between +0.76° and +0.1° for a 48-inch mounting height and +0.76° and -0.6° for a 54-inch mounting height.

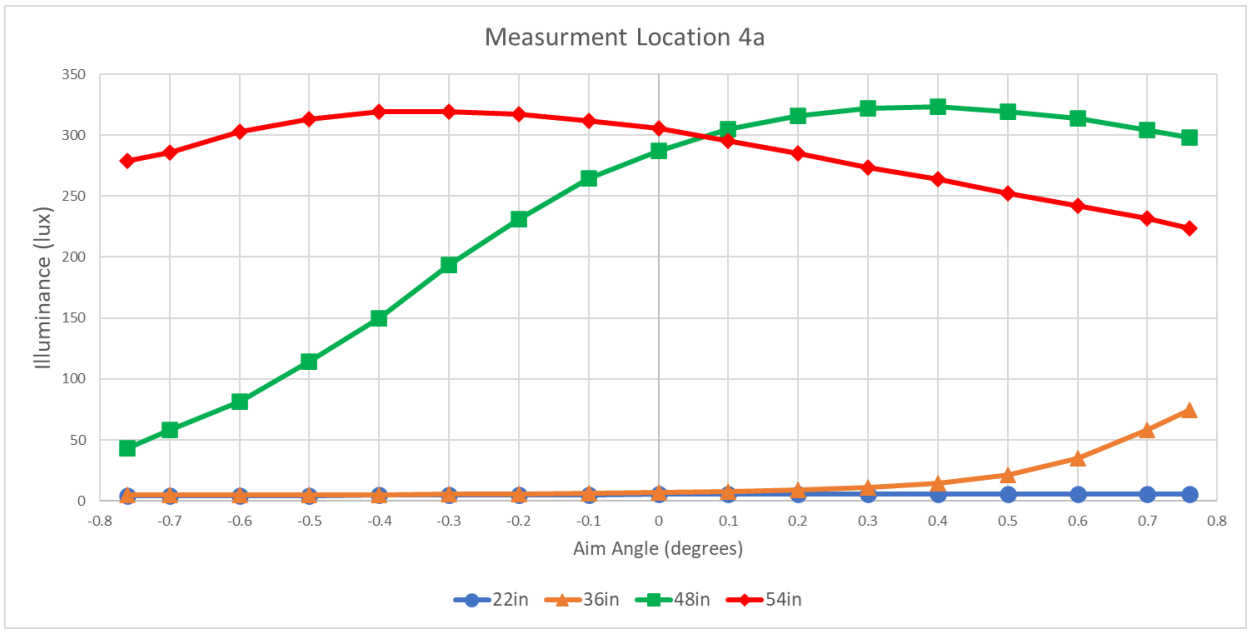


*Figure 19. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 4a*

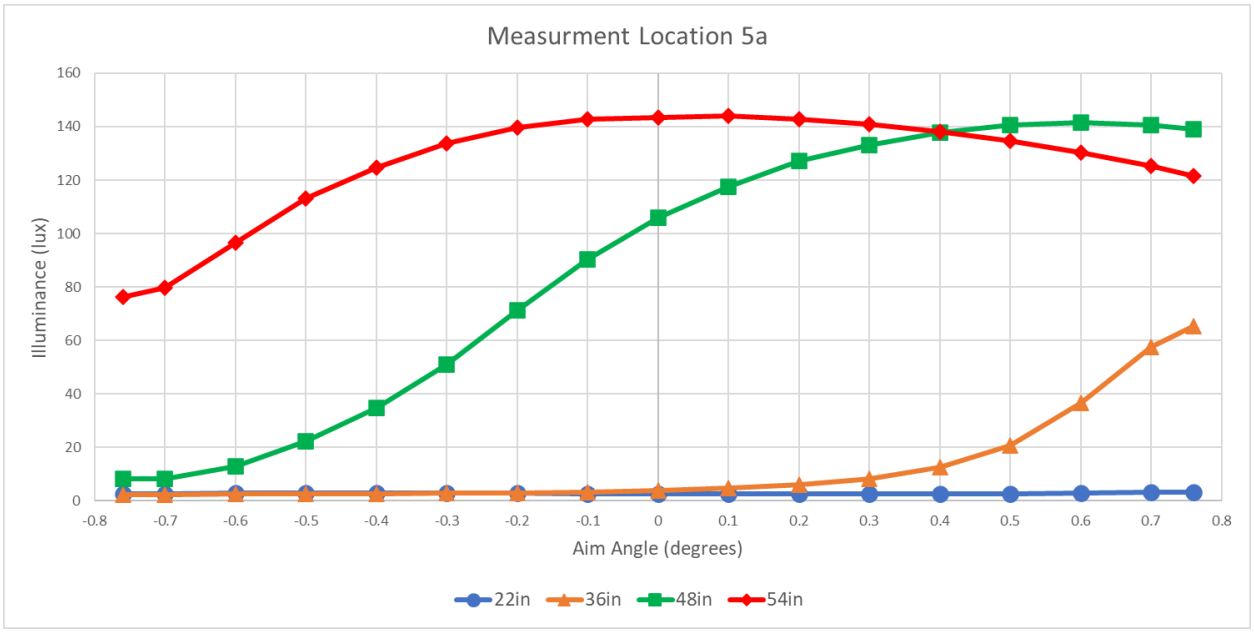


*Figure 20. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 5a*

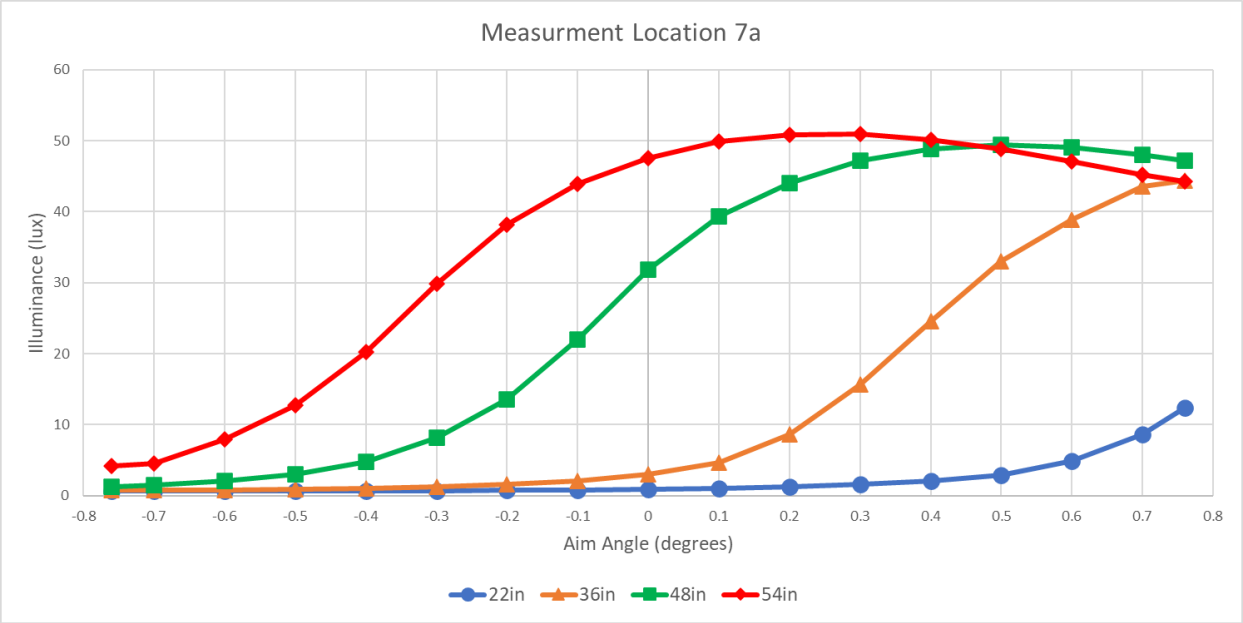


*Figure 21. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 7a*

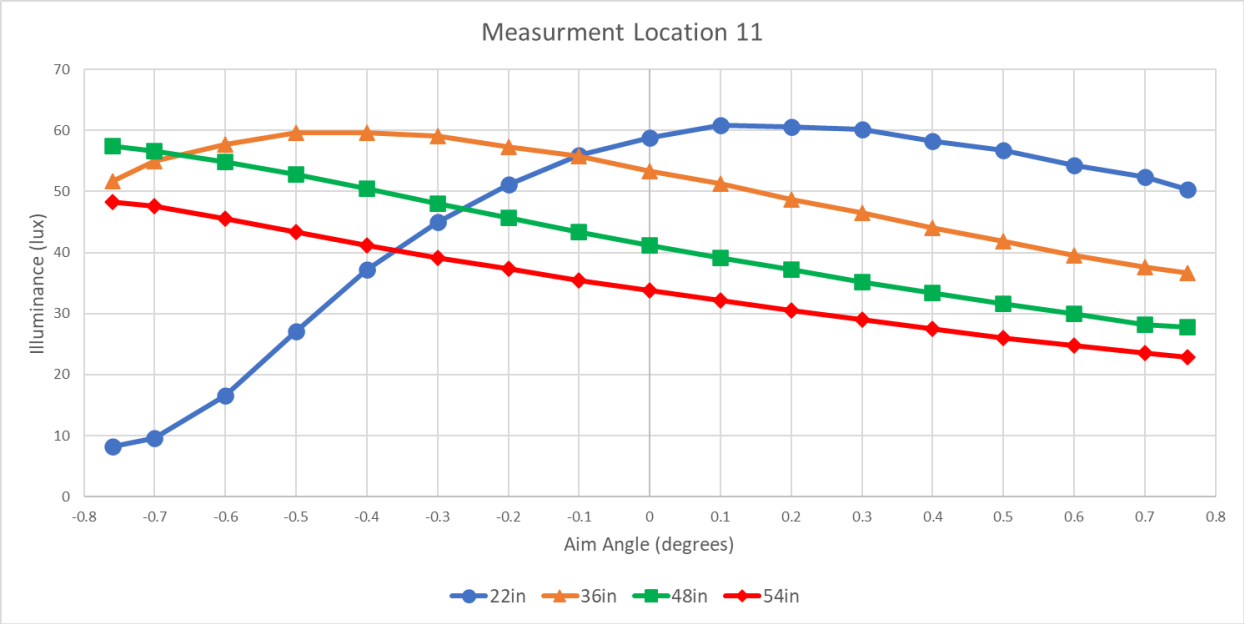


*Figure 22. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 11*

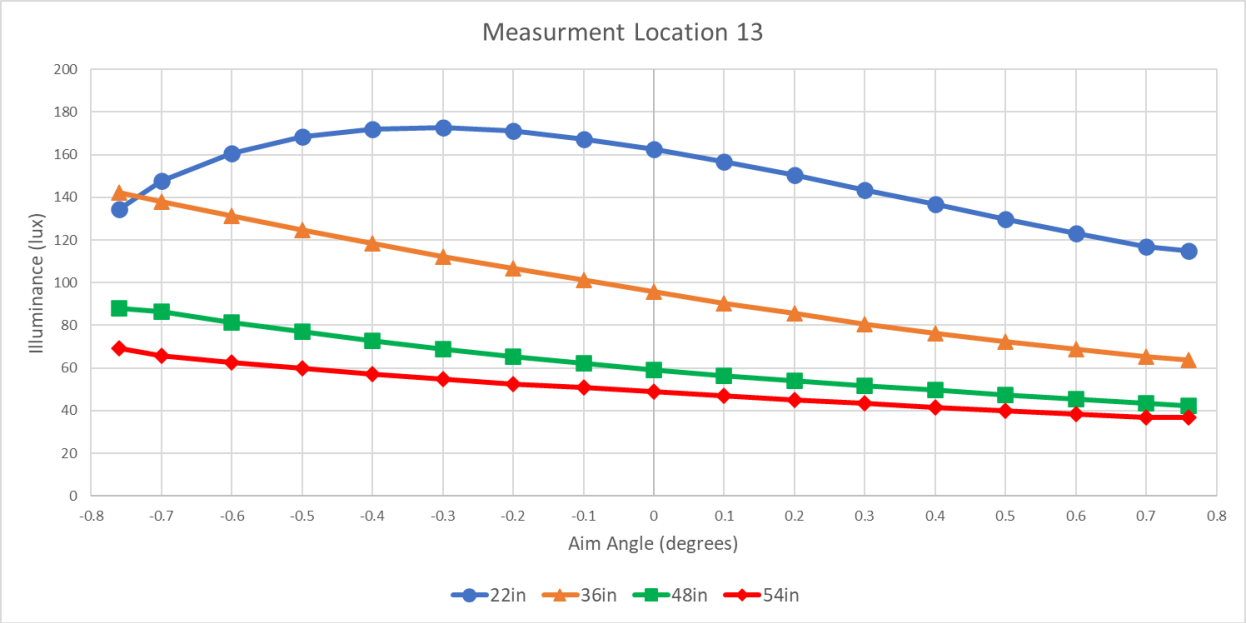


*Figure 23. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 13*

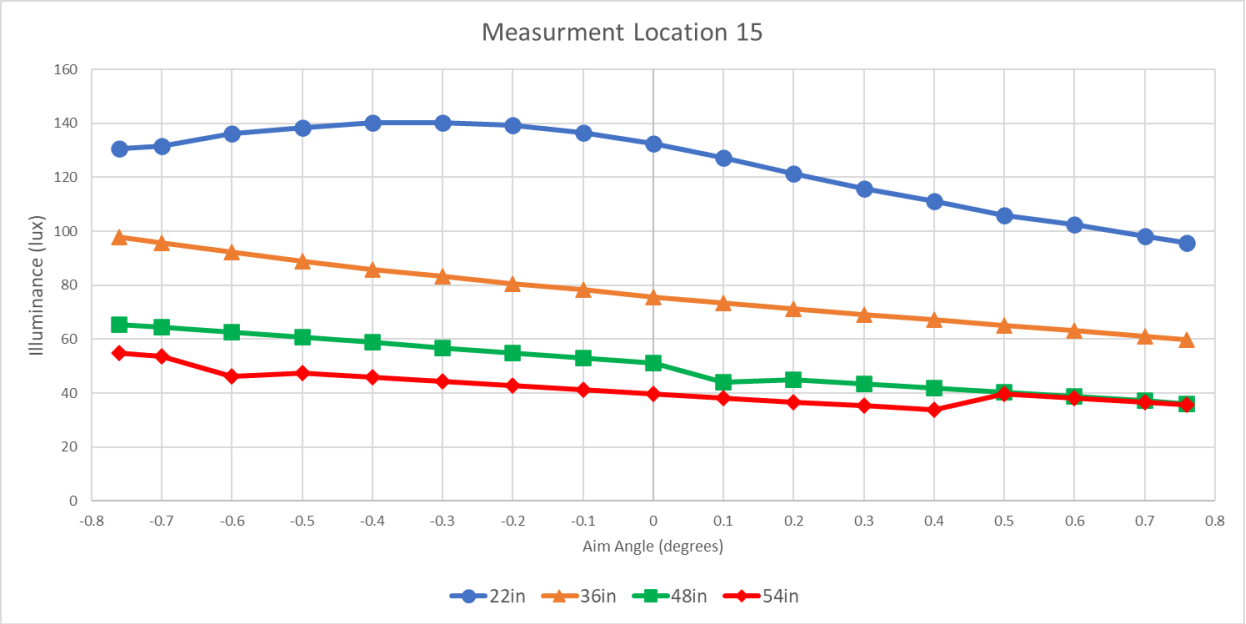


*Figure 24. Average Illuminance Versus Headlamp Aim Angle for Several Mounting Heights – Measurement Location 15*

The preceding figures show similar trends that have previously been explored in this report. In sections 4 and 6.1 of this report, it was noted that mounting height, particularly when above 40 inches, has a drastic effect on glare. From Figures 19, 20, and 21 it can be seen that between mounting heights of 36 inches and 48 inches, glare increases dramatically, so much so that it would require a large aim offset to adjust to similar values, if it can be done at all. The figures also show, as previously discussed in this report, that mounting height causes more illuminance variation for measurement locations closer to the vehicle. For example, measurement location 4a, which is closer to the vehicle, had a bigger difference between all the mounting heights analyzed than measurement location 7a, which is further from the vehicle. This can be seen similarly for road visibility when looking at the difference between Figure 22, measurement location 11, which is further from the vehicle, and Figure 24, measurement location 17 which is closer to the vehicle.

For roadway visibility, it can be noted that mounting height also has an effect on performance, but less so than the effect on glare. For Figures 22, 23, and 24, each successive increase in mounting height showed lowered measured illuminance for all aim angles, except for measurement location 11, at which illuminance dropped dramatically with lower aim angles for the 22-inch mounting height. It can also be observed that for all mounting heights analyzed, except for 22 inches, a downward aim offset from 0° increased illuminance. Although the effect is not as significant as the same offset would have for glare, it is still a noticeable difference.

From the figures above it can be determined that for mounting heights at the top end of the allowable range in FMVSS No. 108, a large aim offset downwards would decrease the glare emitted from vehicles with this mounting height and also give a smaller increase to roadway visibility. However, this result is likely primarily an artifact of the test points being close to the vehicle. It can also be seen that the aim offsets recommended by SAE J599 can be increased. While SAE J599 recommends a 0.38° aim offset for mounting heights between 36 inches and 48 inches and a 0.48° aim offset for mounting heights between 48 inches and 54 inches, glare can be further reduced for these ranges of mounting height and see both a greater decrease in glare and increase in roadway visibility.

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## Summary

This report summarizes research conducted to support NHTSA's response to requirements of the Infrastructure Investment and Jobs Act of 2021 relating to the development of performance-based standards for vehicle headlighting systems to ensure proper headlamp aim and to require on-vehicle testing of headlighting system performance. Research performed sought to (1) develop a candidate on-vehicle headlamp test procedure and to (2) collect data useful for establishing a headlamp aim angle tolerance that could be used in association with a headlamp aim requirement.

Currently, headlighting system photometric performance for FMVSS No. 108 is measured on the equipment level. Single lamps are measured in a test lab using a goniophotometer, which measures the photometric intensity of test points that are based in polar coordinates. Based on previous work to measure lower beam illuminance in an on-vehicle setting and work to adapt FMVSS No. 108 lower beam photometry to a performance-based approach, a test procedure for on-vehicle testing of FMVSS No. 108 was developed. This test procedure was implemented to test the effects of lower beam aim angle and mounting height. The lamps were then submitted to an ISO-accredited photometric test laboratory to compare with the on-vehicle measurements, as well as to provide more data for judgments to support an on-vehicle aim tolerance. Headlamps were measured for FMVSS No. 108 lower beam photometry and ISO candela scans.

Results showed that headlamp vertical aim angle had a very large effect on measured on-vehicle measured illuminance levels at test points and subpoints. For all seven test vehicles, whether the illuminance levels were measured using the candidate on-vehicle test procedure or determined from photometric test lab data, illuminance levels for some test points were very large due to changes in vertical aim angle. To control lower beam headlamp glare while obtaining adequate forward visibility, headlamps need to be correctly aimed.

Certain test locations are more affected by lower beam vertical aim angle than others. In general, test locations close to the cutoff line varied more in measured illuminance across the range of aim angles. The Horizontal Line test points, those right on the cutoff line for a nominal vertical aim angle, have very high illuminance ranges (183.3 to 691.3 lux depending upon the test method and test point). For these test locations, much higher on-vehicle measured illuminance values were measured at higher vertical aim angles (e.g., +0.76°) and vice versa with lower on-vehicle measured illuminance values at lower vertical aim angles (e.g., -0.76°). Other test locations, like the Overhead Sign Visibility test points and those Road Points at lower vertical angles, showed less variation across vertical aim angles. For example, Overhead Sign Visibility test points had illuminance ranges from 0.1 to 3.2 lux (again, depending upon the test method and test point).

Lower beam illuminance measurements for the lamps from the tested vehicles, as well as two additional sets of headlamp assemblies, were analyzed to assess the effects of mounting height. Lower beam illuminance was analyzed for mounting heights from 22 inches to 54 inches at every 2-inch interval to match the allowable mounting height of lower beams for FMVSS compliant vehicles. Similar to the aim effects testing, some test locations varied by a large amount. Unlike the aim effects results, however, the points further from the cutoff had more variation. Low road visibility test locations, like 4D – 20R and 4D – 20L, and higher glare test locations like those for 1.5U – 1R to 3R/R varied more than those closer to the cutoff like 0.6D – 1.3R.

Further analysis explored the combined effects of headlamp aim angle and mounting height, particularly analyzing aim offsets. When the SAE J599 offsets were applied to the mounting height effects data, glare and roadway visibility were found to be improved, although not substantially. The average illuminance values were calculated for each aim angle at some select mounting heights. This showed that the SAE J599 offsets could be increased and achieve both lower glare and higher roadway visibility.

Overall, this effort showed the effects of headlamp aim angle, mounting height, and a combination of the two on lower beam headlamp performance. The data could be used to assert an on-vehicle headlamp aim angle tolerance with consideration for headlamp mounting height.

## References


Akashi, Y., Hu, F., & Bullough, J. D. (2008, December). *Sensitivity analysis of headlamp parameters affecting visibility and glare* (Report No. DOT HS 811 055). National Highway Traffic Safety Administration. www.nhtsa.gov/sites/nhtsa.gov/files/811055.pdf

Akashi, Y., Van Derlofske, J., Raghavan, R., & Bullough, J. D. (2008, June). *Assessment of headlamp glare and potential countermeasures: The effects of headlamp mounting height* (Report No. DOT HS 810 947). National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/16670/Print

Federal Motor Vehicle Safety Standards, Standard No. 108; *Lamps, reflective devices, and associated equipment*, 49 CFR Sec. 571.108. www.ecfr.gov/current/title-49/subtitle-B/chapter-V/part-571/subpart-B/section-571.108

Flannagan, M. J., & Sullivan, J. M. (2011, June). *Feasibility of new approaches for the regulation of motor vehicle lighting performance.* National Highway Traffic Safety Administration. [Docket submission. Docket No. NHTSA-2011-0145 in Regulatiopns.gov]. https://downloads.regulations.gov/NHTSA-2018-0090-0002/attachment_1.pdf

IIHS. *Headlights.* https://www.iihs.org/topics/headlights

Infrastructure Investment and Jobs Act, Public Law No: 117-58, November 15, 2021. www.congress.gov/bill/117th-congress/house-bill/3684

Mazzae, E. N., Andrella, A., & Baldwin, G. H. S. (2019, August). *Lower beam headlighting system visibility confirmation test - Test procedure assessment* (Report No. DOT HS 812 701). National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/42404/dot_42404_DS1.pdf

SAE International (2015, November). SAE J599, *Lighting inspection*.

SAE International. (2021, April). SAE J2650, Performance requirements for road illumination devices using light emitting diode (LED) sources.

Singh, S., & Perel, M. (2004, January). *Drivers' perceptions of headlight glare from oncoming and following vehicles* (Report No. DOT HS 809 669). National Highway Traffic Safety Administration. www.nhtsa.gov/sites/nhtsa.gov/files/glare_percep.pdf

Voyzey, N., Mazzae, E. N., Baldwin, G. H. S., & Andrella, A. (in press). *On-vehicle lower beam performance test examination*. National Highway Traffic Safety Administration.

# Appendix A: Konica Minolta T-10A Illuminance Meter Specifications

*Table 17. Konica Minolta T-10A Specification Sheet*

| | |
|---|---|
| Type | Digital illuminance meter with detachable receptor head. |
| Receptor | Silicon photocell. |
| Relative Spectral Response ($f_1'$) | The amount of departure from V(λ) … within 6% (CIE). |
| Cosine Correction Characteristics ($f_2$) | Within 3%. |
| Illuminance Units | Lux (lx) or foot-candles (fcd) (switchable). |
| Range Setting | Auto range (can be switched between five ranges manually). |
| Measuring Function | NORM: illuminance in lux (lx) or foot-candles (fcd), delta: illuminance difference lx (fcd)/ratio (%), Σ: integrated illuminance in lux-hours (lx-h) of foot-candle-hours (fcd-h)/integration time (h)/average illuminance in lux (lx) or foot-candles (fcd). |
| Measuring Range | 0.01 – 299,900 lx /0.001 – 29,990 fcd. |
| User Calibration Function | Set the color correction factor (CCF): 0.500 to 2.000. |
| Integrated Illuminance/ Time | 0.01 – 999,900 103 lx-h, 0.001 to 99,990 103 fcd-h/0.001 – 9,999 h |
| Correction Function | Settable range of the color correction factor (CCF): 0.500 to 2.000. |
| Linearity | 2% ±1 digit of value displayed |
| Temperature Drift | Within 3%. |
| Humidity Drift | Within 3%. |
| Computer Interface | Conforms to USB standard. |
| Printer Output | RS-232C. |
| Analog Output | 1 mV/digit, maximum saturation voltage 3 V, output impedance 10 kΩ, 90% response time: FAST setting: 1 ms, SLOW setting: 1 s. |
| Display | 3 or 4 significant - digital LCD with back - light illumination. |
| Operating Temperature/ Humidity Range | -10 to 40 °C, relative humidity 85% or less (at 35 °C) with no condensation. |
| Storage Temperature/ Humidity Range | -20 to 55 °C, relative humidity 85% or less (at 35 °C) with no condensation. |
| Power | AA batteries (x2)/AC adapter (optional). |
| Battery Life | 72 hours or longer (when alkaline batteries are used for continuous measurement). |
| Dimensions | 69 × 174 × 35 mm. |
| Weight | 200 g without batteries. |
| Standard Accessories | Batteries, case, cap, strap. |

# Appendix B: Height Effects Data – Lab Testing Method

*Table 18. The 2022 Chevrolet Equinox Lab Tested Height Effects Data –Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.6 | 1.2 | 0.3 | 407.9 | 405.0 | 301.2 | 105.6 | 203.8 | 113.3 | 79.2 | 36.8 | 22.2 | 16.4 | 55.1 | - | 55.4 |
| **52** | 1.3 | 1.4 | 0.3 | 419.6 | 423.3 | 304.2 | 98.9 | 196.4 | 98.3 | 66.1 | 28.6 | 16.3 | 14.1 | 49.3 | - | 51.1 |
| **50** | 1.1 | 1.6 | 0.3 | 415.2 | 432.9 | 299.8 | 90.1 | 176.7 | 75.8 | 52.0 | 19.2 | 11.1 | 11.9 | 40.1 | - | 43.7 |
| **48** | 0.9 | 1.8 | 0.3 | 364.6 | 406.7 | 271.6 | 76.9 | 143.0 | 57.9 | 38.2 | 11.7 | 7.2 | 10.0 | 28.5 | - | 34.5 |
| **46** | 0.8 | 2.0 | 0.3 | 253.6 | 268.8 | 206.0 | 66.7 | 88.8 | 45.4 | 27.0 | 6.6 | 4.5 | 8.0 | 18.3 | - | 23.3 |
| **44** | 0.8 | 2.0 | 0.3 | 110.7 | 107.1 | 104.5 | 51.8 | 32.4 | 32.2 | 18.5 | 3.4 | 2.7 | 5.9 | 9.6 | - | 13.2 |
| **42** | 0.8 | 1.8 | 0.3 | 19.3 | 29.0 | 52.6 | 38.9 | 9.3 | 18.0 | 13.7 | 2.0 | 1.7 | 4.2 | 5.3 | - | 7.3 |
| **40** | 0.8 | 1.5 | 0.3 | 5.2 | 7.8 | 30.2 | 27.1 | 3.8 | 8.3 | 10.4 | 1.2 | 1.1 | 2.7 | 2.8 | - | 3.7 |
| **38** | 0.8 | 1.2 | 0.3 | 3.8 | 4.3 | 13.1 | 18.0 | 2.5 | 3.8 | 7.7 | 0.8 | 0.8 | 1.8 | 1.7 | - | 2.1 |
| **36** | 0.8 | 0.9 | 0.3 | 3.6 | 4.0 | 5.2 | 12.7 | 2.1 | 1.9 | 5.5 | 0.6 | 0.6 | 1.2 | 1.2 | - | 1.3 |
| **34** | 0.8 | 0.8 | 0.4 | 3.4 | 3.8 | 2.9 | 9.5 | 1.9 | 1.3 | 3.8 | 0.5 | 0.5 | 0.8 | 0.9 | - | 0.9 |
| **32** | 0.7 | 0.7 | 0.4 | 3.3 | 3.9 | 2.6 | 7.3 | 1.8 | 1.0 | 2.3 | 0.5 | 0.4 | 0.6 | 0.7 | - | 0.7 |
| **30** | 0.7 | 0.7 | 0.4 | 3.8 | 4.5 | 2.5 | 5.6 | 1.8 | 1.0 | 1.4 | 0.4 | 0.4 | 0.4 | 0.7 | - | 0.6 |
| **28** | 0.6 | 0.6 | 0.4 | 5.1 | 6.3 | 2.7 | 4.0 | 1.9 | 1.0 | 1.0 | 0.4 | 0.4 | 0.4 | 0.6 | - | 0.6 |
| **26** | 0.6 | 0.6 | 0.4 | 6.9 | 8.8 | 3.2 | 2.7 | 2.2 | 1.1 | 0.8 | 0.4 | 0.4 | 0.3 | 0.6 | - | 0.6 |
| **24** | 0.6 | 0.6 | 0.4 | 7.5 | 9.0 | 3.5 | 1.6 | 3.3 | 1.4 | 0.7 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.6 |
| **22** | 0.6 | 0.5 | 0.4 | 6.2 | 6.2 | 3.2 | 1.0 | 5.1 | 1.6 | 0.8 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.5 |

*Table 19. The 2022 Chevrolet Equinox Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 195.8 | 173.1 | 16.5 | 29.1 | 21.6 | 65.4 | 60.8 | 67.9 | 46.8 | 47.7 | 14.6 | 7.7 | 3.9 |
| **52** | 219.2 | 192.6 | 16.6 | 29.6 | 22.0 | 67.5 | 63.3 | 71.4 | 48.6 | 49.8 | 15.5 | 8.5 | 4.5 |
| **50** | 242.8 | 209.2 | 16.6 | 30.1 | 21.8 | 69.6 | 65.4 | 75.0 | 50.4 | 52.1 | 17.3 | 9.6 | 5.3 |
| **48** | 265.1 | 224.6 | 16.7 | 30.5 | 21.7 | 72.0 | 67.3 | 78.1 | 52.1 | 53.8 | 20.0 | 10.6 | 6.1 |
| **46** | 286.8 | 238.9 | 16.7 | 31.0 | 22.0 | 74.0 | 69.1 | 80.9 | 53.7 | 55.7 | 23.2 | 12.1 | 6.7 |
| **44** | 306.9 | 251.0 | 16.7 | 31.3 | 21.6 | 76.3 | 70.9 | 83.6 | 55.1 | 57.1 | 26.3 | 14.5 | 7.5 |
| **42** | 328.3 | 263.9 | 16.6 | 31.7 | 21.3 | 78.8 | 72.2 | 86.0 | 56.5 | 58.8 | 30.6 | 17.3 | 8.3 |
| **40** | 350.6 | 276.3 | 16.5 | 32.1 | 21.4 | 81.1 | 73.5 | 88.3 | 57.6 | 60.4 | 39.1 | 38.7 | 18.0 |
| **38** | 370.3 | 286.1 | 16.3 | 32.2 | 20.7 | 83.5 | 75.1 | 90.4 | 58.7 | 61.8 | 179.8 | 89.9 | 88.8 |
| **36** | 391.1 | 290.8 | 16.0 | 32.4 | 20.0 | 85.7 | 76.6 | 92.2 | 60.0 | 63.1 | 212.2 | 101.5 | 101.1 |
| **34** | 412.7 | 279.2 | 15.8 | 32.6 | 19.6 | 88.2 | 78.2 | 93.8 | 61.1 | 64.1 | 243.1 | 114.6 | 111.1 |
| **32** | 430.8 | 254.5 | 15.4 | 32.1 | 18.2 | 90.8 | 79.6 | 95.7 | 62.0 | 65.4 | 277.4 | 126.6 | 121.6 |
| **30** | 415.3 | 194.8 | 15.0 | 31.6 | 16.6 | 93.1 | 80.9 | 97.7 | 61.6 | 66.3 | 311.6 | 137.6 | 132.4 |
| **28** | 347.0 | 119.8 | 14.4 | 30.9 | 14.9 | 95.2 | 81.8 | 99.1 | 60.3 | 66.5 | 345.2 | 146.7 | 141.4 |
| **26** | 176.7 | 81.2 | 13.8 | 29.5 | 13.0 | 96.6 | 82.8 | 100.0 | 58.1 | 66.1 | 375.8 | 151.5 | 151.1 |
| **24** | 50.3 | 50.8 | 13.0 | 27.8 | 10.9 | 98.0 | 83.2 | 100.0 | 54.0 | 64.4 | 402.1 | 157.1 | 158.1 |
| **22** | 13.3 | 23.8 | 11.9 | 26.0 | 8.8 | 98.2 | 81.5 | 99.8 | 48.8 | 62.2 | 431.9 | 159.1 | 163.4 |

*Table 20. The 2023 Ford F-150 Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 2.1 | 2.9 | 0.7 | 490.1 | 525.4 | 252.9 | 69.9 | 326.1 | 170.9 | 65.7 | 73.8 | 47.0 | 35.2 | 113.4 | - | 114.7 |
| **52** | 2.1 | 3.0 | 0.7 | 555.8 | 581.7 | 298.3 | 69.1 | 348.1 | 153.6 | 69.4 | 66.0 | 38.7 | 32.1 | 108.3 | - | 110.4 |
| **50** | 2.2 | 3.0 | 0.6 | 559.1 | 566.4 | 336.9 | 66.5 | 338.0 | 120.7 | 62.9 | 59.0 | 24.8 | 25.5 | 99.4 | - | 103.3 |
| **48** | 2.3 | 3.1 | 0.6 | 486.0 | 510.9 | 360.9 | 66.3 | 306.1 | 83.5 | 47.1 | 51.8 | 13.8 | 14.5 | 84.6 | - | 95.1 |
| **46** | 2.5 | 3.2 | 0.6 | 390.8 | 363.6 | 361.5 | 65.5 | 241.7 | 40.7 | 22.0 | 42.9 | 8.4 | 7.9 | 65.1 | - | 84.8 |
| **44** | 2.6 | 3.4 | 0.6 | 279.4 | 217.2 | 296.5 | 32.6 | 173.2 | 14.5 | 9.8 | 29.0 | 5.1 | 4.7 | 46.1 | - | 64.4 |
| **42** | 2.6 | 3.5 | 0.6 | 61.4 | 57.1 | 84.2 | 17.3 | 54.2 | 7.5 | 6.0 | 15.1 | 3.3 | 3.0 | 24.6 | - | 34.3 |
| **40** | 2.6 | 3.7 | 0.6 | 20.4 | 20.2 | 33.0 | 13.0 | 18.8 | 5.1 | 4.0 | 8.3 | 2.4 | 2.1 | 13.5 | - | 18.4 |
| **38** | 2.5 | 3.7 | 0.6 | 12.7 | 12.9 | 16.3 | 9.5 | 9.7 | 4.0 | 3.0 | 5.0 | 1.9 | 1.6 | 8.2 | - | 10.6 |
| **36** | 2.5 | 3.5 | 0.6 | 10.6 | 10.7 | 10.7 | 6.4 | 7.1 | 3.6 | 2.6 | 3.5 | 1.6 | 1.3 | 5.2 | - | 6.5 |
| **34** | 2.3 | 3.4 | 0.6 | 9.6 | 9.6 | 8.8 | 4.1 | 6.1 | 3.4 | 2.3 | 2.7 | 1.4 | 1.2 | 3.7 | - | 4.4 |
| **32** | 2.2 | 3.3 | 0.6 | 9.5 | 9.5 | 8.0 | 3.2 | 5.6 | 3.2 | 2.2 | 2.2 | 1.3 | 1.0 | 2.9 | - | 3.3 |
| **30** | 2.1 | 3.3 | 0.6 | 10.0 | 10.0 | 8.2 | 3.1 | 5.3 | 3.1 | 2.1 | 1.9 | 1.2 | 0.9 | 2.4 | - | 2.7 |
| **28** | 1.9 | 3.1 | 0.7 | 10.5 | 10.5 | 8.4 | 3.0 | 5.2 | 3.0 | 2.0 | 1.7 | 1.2 | 0.9 | 2.1 | - | 2.3 |
| **26** | 1.6 | 2.9 | 0.7 | 11.8 | 11.3 | 9.4 | 3.3 | 5.1 | 3.1 | 2.0 | 1.6 | 1.1 | 0.9 | 2.0 | - | 2.1 |
| **24** | 1.4 | 2.8 | 0.7 | 13.4 | 12.9 | 10.2 | 3.6 | 5.3 | 3.3 | 2.1 | 1.5 | 1.1 | 0.9 | 1.9 | - | 1.9 |
| **22** | - | - | 0.7 | 13.7 | 13.2 | 10.5 | 3.6 | 5.5 | 3.5 | 2.1 | 1.5 | 1.1 | 0.8 | 1.8 | - | 1.8 |

*Table 21. The 2023 Ford F-150 Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 120.2 | 90.9 | 18.5 | 30.0 | 23.8 | 41.6 | 27.5 | 33.5 | 16.2 | 19.2 | 32.2 | 11.4 | 12.9 |
| **52** | 132.9 | 106.2 | 19.0 | 30.9 | 23.6 | 41.7 | 28.5 | 35.2 | 17.0 | 20.3 | 35.4 | 12.6 | 14.4 |
| **50** | 149.9 | 124.3 | 19.3 | 32.0 | 23.1 | 42.4 | 29.7 | 37.1 | 18.1 | 21.7 | 38.5 | 14.1 | 16.1 |
| **48** | 166.0 | 144.0 | 19.6 | 32.8 | 22.7 | 43.9 | 31.1 | 38.7 | 19.1 | 22.4 | 43.1 | 16.1 | 18.5 |
| **46** | 174.8 | 156.9 | 19.8 | 33.5 | 22.2 | 46.2 | 33.3 | 40.3 | 20.2 | 23.5 | 47.5 | 18.8 | 21.0 |
| **44** | 188.2 | 181.4 | 19.9 | 34.0 | 21.5 | 50.0 | 35.3 | 42.1 | 21.3 | 24.9 | 54.5 | 22.0 | 24.1 |
| **42** | 207.7 | 195.4 | 19.9 | 34.5 | 20.6 | 55.0 | 37.3 | 44.7 | 22.2 | 25.8 | 66.2 | 30.2 | 31.6 |
| **40** | 228.8 | 224.5 | 19.9 | 35.6 | 19.6 | 61.1 | 39.3 | 46.7 | 22.8 | 26.4 | 112.8 | 34.5 | 35.6 |
| **38** | 276.1 | 259.2 | 19.7 | 36.4 | 18.5 | 67.5 | 42.0 | 48.6 | 23.5 | 26.5 | 120.8 | 38.6 | 38.4 |
| **36** | 355.4 | 287.9 | 19.5 | 37.0 | 17.0 | 75.5 | 45.7 | 50.3 | 24.5 | 26.6 | 132.7 | 43.0 | 42.9 |
| **34** | 440.0 | 282.6 | 19.3 | 37.2 | 15.9 | 84.9 | 50.7 | 54.5 | 25.7 | 26.8 | 148.3 | 49.0 | 48.6 |
| **32** | 495.9 | 252.1 | 18.9 | 37.1 | 14.5 | 92.8 | 55.4 | 58.9 | 27.4 | 26.4 | 168.6 | 52.9 | 55.7 |
| **30** | 538.6 | 174.8 | 18.5 | 36.4 | 12.9 | 100.0 | 58.7 | 62.7 | 28.8 | 26.5 | 194.5 | 58.6 | 62.1 |
| **28** | 486.0 | 97.7 | 17.9 | 35.8 | 11.6 | 105.4 | 61.2 | 67.8 | 29.8 | 26.4 | 207.9 | 62.5 | 69.3 |
| **26** | 347.1 | 33.0 | 17.4 | 35.0 | 10.1 | 110.1 | 64.0 | 72.3 | 30.9 | 26.8 | 240.1 | 67.4 | 74.4 |
| **24** | 122.7 | 12.6 | 16.8 | 33.8 | 8.4 | 113.7 | 65.5 | 75.1 | 32.2 | 27.5 | 264.1 | 72.5 | 79.3 |
| **22** | 29.8 | 7.8 | 16.3 | 32.3 | 6.5 | 114.4 | 66.4 | 79.2 | 33.2 | 28.0 | 307.6 | 75.7 | 80.3 |

*Table 22. The 2019 Ford Fusion Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 0.7 | 0.8 | 0.3 | 107.4 | 129.0 | 43.3 | 99.9 | 49.8 | 24.1 | 9.5 | 7.5 | 5.8 | 4.2 | 9.2 | 7.0 | 5.9 |
| **52** | 0.7 | 0.8 | 0.3 | 100.2 | 121.3 | 41.8 | 92.7 | 43.7 | 22.0 | 9.1 | 6.3 | 5.0 | 3.6 | 7.6 | 5.6 | 4.8 |
| **50** | 0.7 | 0.8 | 0.3 | 89.5 | 105.6 | 39.0 | 81.3 | 36.9 | 18.9 | 8.7 | 5.3 | 4.2 | 3.2 | 6.3 | 4.6 | 3.9 |
| **48** | 0.6 | 0.8 | 0.3 | 72.7 | 83.7 | 33.8 | 66.2 | 28.6 | 14.9 | 8.0 | 4.1 | 3.4 | 2.7 | 5.0 | 3.6 | 3.0 |
| **46** | 0.6 | 0.8 | 0.3 | 47.4 | 55.7 | 24.4 | 44.2 | 19.2 | 10.9 | 6.8 | 3.2 | 2.6 | 2.3 | 3.8 | 2.7 | 2.2 |
| **44** | 0.6 | 0.8 | 0.3 | 22.6 | 27.4 | 15.2 | 22.3 | 12.3 | 8.1 | 5.5 | 2.5 | 2.0 | 1.8 | 2.9 | 2.0 | 1.6 |
| **42** | 0.6 | 0.8 | 0.3 | 10.4 | 12.2 | 10.4 | 10.4 | 7.0 | 5.1 | 4.3 | 2.0 | 1.6 | 1.5 | 2.3 | 1.6 | 1.3 |
| **40** | 0.6 | 0.7 | 0.3 | 5.3 | 5.8 | 6.3 | 5.4 | 4.3 | 3.2 | 3.5 | 1.5 | 1.2 | 1.1 | 1.8 | 1.2 | 1.0 |
| **38** | 0.5 | 0.7 | 0.3 | 3.7 | 3.6 | 3.4 | 3.7 | 2.7 | 2.0 | 2.8 | 1.2 | 0.9 | 0.8 | 1.4 | 0.9 | 0.8 |
| **36** | 0.5 | 0.7 | 0.3 | 3.2 | 2.9 | 2.1 | 3.2 | 2.0 | 1.4 | 2.2 | 0.9 | 0.7 | 0.6 | 1.1 | 0.7 | 0.6 |
| **34** | 0.5 | 0.7 | 0.3 | 3.0 | 2.6 | 1.7 | 3.0 | 1.6 | 1.1 | 1.5 | 0.7 | 0.6 | 0.5 | 0.9 | 0.6 | 0.5 |
| **32** | 0.5 | 0.7 | 0.3 | 2.9 | 2.5 | 1.6 | 3.0 | 1.5 | 1.0 | 0.9 | 0.6 | 0.5 | 0.4 | 0.7 | 0.5 | 0.4 |
| **30** | 0.5 | 0.7 | 0.3 | 2.8 | 2.5 | 1.5 | 2.9 | 1.3 | 0.9 | 0.7 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **28** | 0.5 | 0.7 | 0.3 | 2.8 | 2.4 | 1.5 | 2.8 | 1.3 | 0.9 | 0.5 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **26** | 0.5 | 0.7 | 0.3 | 2.7 | 2.3 | 1.5 | 2.8 | 1.3 | 0.9 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **24** | 0.5 | 0.6 | 0.3 | 2.6 | 2.3 | 1.5 | 2.7 | 1.2 | 0.9 | 0.4 | 0.4 | 0.4 | 0.2 | 0.5 | 0.4 | 0.3 |
| **22** | 0.5 | 0.6 | 0.3 | 2.6 | 2.2 | 1.5 | 2.6 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |

*Table 23. The 2019 Ford Fusion Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 60.9 | 32.6 | 13.7 | 25.0 | 12.9 | 38.3 | 9.4 | 11.7 | 4.9 | 6.0 | 30.6 | 10.5 | 11.2 |
| **52** | 70.1 | 36.5 | 13.7 | 25.6 | 13.0 | 40.5 | 9.8 | 12.2 | 5.0 | 6.1 | 34.2 | 11.8 | 12.3 |
| **50** | 80.3 | 40.3 | 13.8 | 26.2 | 13.2 | 43.1 | 10.3 | 12.9 | 5.1 | 6.2 | 37.5 | 13.1 | 13.8 |
| **48** | 92.3 | 45.1 | 13.7 | 26.8 | 13.5 | 46.0 | 10.8 | 13.3 | 5.2 | 6.3 | 41.3 | 14.6 | 15.9 |
| **46** | 104.2 | 48.1 | 13.5 | 27.2 | 13.5 | 48.5 | 11.4 | 14.0 | 5.4 | 6.5 | 48.1 | 16.3 | 18.1 |
| **44** | 118.2 | 52.5 | 13.4 | 27.8 | 13.8 | 51.5 | 12.1 | 14.7 | 5.5 | 6.7 | 52.2 | 18.5 | 20.6 |
| **42** | 134.2 | 58.1 | 13.2 | 27.9 | 13.5 | 54.0 | 12.7 | 15.4 | 5.8 | 7.0 | 58.9 | 21.1 | 24.0 |
| **40** | 149.9 | 62.4 | 12.8 | 28.2 | 13.6 | 57.3 | 13.5 | 16.1 | 6.0 | 7.2 | 66.2 | 24.4 | 27.9 |
| **38** | 167.5 | 67.9 | 12.5 | 28.3 | 13.5 | 60.3 | 14.3 | 17.2 | 6.3 | 7.5 | 75.8 | 29.5 | 33.6 |
| **36** | 184.7 | 74.5 | 12.2 | 28.1 | 13.2 | 63.4 | 15.1 | 18.4 | 6.5 | 7.9 | 88.5 | 35.9 | 39.4 |
| **34** | 195.2 | 79.4 | 11.6 | 28.1 | 13.3 | 66.1 | 15.9 | 19.8 | 6.7 | 8.3 | 121.8 | 33.9 | 37.1 |
| **32** | 198.3 | 81.1 | 11.0 | 27.7 | 12.7 | 69.1 | 16.9 | 21.4 | 7.1 | 8.8 | 110.3 | 12.5 | 15.9 |
| **30** | 182.9 | 74.9 | 10.4 | 27.0 | 12.6 | 71.8 | 18.0 | 23.2 | 7.5 | 9.3 | 131.7 | 12.8 | 16.5 |
| **28** | 146.4 | 62.7 | 9.9 | 26.1 | 12.1 | 72.8 | 19.1 | 25.2 | 8.0 | 9.8 | 156.6 | 14.0 | 16.9 |
| **26** | 83.2 | 33.7 | 9.1 | 24.9 | 11.6 | 73.7 | 20.4 | 27.2 | 8.6 | 10.3 | 183.2 | 15.3 | 17.3 |
| **24** | 39.2 | 18.3 | 8.2 | 23.2 | 11.1 | 73.2 | 21.7 | 28.8 | 9.4 | 10.6 | 211.8 | 15.7 | 18.0 |
| **22** | 14.5 | 12.7 | 7.5 | 21.3 | 10.2 | 71.5 | 23.0 | 30.0 | 10.1 | 10.9 | 244.2 | 15.8 | 19.6 |

*Table 24. The 2022 Hyundai Tucson Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.7 | 2.0 | 0.6 | 280.1 | 273.2 | 228.6 | 127.1 | 80.3 | 65.9 | 67.5 | 12.1 | 7.5 | 9.0 | 24.6 | 24.1 | 22.9 |
| **52** | 1.6 | 2.3 | 0.6 | 268.7 | 270.0 | 224.7 | 123.5 | 72.3 | 55.2 | 62.2 | 10.1 | 5.8 | 7.2 | 21.1 | 20.6 | 19.4 |
| **50** | 1.7 | 2.3 | 0.6 | 237.7 | 258.4 | 211.0 | 108.8 | 62.5 | 45.5 | 52.6 | 8.1 | 4.3 | 5.4 | 17.1 | 16.7 | 15.7 |
| **48** | 1.8 | 2.3 | 0.6 | 186.0 | 228.5 | 177.7 | 74.3 | 48.5 | 33.6 | 38.3 | 6.3 | 3.4 | 4.1 | 13.1 | 12.9 | 12.3 |
| **46** | 1.8 | 2.1 | 0.6 | 124.0 | 156.3 | 112.0 | 40.6 | 32.1 | 21.3 | 23.8 | 4.4 | 2.4 | 2.7 | 8.9 | 8.8 | 8.6 |
| **44** | 1.7 | 1.9 | 0.5 | 57.3 | 65.3 | 46.2 | 16.3 | 15.9 | 9.9 | 10.5 | 3.2 | 1.9 | 1.7 | 5.9 | 5.9 | 5.8 |
| **42** | 1.6 | 1.8 | 0.5 | 20.4 | 20.7 | 14.8 | 6.1 | 7.6 | 4.2 | 4.2 | 2.3 | 1.4 | 1.1 | 4.0 | 4.0 | 3.9 |
| **40** | 1.3 | 1.6 | 0.5 | 9.0 | 8.5 | 6.0 | 2.6 | 4.4 | 2.5 | 2.1 | 1.7 | 1.1 | 0.7 | 2.6 | 2.6 | 2.5 |
| **38** | 1.1 | 1.5 | 0.5 | 5.7 | 5.5 | 3.9 | 1.5 | 2.8 | 1.9 | 1.3 | 1.4 | 0.9 | 0.6 | 2.1 | 2.1 | 2.0 |
| **36** | 1.0 | 1.4 | 0.5 | 4.4 | 4.5 | 3.4 | 1.2 | 2.1 | 1.6 | 1.1 | 1.0 | 0.8 | 0.5 | 1.5 | 1.5 | 1.5 |
| **34** | 0.9 | 1.3 | 0.5 | 3.9 | 4.2 | 3.3 | 1.2 | 1.9 | 1.5 | 1.1 | 0.9 | 0.7 | 0.4 | 1.2 | 1.2 | 1.1 |
| **32** | 0.9 | 1.2 | 0.5 | 3.7 | 3.8 | 3.1 | 1.2 | 1.7 | 1.5 | 1.1 | 0.7 | 0.6 | 0.4 | 0.9 | 0.9 | 0.9 |
| **30** | 0.9 | 1.2 | 0.5 | 3.4 | 3.5 | 2.9 | 1.1 | 1.6 | 1.5 | 1.1 | 0.6 | 0.5 | 0.4 | 0.8 | 0.8 | 0.8 |
| **28** | 0.9 | 1.3 | 0.5 | 3.3 | 3.3 | 2.7 | 1.1 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **26** | 0.9 | 1.3 | 0.5 | 3.2 | 3.1 | 2.6 | 1.0 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **24** | 1.0 | 1.3 | 0.5 | 3.1 | 2.9 | 2.5 | 1.0 | 1.4 | 1.4 | 1.0 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **22** | 1.0 | 1.1 | 0.5 | 3.0 | 2.8 | 2.6 | 0.9 | 1.3 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |

*Table 25. The 2022 Hyundai Tucson Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 159.7 | 130.8 | 37.6 | 57.4 | 50.1 | 80.1 | 42.8 | 51.2 | 28.6 | 29.4 | 29.3 | 10.9 | 11.1 |
| **52** | 184.3 | 149.5 | 38.5 | 59.9 | 52.2 | 86.2 | 59.0 | 78.0 | 42.1 | 50.0 | 31.9 | 12.4 | 12.6 |
| **50** | 214.7 | 172.0 | 39.5 | 62.7 | 54.3 | 92.1 | 63.7 | 85.9 | 45.6 | 54.2 | 34.5 | 13.5 | 13.9 |
| **48** | 248.9 | 197.8 | 40.3 | 65.1 | 56.6 | 98.4 | 69.0 | 94.8 | 49.6 | 58.7 | 38.5 | 15.4 | 15.7 |
| **46** | 285.7 | 226.9 | 41.2 | 68.1 | 59.2 | 105.8 | 75.7 | 104.6 | 53.8 | 64.0 | 43.6 | 17.1 | 17.6 |
| **44** | 325.0 | 260.8 | 41.8 | 70.9 | 61.3 | 113.7 | 83.6 | 114.9 | 58.0 | 69.5 | 47.6 | 19.3 | 20.3 |
| **42** | 363.9 | 291.3 | 42.5 | 74.0 | 64.0 | 122.9 | 93.1 | 123.9 | 62.1 | 75.5 | 56.5 | 21.4 | 23.4 |
| **40** | 407.0 | 323.4 | 43.0 | 77.1 | 66.3 | 133.5 | 103.6 | 133.2 | 66.7 | 82.0 | 64.1 | 24.6 | 26.9 |
| **38** | 454.4 | 356.0 | 43.3 | 79.8 | 69.0 | 144.5 | 114.8 | 143.1 | 71.7 | 89.4 | 71.7 | 29.0 | 32.3 |
| **36** | 507.3 | 394.0 | 43.5 | 82.4 | 71.1 | 156.1 | 126.3 | 154.4 | 76.5 | 96.9 | 82.8 | 35.1 | 38.2 |
| **34** | 565.4 | 432.8 | 43.4 | 84.5 | 73.0 | 168.7 | 139.0 | 167.1 | 82.0 | 103.8 | 98.3 | 42.1 | 46.5 |
| **32** | 611.7 | 439.8 | 43.1 | 85.8 | 73.9 | 181.7 | 151.2 | 180.4 | 87.1 | 110.5 | 122.5 | 54.8 | 59.1 |
| **30** | 629.1 | 380.2 | 42.8 | 87.0 | 73.0 | 195.5 | 163.8 | 193.8 | 92.7 | 117.0 | 319.2 | 109.0 | 144.5 |
| **28** | 574.5 | 225.3 | 42.1 | 87.1 | 70.9 | 210.0 | 176.1 | 208.6 | 97.8 | 123.5 | 384.6 | 124.8 | 168.0 |
| **26** | 348.9 | 70.0 | 41.4 | 86.4 | 66.2 | 223.5 | 189.5 | 225.2 | 102.8 | 129.7 | 476.1 | 143.2 | 195.2 |
| **24** | 63.4 | 11.6 | 40.1 | 84.4 | 60.7 | 235.8 | 203.3 | 239.6 | 107.1 | 135.3 | 569.5 | 164.8 | 225.3 |
| **22** | 15.3 | 7.0 | 38.2 | 80.2 | 53.9 | 246.3 | 215.9 | 254.4 | 111.0 | 140.4 | 664.4 | 188.0 | 260.2 |

*Table 26. The 2022 Subaru Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.5 | 1.8 | 0.7 | 489.9 | 444.1 | 301.7 | 113.0 | 242.7 | 126.3 | 65.7 | 45.1 | 36.6 | 23.1 | 72.4 | - | 61.9 |
| **52** | 1.4 | 1.7 | 0.7 | 519.2 | 478.1 | 321.0 | 112.7 | 239.6 | 112.3 | 61.3 | 42.1 | 29.5 | 20.7 | 65.8 | - | 55.7 |
| **50** | 1.3 | 1.7 | 0.7 | 483.9 | 491.8 | 325.2 | 105.2 | 218.0 | 100.5 | 52.7 | 36.3 | 21.0 | 17.4 | 56.5 | - | 47.7 |
| **48** | 1.2 | 1.7 | 0.7 | 391.0 | 476.7 | 299.5 | 78.5 | 186.4 | 77.1 | 39.3 | 29.3 | 15.2 | 13.6 | 43.8 | - | 36.8 |
| **46** | 1.2 | 1.7 | 0.7 | 271.5 | 379.3 | 206.6 | 37.4 | 132.9 | 45.7 | 21.5 | 15.8 | 9.1 | 8.8 | 26.6 | - | 23.5 |
| **44** | 1.1 | 1.6 | 0.6 | 106.7 | 143.0 | 64.6 | 10.4 | 42.7 | 18.0 | 8.7 | 8.4 | 5.3 | 4.9 | 14.8 | - | 13.7 |
| **42** | 1.0 | 1.4 | 0.6 | 27.0 | 30.5 | 15.0 | 2.9 | 15.2 | 5.7 | 4.3 | 5.0 | 3.2 | 2.7 | 8.3 | - | 7.7 |
| **40** | 0.9 | 1.3 | 0.6 | 12.7 | 12.2 | 6.9 | 1.1 | 7.8 | 2.9 | 2.7 | 3.3 | 2.2 | 1.6 | 5.2 | - | 4.8 |
| **38** | 0.8 | 1.1 | 0.6 | 8.2 | 8.3 | 5.7 | 0.8 | 5.4 | 2.2 | 1.8 | 2.4 | 1.6 | 1.1 | 3.5 | - | 3.2 |
| **36** | 0.8 | 1.1 | 0.6 | 6.3 | 6.9 | 5.0 | 0.7 | 4.0 | 1.9 | 1.4 | 1.8 | 1.3 | 0.8 | 2.4 | - | 2.2 |
| **34** | 0.7 | 1.0 | 0.6 | 5.7 | 6.1 | 4.5 | 0.6 | 3.3 | 2.0 | 1.2 | 1.5 | 1.1 | 0.7 | 1.9 | - | 1.8 |
| **32** | 0.6 | 1.0 | 0.6 | 5.4 | 5.6 | 4.3 | 0.6 | 2.9 | 2.2 | 1.1 | 1.2 | 1.0 | 0.6 | 1.6 | - | 1.5 |
| **30** | 0.5 | 1.0 | 0.6 | 5.3 | 5.4 | 4.0 | 0.5 | 2.7 | 2.3 | 1.0 | 1.1 | 0.9 | 0.6 | 1.4 | - | 1.3 |
| **28** | 0.4 | 0.9 | 0.6 | 5.1 | 5.3 | 3.7 | 0.5 | 2.6 | 2.2 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | - | 1.2 |
| **26** | 0.4 | 0.8 | 0.6 | 4.9 | 5.3 | 3.7 | 0.4 | 2.5 | 2.2 | 0.9 | 0.8 | 0.8 | 0.6 | 1.1 | - | 1.1 |
| **24** | 0.4 | 0.7 | 0.6 | 4.8 | 5.0 | 3.7 | 0.4 | 2.4 | 2.2 | 0.8 | 0.8 | 0.7 | 0.6 | 1.0 | - | 1.0 |
| **22** | 0.3 | 0.7 | 0.5 | 4.5 | 4.5 | 3.6 | 0.4 | 2.4 | 2.3 | 0.9 | 0.7 | 0.7 | 0.6 | 0.9 | - | 0.9 |

*Table 27. The 2022 Subaru Outback Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 144.6 | 120.3 | 23.1 | 37.1 | 30.7 | 57.7 | 46.0 | 58.1 | 31.1 | 37.9 | 32.3 | 10.8 | 11.9 |
| **52** | 161.9 | 132.7 | 23.5 | 38.3 | 31.7 | 61.4 | 48.9 | 61.5 | 32.6 | 40.2 | 36.7 | 12.1 | 13.3 |
| **50** | 185.3 | 146.9 | 23.9 | 39.8 | 32.6 | 65.9 | 51.4 | 64.9 | 34.2 | 42.5 | 39.4 | 13.5 | 15.1 |
| **48** | 214.8 | 162.0 | 24.3 | 41.1 | 33.9 | 70.5 | 53.8 | 68.4 | 35.7 | 45.2 | 43.6 | 14.9 | 17.1 |
| **46** | 244.8 | 179.2 | 24.6 | 42.3 | 34.8 | 74.9 | 56.6 | 72.3 | 37.3 | 47.7 | 47.4 | 17.1 | 19.5 |
| **44** | 275.5 | 198.2 | 24.9 | 43.6 | 35.6 | 80.3 | 59.6 | 76.3 | 38.9 | 50.1 | 53.2 | 19.7 | 22.5 |
| **42** | 303.5 | 216.6 | 25.1 | 45.2 | 36.6 | 85.8 | 62.7 | 81.2 | 40.7 | 52.5 | 60.0 | 23.2 | 26.1 |
| **40** | 336.4 | 237.5 | 25.3 | 46.6 | 37.1 | 91.5 | 65.9 | 86.6 | 42.3 | 55.1 | 70.0 | 27.9 | 30.7 |
| **38** | 372.8 | 262.3 | 25.5 | 48.1 | 37.4 | 97.0 | 68.3 | 91.5 | 43.8 | 57.3 | 160.0 | 38.8 | 39.7 |
| **36** | 413.7 | 289.8 | 25.6 | 49.9 | 37.7 | 103.5 | 70.7 | 95.6 | 45.1 | 59.3 | 188.6 | 58.7 | 71.4 |
| **34** | 468.6 | 309.1 | 25.4 | 50.9 | 37.2 | 109.6 | 73.0 | 99.6 | 46.2 | 60.9 | 216.8 | 65.5 | 79.2 |
| **32** | 534.0 | 286.2 | 25.2 | 52.1 | 36.2 | 116.1 | 75.4 | 103.9 | 46.7 | 62.4 | 248.7 | 72.8 | 88.0 |
| **30** | 621.0 | 224.4 | 24.8 | 53.2 | 34.8 | 121.8 | 77.0 | 107.7 | 47.3 | 63.7 | 277.2 | 79.6 | 97.3 |
| **28** | 625.1 | 169.5 | 24.3 | 53.2 | 33.2 | 128.3 | 78.8 | 111.9 | 47.4 | 64.8 | 306.4 | 86.0 | 107.7 |
| **26** | 418.3 | 80.6 | 23.2 | 53.2 | 30.7 | 134.1 | 81.2 | 116.5 | 47.6 | 65.9 | 344.4 | 92.6 | 119.2 |
| **24** | 62.9 | 16.4 | 22.1 | 52.6 | 27.8 | 137.8 | 84.2 | 120.7 | 47.5 | 66.5 | 403.1 | 100.2 | 132.1 |
| **22** | 17.5 | 5.9 | 20.6 | 50.2 | 24.1 | 140.9 | 87.8 | 125.0 | 46.9 | 66.4 | 471.2 | 106.3 | 145.1 |

*Table 28. The 2022 Tesla Model 3 Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 0.6 | 2.3 | 0.4 | 356.5 | 294.9 | 333.6 | 232.7 | 66.6 | 81.2 | 47.7 | 10.2 | 11.5 | 11.0 | 8.7 | 10.3 | 13.4 |
| **52** | 0.6 | 2.1 | 0.4 | 324.9 | 266.5 | 300.5 | 214.2 | 53.2 | 67.0 | 39.3 | 8.3 | 9.4 | 9.0 | 7.0 | 8.4 | 10.9 |
| **50** | 0.6 | 1.8 | 0.4 | 270.7 | 220.2 | 255.3 | 185.6 | 40.5 | 51.2 | 29.1 | 6.2 | 6.9 | 6.8 | 5.2 | 6.3 | 8.2 |
| **48** | 0.5 | 1.5 | 0.3 | 189.8 | 156.8 | 188.0 | 140.0 | 27.7 | 35.2 | 19.5 | 4.7 | 5.3 | 5.2 | 4.0 | 4.8 | 6.3 |
| **46** | 0.5 | 1.2 | 0.3 | 105.7 | 91.4 | 112.7 | 85.7 | 16.7 | 21.1 | 11.7 | 3.3 | 3.8 | 3.8 | 2.9 | 3.4 | 4.5 |
| **44** | 0.5 | 1.0 | 0.3 | 41.3 | 39.5 | 49.3 | 37.8 | 8.8 | 11.1 | 6.3 | 2.2 | 2.5 | 2.6 | 1.9 | 2.3 | 2.9 |
| **42** | 0.5 | 0.8 | 0.3 | 11.5 | 12.1 | 16.2 | 13.9 | 4.4 | 5.6 | 3.3 | 1.5 | 1.7 | 1.9 | 1.3 | 1.6 | 2.0 |
| **40** | 0.5 | 0.8 | 0.3 | 5.4 | 6.0 | 6.7 | 7.8 | 2.3 | 2.8 | 1.7 | 0.9 | 1.0 | 1.2 | 0.8 | 1.0 | 1.3 |
| **38** | 0.5 | 0.7 | 0.3 | 4.4 | 5.1 | 4.4 | 5.0 | 1.7 | 1.8 | 1.1 | 0.7 | 0.8 | 0.9 | 0.7 | 0.8 | 0.9 |
| **36** | 0.5 | 0.7 | 0.3 | 4.1 | 4.8 | 3.8 | 3.4 | 1.5 | 1.4 | 0.9 | 0.6 | 0.6 | 0.7 | 0.5 | 0.6 | 0.7 |
| **34** | 0.5 | 0.7 | 0.3 | 3.8 | 4.6 | 3.6 | 2.9 | 1.5 | 1.2 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 |
| **32** | 0.5 | 0.6 | 0.2 | 3.7 | 4.7 | 3.7 | 2.8 | 1.5 | 1.1 | 0.7 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 |
| **30** | 0.5 | 0.6 | 0.2 | 3.7 | 4.9 | 4.0 | 2.6 | 1.5 | 1.0 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 |
| **28** | 0.5 | 0.6 | 0.2 | 3.6 | 5.0 | 4.1 | 2.4 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **26** | 0.6 | 0.6 | 0.2 | 3.4 | 4.8 | 4.0 | 2.2 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **24** | 0.6 | 0.6 | 0.2 | 3.1 | 4.5 | 3.7 | 2.0 | 1.5 | 0.8 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **22** | 0.6 | 0.6 | 0.2 | 2.8 | 4.0 | 3.3 | 1.9 | 1.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |

*Table 29. The 2022 Tesla Model 3 Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 133.8 | 131.8 | 21.5 | 30.3 | 31.5 | 44.7 | 54.7 | 50.8 | 37.5 | 32.6 | 29.1 | 11.1 | 11.3 |
| **52** | 145.6 | 143.7 | 22.0 | 32.2 | 33.3 | 47.4 | 59.1 | 55.3 | 39.5 | 34.8 | 31.9 | 12.3 | 12.6 |
| **50** | 160.3 | 157.2 | 22.2 | 34.3 | 35.9 | 50.9 | 64.0 | 59.7 | 41.8 | 37.2 | 35.9 | 13.9 | 13.9 |
| **48** | 176.6 | 175.3 | 22.8 | 37.0 | 39.2 | 53.9 | 68.9 | 65.1 | 44.6 | 40.3 | 39.3 | 15.5 | 16.0 |
| **46** | 194.8 | 188.7 | 22.2 | 40.1 | 42.7 | 57.7 | 73.5 | 70.1 | 47.9 | 43.5 | 44.2 | 17.1 | 18.5 |
| **44** | 215.1 | 201.3 | 21.8 | 43.0 | 46.5 | 62.4 | 78.8 | 75.3 | 50.4 | 46.9 | 51.9 | 19.3 | 20.8 |
| **42** | 229.6 | 209.3 | 21.8 | 46.3 | 50.3 | 68.0 | 85.2 | 81.0 | 52.7 | 50.2 | 57.1 | 21.9 | 23.8 |
| **40** | 243.4 | 233.4 | 20.9 | 49.2 | 53.4 | 75.2 | 89.9 | 86.8 | 55.5 | 53.0 | 63.8 | 25.5 | 28.4 |
| **38** | 259.6 | 274.3 | 20.6 | 51.2 | 55.4 | 84.4 | 95.2 | 92.3 | 58.5 | 55.1 | 73.7 | 30.5 | 33.7 |
| **36** | 274.8 | 354.6 | 19.5 | 51.9 | 56.4 | 94.6 | 99.7 | 98.5 | 60.8 | 57.5 | 85.4 | 36.2 | 40.0 |
| **34** | 282.4 | 441.0 | 18.3 | 51.7 | 56.4 | 107.9 | 103.6 | 105.5 | 62.7 | 60.5 | 104.9 | 46.5 | 49.0 |
| **32** | 263.9 | 432.9 | 17.6 | 50.6 | 55.4 | 125.3 | 107.8 | 115.8 | 64.7 | 67.1 | 193.3 | 90.0 | 76.9 |
| **30** | 208.3 | 353.0 | 16.1 | 48.8 | 53.2 | 150.9 | 114.8 | 132.6 | 66.8 | 77.5 | 229.9 | 112.8 | 94.0 |
| **28** | 122.7 | 237.5 | 14.9 | 46.6 | 50.3 | 177.5 | 125.1 | 156.5 | 69.7 | 94.0 | 267.9 | 130.4 | 109.9 |
| **26** | 56.2 | 94.2 | 13.0 | 43.8 | 47.3 | 202.9 | 143.0 | 194.2 | 72.9 | 118.6 | 308.6 | 149.9 | 129.8 |
| **24** | 18.8 | 19.1 | 11.2 | 40.7 | 43.4 | 214.4 | 168.6 | 252.0 | 75.9 | 155.9 | 354.3 | 168.6 | 155.2 |
| **22** | 7.9 | 5.4 | 9.8 | 35.7 | 38.3 | 213.0 | 189.8 | 323.9 | 78.6 | 207.8 | 414.0 | 185.0 | 176.7 |

*Table 30. The 2022 Toyota Camry Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.6 | 1.8 | 0.5 | 303.0 | 285.3 | 202.2 | 57.8 | 117.5 | 52.4 | 33.6 | 20.9 | 12.1 | 5.9 | 48.1 | 48.4 | 46.4 |
| **52** | 1.6 | 1.8 | 0.5 | 328.4 | 321.9 | 221.2 | 56.8 | 113.4 | 44.2 | 30.6 | 18.5 | 10.2 | 5.3 | 46.8 | 47.0 | 45.0 |
| **50** | 1.6 | 1.8 | 0.5 | 334.9 | 346.9 | 234.3 | 53.5 | 104.1 | 33.8 | 27.5 | 14.4 | 7.7 | 4.5 | 43.3 | 44.0 | 41.9 |
| **48** | 1.6 | 1.8 | 0.5 | 312.7 | 356.2 | 234.9 | 48.4 | 95.0 | 23.0 | 23.1 | 11.2 | 6.0 | 3.9 | 38.4 | 39.5 | 37.7 |
| **46** | 1.6 | 1.8 | 0.5 | 252.6 | 334.1 | 213.8 | 40.7 | 72.9 | 14.4 | 16.3 | 8.0 | 4.4 | 3.3 | 31.2 | 32.8 | 31.4 |
| **44** | 1.5 | 1.7 | 0.5 | 144.5 | 222.3 | 143.7 | 28.5 | 36.6 | 9.1 | 9.0 | 5.3 | 3.1 | 2.7 | 20.6 | 23.4 | 23.1 |
| **42** | 1.5 | 1.6 | 0.5 | 51.6 | 66.9 | 51.9 | 10.6 | 14.2 | 5.5 | 4.7 | 3.8 | 2.4 | 2.2 | 13.8 | 16.2 | 16.5 |
| **40** | 1.4 | 1.6 | 0.5 | 20.0 | 24.3 | 19.6 | 4.9 | 8.2 | 3.6 | 3.3 | 2.7 | 1.8 | 1.6 | 7.7 | 9.2 | 9.5 |
| **38** | 1.3 | 1.5 | 0.5 | 11.6 | 13.1 | 10.7 | 3.2 | 5.5 | 2.7 | 2.5 | 2.1 | 1.4 | 1.2 | 5.4 | 6.2 | 6.4 |
| **36** | 1.3 | 1.4 | 0.5 | 7.6 | 8.4 | 6.6 | 2.3 | 4.0 | 2.2 | 1.9 | 1.7 | 1.2 | 1.0 | 4.0 | 4.6 | 4.7 |
| **34** | 1.2 | 1.4 | 0.5 | 5.6 | 6.0 | 4.8 | 1.9 | 3.1 | 2.0 | 1.6 | 1.3 | 1.0 | 0.8 | 3.0 | 3.3 | 3.4 |
| **32** | 1.1 | 1.3 | 0.5 | 4.7 | 5.1 | 4.0 | 1.8 | 2.6 | 1.7 | 1.4 | 1.2 | 0.9 | 0.7 | 2.5 | 2.7 | 2.8 |
| **30** | 1.1 | 1.2 | 0.5 | 4.3 | 4.6 | 3.6 | 1.7 | 2.2 | 1.6 | 1.3 | 1.0 | 0.8 | 0.6 | 2.0 | 2.1 | 2.2 |
| **28** | 1.0 | 1.1 | 0.5 | 4.2 | 4.3 | 3.3 | 1.6 | 2.0 | 1.5 | 1.2 | 0.9 | 0.7 | 0.6 | 1.6 | 1.7 | 1.8 |
| **26** | 0.9 | 1.0 | 0.5 | 4.1 | 4.1 | 3.2 | 1.5 | 1.9 | 1.5 | 1.1 | 0.8 | 0.6 | 0.5 | 1.4 | 1.5 | 1.5 |
| **24** | 0.8 | 0.9 | 0.5 | 4.0 | 3.9 | 3.0 | 1.5 | 1.8 | 1.4 | 1.1 | 0.7 | 0.6 | 0.5 | 1.2 | 1.2 | 1.3 |
| **22** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |

*Table 31. The 2022 Toyota Camry Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 117.4 | 106.9 | 23.8 | 32.9 | 27.3 | 47.0 | 42.3 | 43.1 | 28.4 | 29.4 | 29.8 | 10.9 | 11.4 |
| **52** | 131.8 | 120.0 | 25.0 | 34.4 | 28.5 | 50.7 | 46.7 | 47.1 | 30.9 | 31.6 | 32.8 | 12.3 | 12.6 |
| **50** | 147.5 | 132.4 | 26.2 | 35.7 | 29.6 | 54.7 | 50.6 | 51.5 | 33.2 | 33.8 | 36.5 | 13.6 | 14.1 |
| **48** | 164.7 | 146.1 | 27.6 | 37.5 | 30.8 | 59.3 | 54.9 | 55.4 | 35.9 | 36.3 | 39.6 | 15.1 | 16.1 |
| **46** | 186.1 | 157.9 | 29.2 | 39.1 | 32.0 | 63.7 | 59.0 | 59.0 | 38.3 | 38.6 | 46.5 | 16.6 | 18.3 |
| **44** | 211.1 | 170.8 | 30.7 | 41.4 | 33.6 | 68.1 | 62.7 | 63.1 | 40.8 | 40.9 | 51.6 | 19.0 | 20.9 |
| **42** | 234.4 | 188.1 | 32.1 | 43.6 | 34.8 | 72.7 | 66.8 | 66.3 | 43.0 | 43.1 | 57.2 | 21.9 | 24.2 |
| **40** | 257.6 | 204.4 | 33.7 | 46.1 | 35.9 | 77.9 | 70.0 | 69.5 | 45.3 | 45.3 | 64.6 | 25.3 | 28.3 |
| **38** | 282.9 | 220.3 | 35.3 | 49.3 | 36.9 | 84.1 | 72.6 | 72.4 | 47.7 | 47.6 | 74.6 | 30.5 | 33.7 |
| **36** | 307.8 | 236.0 | 36.5 | 52.5 | 37.1 | 90.3 | 75.8 | 77.2 | 49.9 | 50.4 | 87.1 | 36.7 | 40.1 |
| **34** | 348.9 | 245.8 | 37.7 | 56.7 | 36.6 | 97.9 | 79.5 | 82.2 | 52.1 | 53.0 | 110.4 | 48.5 | 51.9 |
| **32** | 415.4 | 233.1 | 38.9 | 60.2 | 34.6 | 105.6 | 82.9 | 86.8 | 53.8 | 55.1 | 173.9 | 70.2 | 73.8 |
| **30** | 489.3 | 171.4 | 39.4 | 64.6 | 32.4 | 115.1 | 84.6 | 91.2 | 55.0 | 56.2 | 205.1 | 82.3 | 84.0 |
| **28** | 494.4 | 113.5 | 39.7 | 67.9 | 29.8 | 126.8 | 85.1 | 96.6 | 55.0 | 56.2 | 238.6 | 95.9 | 95.9 |
| **26** | 365.9 | 84.0 | 39.9 | 70.7 | 26.8 | 141.3 | 86.0 | 101.6 | 55.0 | 55.7 | 277.5 | 107.8 | 106.1 |
| **24** | 74.4 | 27.2 | 39.8 | 71.9 | 23.8 | 159.4 | 87.1 | 107.6 | 54.3 | 54.5 | 329.6 | 119.0 | 117.4 |
| **22** | 25.7 | 11.0 | 39.4 | 71.8 | 20.3 | 179.9 | 88.1 | 114.8 | 53.0 | 53.4 | 387.9 | 131.0 | 130.2 |

*Table 32. The 2018 Ford F-150 Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.25 | 1.17 | 0.51 | 142.38 | 158.03 | 94.71 | 12.88 | 37.53 | 18.74 | 9.07 | 5.68 | 4.96 | 2.83 | 12.64 | 13.47 | 11.61 |
| **52** | 1.21 | 1.14 | 0.49 | 133.32 | 144.60 | 85.66 | 11.05 | 33.71 | 16.62 | 8.08 | 5.15 | 4.44 | 2.51 | 11.40 | 12.03 | 10.48 |
| **50** | 1.16 | 1.10 | 0.47 | 121.55 | 124.26 | 70.85 | 9.24 | 29.31 | 14.16 | 7.08 | 4.56 | 3.93 | 2.23 | 10.12 | 10.54 | 9.32 |
| **48** | 1.11 | 1.06 | 0.45 | 102.61 | 102.56 | 53.88 | 7.59 | 24.90 | 11.73 | 6.13 | 3.90 | 3.33 | 1.90 | 8.42 | 8.70 | 7.74 |
| **46** | 1.07 | 1.03 | 0.44 | 79.00 | 73.98 | 35.86 | 6.13 | 19.33 | 8.90 | 5.04 | 3.30 | 2.85 | 1.65 | 6.90 | 7.08 | 6.41 |
| **44** | 1.03 | 1.00 | 0.43 | 48.74 | 43.56 | 18.32 | 4.98 | 13.74 | 6.56 | 4.03 | 2.74 | 2.38 | 1.41 | 5.32 | 5.43 | 5.03 |
| **42** | 1.00 | 0.96 | 0.43 | 21.58 | 19.28 | 9.15 | 3.96 | 8.48 | 4.62 | 3.09 | 2.26 | 1.98 | 1.21 | 4.04 | 4.09 | 3.88 |
| **40** | 0.97 | 0.92 | 0.42 | 10.64 | 9.44 | 5.88 | 3.13 | 5.61 | 3.52 | 2.50 | 1.78 | 1.58 | 1.02 | 2.75 | 2.75 | 2.67 |
| **38** | 0.92 | 0.87 | 0.41 | 6.35 | 5.46 | 4.17 | 2.48 | 3.72 | 2.64 | 2.01 | 1.48 | 1.34 | 0.90 | 2.14 | 2.14 | 2.06 |
| **36** | 0.89 | 0.85 | 0.40 | 4.45 | 3.88 | 3.27 | 2.04 | 2.66 | 2.07 | 1.65 | 1.23 | 1.12 | 0.78 | 1.66 | 1.65 | 1.54 |
| **34** | 0.87 | 0.82 | 0.39 | 3.47 | 3.20 | 2.76 | 1.76 | 2.12 | 1.71 | 1.43 | 1.01 | 0.94 | 0.68 | 1.32 | 1.31 | 1.19 |
| **32** | 0.84 | 0.80 | 0.39 | 2.95 | 2.85 | 2.42 | 1.56 | 1.72 | 1.45 | 1.23 | 0.85 | 0.80 | 0.60 | 1.08 | 1.07 | 0.94 |
| **30** | 0.81 | 0.78 | 0.38 | 2.67 | 2.69 | 2.25 | 1.41 | 1.49 | 1.29 | 1.11 | 0.75 | 0.70 | 0.55 | 0.93 | 0.93 | 0.81 |
| **28** | 0.79 | 0.75 | 0.38 | 2.53 | 2.52 | 2.16 | 1.32 | 1.31 | 1.15 | 1.01 | 0.64 | 0.61 | 0.49 | 0.79 | 0.80 | 0.69 |
| **26** | 0.76 | 0.73 | 0.37 | 2.42 | 2.46 | 2.06 | 1.24 | 1.20 | 1.06 | 0.95 | 0.56 | 0.54 | 0.45 | 0.70 | 0.70 | 0.60 |
| **24** | 0.74 | 0.71 | 0.36 | 2.34 | 2.37 | 1.98 | 1.17 | 1.11 | 0.99 | 0.89 | 0.50 | 0.48 | 0.41 | 0.62 | 0.62 | 0.54 |
| **22** | 0.72 | 0.69 | 0.35 | 2.26 | 2.33 | 1.91 | 1.14 | 1.05 | 0.94 | 0.85 | 0.46 | 0.44 | 0.38 | 0.56 | 0.56 | 0.49 |

*Table 33. The 2018 Ford F-150 Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 67.07 | 56.04 | 28.30 | 33.23 | 21.14 | 29.68 | 23.68 | 23.45 | 18.30 | 15.84 | 6.98 | 2.87 | 3.49 |
| **52** | 76.13 | 62.07 | 29.64 | 35.52 | 22.22 | 31.76 | 26.37 | 25.90 | 19.96 | 17.70 | 7.88 | 3.21 | 3.84 |
| **50** | 85.43 | 68.72 | 30.86 | 37.65 | 23.28 | 34.83 | 29.09 | 28.52 | 22.16 | 19.38 | 9.45 | 3.76 | 4.31 |
| **48** | 96.46 | 75.48 | 32.18 | 40.00 | 24.41 | 39.02 | 31.91 | 31.71 | 24.20 | 21.17 | 11.86 | 4.70 | 5.26 |
| **46** | 108.76 | 82.39 | 33.60 | 42.59 | 25.55 | 44.18 | 34.73 | 34.69 | 26.35 | 22.95 | 15.19 | 5.83 | 7.38 |
| **44** | 126.19 | 89.51 | 34.49 | 44.97 | 26.49 | 50.14 | 37.87 | 37.61 | 28.29 | 24.79 | 20.64 | 7.39 | 10.02 |
| **42** | 144.77 | 97.70 | 35.80 | 47.55 | 27.07 | 57.48 | 41.07 | 40.35 | 30.04 | 26.70 | 29.61 | 10.72 | 12.68 |
| **40** | 163.64 | 108.08 | 37.12 | 50.04 | 27.56 | 66.03 | 44.59 | 43.29 | 32.11 | 28.78 | 39.21 | 15.71 | 16.66 |
| **38** | 188.82 | 116.36 | 38.44 | 52.55 | 27.79 | 75.98 | 48.01 | 47.53 | 33.64 | 30.80 | 51.64 | 22.50 | 21.70 |
| **36** | 216.37 | 116.34 | 39.11 | 55.21 | 28.04 | 87.77 | 51.73 | 53.80 | 35.78 | 32.83 | 65.44 | 30.17 | 27.99 |
| **34** | 252.35 | 111.30 | 39.82 | 57.47 | 28.11 | 99.14 | 55.29 | 59.41 | 37.84 | 34.79 | 79.09 | 36.89 | 34.09 |
| **32** | 272.88 | 103.56 | 40.19 | 59.60 | 28.03 | 111.75 | 59.46 | 64.68 | 40.48 | 36.51 | 95.38 | 43.65 | 41.40 |
| **30** | 252.95 | 90.61 | 39.84 | 60.92 | 27.64 | 128.04 | 63.25 | 70.82 | 41.86 | 37.59 | 112.35 | 51.53 | 49.48 |
| **28** | 210.01 | 71.74 | 38.56 | 61.44 | 27.03 | 141.83 | 67.09 | 74.90 | 41.91 | 37.47 | 137.65 | 64.11 | 58.10 |
| **26** | 143.66 | 48.08 | 37.35 | 61.47 | 26.13 | 154.95 | 71.65 | 76.76 | 41.50 | 36.78 | 168.29 | 77.24 | 67.94 |
| **24** | 57.84 | 25.10 | 35.73 | 60.62 | 24.93 | 168.06 | 74.38 | 78.20 | 40.37 | 35.52 | 202.30 | 92.81 | 81.04 |
| **22** | 20.86 | 13.29 | 33.02 | 57.70 | 23.26 | 179.88 | 72.86 | 79.38 | 38.90 | 33.68 | 254.46 | 110.80 | 95.71 |

*Table 34. The 2018 Toyota Camry Lab Tested Height Effects – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.0 | 1.1 | 0.2 | 248.5 | 218.8 | 134.2 | 49.8 | 70.6 | 22.3 | 25.3 | 8.2 | 6.5 | 3.6 | 29.0 | 26.3 | 21.4 |
| **52** | 1.0 | 1.1 | 0.2 | 250.0 | 224.6 | 135.6 | 48.6 | 61.9 | 20.4 | 20.9 | 7.5 | 6.0 | 3.3 | 26.7 | 24.1 | 19.4 |
| **50** | 1.1 | 1.1 | 0.2 | 241.7 | 224.4 | 134.1 | 46.7 | 51.8 | 17.5 | 16.4 | 6.7 | 5.4 | 3.0 | 23.9 | 21.6 | 17.2 |
| **48** | 1.1 | 1.1 | 0.2 | 214.9 | 212.5 | 125.6 | 44.0 | 41.0 | 14.6 | 12.7 | 5.4 | 4.5 | 2.6 | 19.7 | 18.0 | 14.2 |
| **46** | 1.1 | 1.1 | 0.2 | 162.7 | 170.7 | 99.8 | 37.1 | 29.7 | 11.7 | 9.8 | 4.5 | 3.8 | 2.3 | 16.1 | 14.8 | 11.6 |
| **44** | 1.1 | 1.0 | 0.2 | 89.7 | 97.2 | 53.0 | 19.5 | 20.1 | 8.9 | 7.6 | 3.8 | 3.2 | 2.0 | 12.4 | 11.5 | 9.0 |
| **42** | 1.1 | 1.0 | 0.2 | 39.5 | 40.7 | 23.2 | 7.0 | 11.9 | 5.9 | 4.9 | 3.1 | 2.6 | 1.7 | 9.5 | 8.8 | 6.9 |
| **40** | 1.0 | 1.0 | 0.2 | 21.6 | 22.9 | 13.3 | 4.1 | 7.6 | 3.8 | 2.9 | 2.3 | 2.0 | 1.3 | 6.5 | 6.1 | 4.9 |
| **38** | 0.9 | 0.9 | 0.2 | 11.7 | 12.8 | 7.6 | 2.8 | 5.0 | 2.6 | 1.8 | 1.9 | 1.6 | 1.0 | 5.3 | 4.9 | 4.0 |
| **36** | 0.9 | 0.9 | 0.2 | 6.9 | 7.1 | 4.5 | 1.9 | 3.3 | 1.9 | 1.2 | 1.5 | 1.3 | 0.8 | 4.3 | 4.0 | 3.2 |
| **34** | 0.8 | 0.9 | 0.3 | 4.4 | 4.6 | 3.1 | 1.4 | 2.4 | 1.4 | 0.9 | 1.2 | 1.0 | 0.7 | 3.5 | 3.2 | 2.6 |
| **32** | 0.8 | 0.9 | 0.3 | 3.1 | 3.4 | 2.4 | 1.1 | 1.7 | 1.1 | 0.7 | 1.0 | 0.8 | 0.6 | 2.9 | 2.7 | 2.2 |
| **30** | 0.8 | 0.8 | 0.3 | 2.5 | 2.6 | 2.0 | 1.1 | 1.3 | 0.8 | 0.5 | 0.8 | 0.7 | 0.5 | 2.4 | 2.3 | 1.9 |
| **28** | 0.7 | 0.8 | 0.3 | 2.1 | 2.2 | 1.8 | 1.1 | 1.0 | 0.6 | 0.4 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **26** | 0.7 | 0.8 | 0.3 | 1.8 | 1.9 | 1.6 | 1.0 | 0.8 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 1.6 | 1.5 | 1.2 |
| **24** | 0.7 | 0.7 | 0.3 | 1.6 | 1.7 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.0 |
| **22** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 1.1 | 1.0 | 0.9 |

*Table 35. The 2018 Toyota Camry Lab Tested Height Effects – Test Locations at and Below the Horizon*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 67.07 | 56.04 | 28.30 | 33.23 | 21.14 | 29.68 | 23.68 | 23.45 | 18.30 | 15.84 | 6.98 | 2.87 | 3.49 |
| **52** | 76.13 | 62.07 | 29.64 | 35.52 | 22.22 | 31.76 | 26.37 | 25.90 | 19.96 | 17.70 | 7.88 | 3.21 | 3.84 |
| **50** | 85.43 | 68.72 | 30.86 | 37.65 | 23.28 | 34.83 | 29.09 | 28.52 | 22.16 | 19.38 | 9.45 | 3.76 | 4.31 |
| **48** | 96.46 | 75.48 | 32.18 | 40.00 | 24.41 | 39.02 | 31.91 | 31.71 | 24.20 | 21.17 | 11.86 | 4.70 | 5.26 |
| **46** | 108.76 | 82.39 | 33.60 | 42.59 | 25.55 | 44.18 | 34.73 | 34.69 | 26.35 | 22.95 | 15.19 | 5.83 | 7.38 |
| **44** | 126.19 | 89.51 | 34.49 | 44.97 | 26.49 | 50.14 | 37.87 | 37.61 | 28.29 | 24.79 | 20.64 | 7.39 | 10.02 |
| **42** | 144.77 | 97.70 | 35.80 | 47.55 | 27.07 | 57.48 | 41.07 | 40.35 | 30.04 | 26.70 | 29.61 | 10.72 | 12.68 |
| **40** | 163.64 | 108.08 | 37.12 | 50.04 | 27.56 | 66.03 | 44.59 | 43.29 | 32.11 | 28.78 | 39.21 | 15.71 | 16.66 |
| **38** | 188.82 | 116.36 | 38.44 | 52.55 | 27.79 | 75.98 | 48.01 | 47.53 | 33.64 | 30.80 | 51.64 | 22.50 | 21.70 |
| **36** | 216.37 | 116.34 | 39.11 | 55.21 | 28.04 | 87.77 | 51.73 | 53.80 | 35.78 | 32.83 | 65.44 | 30.17 | 27.99 |
| **34** | 252.35 | 111.30 | 39.82 | 57.47 | 28.11 | 99.14 | 55.29 | 59.41 | 37.84 | 34.79 | 79.09 | 36.89 | 34.09 |
| **32** | 272.88 | 103.56 | 40.19 | 59.60 | 28.03 | 111.75 | 59.46 | 64.68 | 40.48 | 36.51 | 95.38 | 43.65 | 41.40 |
| **30** | 252.95 | 90.61 | 39.84 | 60.92 | 27.64 | 128.04 | 63.25 | 70.82 | 41.86 | 37.59 | 112.35 | 51.53 | 49.48 |
| **28** | 210.01 | 71.74 | 38.56 | 61.44 | 27.03 | 141.83 | 67.09 | 74.90 | 41.91 | 37.47 | 137.65 | 64.11 | 58.10 |
| **26** | 143.66 | 48.08 | 37.35 | 61.47 | 26.13 | 154.95 | 71.65 | 76.76 | 41.50 | 36.78 | 168.29 | 77.24 | 67.94 |
| **24** | 57.84 | 25.10 | 35.73 | 60.62 | 24.93 | 168.06 | 74.38 | 78.20 | 40.37 | 35.52 | 202.30 | 92.81 | 81.04 |
| **22** | 20.86 | 13.29 | 33.02 | 57.70 | 23.26 | 179.88 | 72.86 | 79.38 | 38.90 | 33.68 | 254.46 | 110.80 | 95.71 |

# Appendix C: Aim Effects Data – On-Vehicle Testing Method

*Table 36. The 2022 Chevrolet Equinox On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.3 | 2.0 | 0.6 | 6.5 | 9.0 | 22.9 | 20.2 | 5.4 | 4.0 | 10.0 | 15.1 | 9.6 | 4.1 | 19.7 | - | 17.8 |
| **0.70** | 2.3 | 2.0 | 0.7 | 6.5 | 8.5 | 20.3 | 20.4 | 4.5 | 4.1 | 10.5 | 12.2 | 7.5 | 4.3 | 17.9 | - | 17.5 |
| **0.60** | 2.2 | 2.0 | 0.7 | 6.3 | 7.9 | 17.4 | 17.2 | 4.0 | 2.8 | 6.7 | 8.0 | 4.9 | 2.1 | 11.7 | - | 10.7 |
| **0.50** | 1.9 | 2.0 | 0.7 | 6.1 | 7.3 | 12.7 | 15.8 | 3.3 | 2.7 | 6.1 | 4.0 | 2.6 | 1.9 | 6.1 | - | 7.1 |
| **0.40** | 2.0 | 2.0 | 0.7 | 6.0 | 7.1 | 10.5 | 14.3 | 3.0 | 2.4 | 4.8 | 2.7 | 1.8 | 1.4 | 3.7 | - | 4.7 |
| **0.30** | 2.0 | 2.0 | 0.8 | 5.9 | 6.9 | 8.3 | 12.7 | 2.9 | 2.2 | 3.8 | 1.9 | 1.4 | 1.2 | 2.2 | - | 2.9 |
| **0.20** | 1.9 | 2.0 | 0.9 | 5.8 | 6.8 | 7.2 | 11.8 | 2.8 | 2.2 | 3.4 | 1.6 | 1.2 | 1.0 | 1.7 | - | 2.2 |
| **0.10** | 1.8 | 2.0 | 1.0 | 5.8 | 6.7 | 6.3 | 10.6 | 2.7 | 2.1 | 3.0 | 1.4 | 1.1 | 0.9 | 1.3 | - | 1.5 |
| **0.00** | 1.8 | 1.9 | 1.1 | 5.8 | 6.7 | 5.8 | 9.9 | 2.6 | 2.1 | 2.7 | 1.3 | 1.0 | 0.8 | 1.1 | - | 1.2 |
| **-0.10** | 1.8 | 1.9 | 1.3 | 5.8 | 6.8 | 4.8 | 8.8 | 2.6 | 2.1 | 2.4 | 1.2 | 1.0 | 0.8 | 1.0 | - | 1.0 |
| **-0.20** | 1.7 | 1.8 | 1.4 | 5.8 | 6.9 | 4.4 | 8.2 | 2.6 | 2.1 | 2.3 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.9 |
| **-0.30** | 1.8 | 1.7 | 1.4 | 6.0 | 7.2 | 4.2 | 7.7 | 2.5 | 2.1 | 2.2 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.9 |
| **-0.40** | 1.7 | 1.7 | 1.5 | 6.1 | 7.6 | 4.1 | 7.2 | 2.5 | 2.1 | 2.2 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.9 |
| **-0.50** | 1.7 | 1.6 | 1.5 | 6.5 | 9.1 | 4.1 | 6.8 | 2.6 | 2.1 | 2.2 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.9 |
| **-0.60** | 1.7 | 1.6 | 1.4 | 7.0 | 10.2 | 4.1 | 6.3 | 2.6 | 2.1 | 2.2 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.9 |
| **-0.70** | 1.7 | 1.6 | 1.3 | 7.7 | 11.5 | 4.2 | 5.8 | 2.6 | 2.2 | 2.2 | 1.1 | 0.9 | 0.8 | 0.9 | - | 0.8 |
| **-0.76** | 1.7 | 1.6 | 1.2 | 8.5 | 12.1 | 4.2 | 5.7 | 2.7 | 2.2 | 2.3 | 1.2 | 0.9 | 0.9 | 0.9 | - | 0.8 |

*Table 37. The 2022 Chevrolet Equinox On-Vehicle Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 389.0 | 294.7 | 15.0 | 28.7 | 28.0 | 56.8 | 81.9 | 78.1 | 64.4 | 45.6 | 200.9 | 120.0 | 86.2 |
| **0.70** | 386.0 | 274.2 | 15.0 | 28.9 | 28.1 | 56.8 | 75.6 | 78.3 | 64.6 | 45.6 | 202.0 | 121.7 | 86.1 |
| **0.60** | 361.0 | 246.0 | 15.2 | 29.5 | 28.6 | 59.3 | 79.5 | 79.7 | 65.4 | 46.7 | 215.0 | 124.4 | 90.1 |
| **0.50** | 335.8 | 154.6 | 15.4 | 30.0 | 29.1 | 60.3 | 83.0 | 80.7 | 65.9 | 47.2 | 222.9 | 128.6 | 91.6 |
| **0.40** | 295.4 | 120.1 | 15.6 | 30.4 | 29.4 | 61.7 | 86.0 | 81.5 | 66.3 | 47.8 | 232.0 | 131.7 | 93.7 |
| **0.30** | 239.7 | 92.2 | 15.6 | 30.8 | 29.7 | 63.3 | 81.1 | 82.5 | 66.9 | 48.4 | 242.6 | 135.0 | 96.1 |
| **0.20** | 195.0 | 70.9 | 15.5 | 31.0 | 29.8 | 64.3 | 87.7 | 83.2 | 67.4 | 48.8 | 250.1 | 137.3 | 97.8 |
| **0.10** | 133.1 | 46.3 | 15.0 | 31.2 | 29.6 | 65.7 | 88.1 | 84.0 | 67.9 | 49.2 | 260.8 | 140.8 | 100.0 |
| **0.00** | 85.0 | 33.0 | 14.4 | 31.2 | 29.0 | 66.8 | 87.7 | 84.8 | 68.3 | 49.4 | 270.3 | 143.3 | 101.9 |
| **-0.10** | 38.2 | 18.6 | 12.8 | 30.7 | 26.7 | 68.4 | 89.2 | 85.9 | 69.2 | 49.5 | 285.1 | 147.5 | 105.0 |
| **-0.20** | 25.6 | 16.1 | 11.5 | 30.2 | 24.3 | 69.2 | 84.2 | 86.5 | 69.6 | 49.5 | 293.1 | 150.3 | 106.6 |
| **-0.30** | 14.5 | 12.5 | 8.9 | 28.7 | 19.8 | 70.2 | 89.2 | 87.1 | 70.2 | 49.3 | 304.0 | 153.7 | 109.1 |
| **-0.40** | 11.3 | 10.6 | 6.8 | 26.7 | 15.3 | 70.9 | 83.6 | 87.6 | 70.3 | 49.1 | 312.0 | 156.6 | 111.1 |
| **-0.50** | 9.3 | 7.3 | 3.9 | 20.7 | 9.0 | 71.5 | 89.2 | 87.6 | 69.9 | 48.2 | 326.0 | 160.3 | 114.0 |
| **-0.60** | 8.1 | 6.5 | 2.1 | 15.1 | 5.1 | 71.8 | 88.0 | 87.6 | 69.2 | 47.5 | 336.0 | 164.6 | 116.5 |
| **-0.70** | 7.2 | 5.7 | 1.0 | 8.9 | 2.7 | 71.4 | 85.6 | 86.9 | 67.3 | 46.5 | 347.2 | 168.4 | 119.0 |
| **-0.76** | 7.4 | 5.6 | 0.8 | 6.5 | 2.0 | 70.8 | 79.0 | 86.5 | 66.1 | 45.8 | 353.0 | 170.0 | 120.3 |

*Table 38. The 2023 Ford F-150 On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 3.9 | 3.8 | 1.3 | 60.9 | 74.3 | 49.7 | 20.8 | 144.0 | 13.3 | 18.7 | 73.6 | 51.4 | 7.4 | 50.8 | - | 73.7 |
| **0.70** | 3.9 | 3.8 | 1.3 | 45.4 | 56.9 | 42.8 | 19.4 | 69.6 | 11.7 | 4.3 | 68.6 | 47.4 | 6.1 | 48.7 | - | 71.2 |
| **0.60** | 3.9 | 3.9 | 1.3 | 33.8 | 42.2 | 37.1 | 17.4 | 51.3 | 9.8 | 4.2 | 60.6 | 38.2 | 4.3 | 45.9 | - | 61.9 |
| **0.50** | 3.9 | 4.0 | 1.3 | 24.5 | 29.9 | 31.3 | 15.1 | 32.4 | 8.3 | 4.0 | 49.5 | 19.7 | 2.9 | 40.9 | - | 40.7 |
| **0.40** | 3.9 | 4.0 | 1.3 | 20.3 | 23.9 | 27.7 | 13.4 | 20.8 | 7.4 | 3.8 | 30.1 | 11.7 | 2.4 | 29.6 | - | 28.2 |
| **0.30** | 3.9 | 4.0 | 1.3 | 18.5 | 21.4 | 24.6 | 12.2 | 14.9 | 7.0 | 3.8 | 19.2 | 8.0 | 2.2 | 17.9 | - | 18.5 |
| **0.20** | 3.9 | 3.9 | 1.3 | 17.1 | 19.8 | 21.5 | 11.2 | 12.7 | 6.6 | 3.8 | 12.6 | 5.5 | 2.0 | 11.1 | - | 11.9 |
| **0.10** | 3.9 | 3.9 | 1.3 | 16.0 | 18.6 | 19.1 | 10.4 | 11.3 | 6.4 | 3.5 | 8.1 | 4.1 | 1.9 | 7.0 | - | 7.7 |
| **0.00** | 3.8 | 3.8 | 1.3 | 15.5 | 17.9 | 17.4 | 9.8 | 10.4 | 6.2 | 3.7 | 5.9 | 3.4 | 1.8 | 5.0 | - | 5.8 |
| **-0.10** | 3.6 | 3.8 | 1.4 | 14.8 | 17.1 | 15.8 | 9.2 | 9.6 | 6.1 | 3.6 | 4.4 | 2.7 | 1.8 | 3.4 | - | 4.2 |
| **-0.20** | 3.6 | 3.8 | 1.4 | 14.4 | 16.6 | 14.8 | 8.7 | 9.3 | 5.9 | 3.7 | 3.8 | 2.4 | 1.7 | 2.9 | - | 3.5 |
| **-0.30** | 3.6 | 3.7 | 1.4 | 14.0 | 16.1 | 12.9 | 8.3 | 8.9 | 5.9 | 3.5 | 3.4 | 2.2 | 1.7 | 2.5 | - | 3.0 |
| **-0.40** | 3.5 | 3.7 | 1.4 | 13.8 | 15.7 | 12.3 | 7.8 | 8.7 | 5.9 | 3.6 | 3.1 | 2.1 | 1.6 | 2.2 | - | 2.6 |
| **-0.50** | 3.5 | 3.7 | 1.5 | 13.7 | 15.4 | 11.7 | 7.4 | 8.6 | 5.9 | 3.8 | 3.0 | 2.1 | 1.7 | 2.0 | - | 2.4 |
| **-0.60** | 3.4 | 3.7 | 1.5 | 13.7 | 15.1 | 11.2 | 6.9 | 8.3 | 5.7 | 3.6 | 2.7 | 1.9 | 1.6 | 1.9 | - | 2.3 |
| **-0.70** | 3.3 | 3.6 | 1.5 | 13.6 | 14.9 | 10.9 | 6.6 | 8.4 | 5.6 | 3.7 | 2.7 | 1.9 | 1.6 | 1.9 | - | 2.3 |
| **-0.76** | 3.2 | 3.5 | 1.6 | 13.6 | 14.6 | 10.5 | 6.2 | 8.3 | 5.6 | 3.9 | 2.6 | 1.9 | 1.6 | 1.9 | - | 2.2 |

*Table 39. The 2023 Ford F-150 Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 389.0 | 294.7 | 15.0 | 28.7 | 28.0 | 56.8 | 81.9 | 78.1 | 64.4 | 45.6 | 200.9 | 120.0 | 86.2 |
| **0.70** | 386.0 | 274.2 | 15.0 | 28.9 | 28.1 | 56.8 | 75.6 | 78.3 | 64.6 | 45.6 | 202.0 | 121.7 | 86.1 |
| **0.60** | 361.0 | 246.0 | 15.2 | 29.5 | 28.6 | 59.3 | 79.5 | 79.7 | 65.4 | 46.7 | 215.0 | 124.4 | 90.1 |
| **0.50** | 335.8 | 154.6 | 15.4 | 30.0 | 29.1 | 60.3 | 83.0 | 80.7 | 65.9 | 47.2 | 222.9 | 128.6 | 91.6 |
| **0.40** | 295.4 | 120.1 | 15.6 | 30.4 | 29.4 | 61.7 | 86.0 | 81.5 | 66.3 | 47.8 | 232.0 | 131.7 | 93.7 |
| **0.30** | 239.7 | 92.2 | 15.6 | 30.8 | 29.7 | 63.3 | 81.1 | 82.5 | 66.9 | 48.4 | 242.6 | 135.0 | 96.1 |
| **0.20** | 195.0 | 70.9 | 15.5 | 31.0 | 29.8 | 64.3 | 87.7 | 83.2 | 67.4 | 48.8 | 250.1 | 137.3 | 97.8 |
| **0.10** | 133.1 | 46.3 | 15.0 | 31.2 | 29.6 | 65.7 | 88.1 | 84.0 | 67.9 | 49.2 | 260.8 | 140.8 | 100.0 |
| **0.00** | 85.0 | 33.0 | 14.4 | 31.2 | 29.0 | 66.8 | 87.7 | 84.8 | 68.3 | 49.4 | 270.3 | 143.3 | 101.9 |
| **-0.10** | 38.2 | 18.6 | 12.8 | 30.7 | 26.7 | 68.4 | 89.2 | 85.9 | 69.2 | 49.5 | 285.1 | 147.5 | 105.0 |
| **-0.20** | 25.6 | 16.1 | 11.5 | 30.2 | 24.3 | 69.2 | 84.2 | 86.5 | 69.6 | 49.5 | 293.1 | 150.3 | 106.6 |
| **-0.30** | 14.5 | 12.5 | 8.9 | 28.7 | 19.8 | 70.2 | 89.2 | 87.1 | 70.2 | 49.3 | 304.0 | 153.7 | 109.1 |
| **-0.40** | 11.3 | 10.6 | 6.8 | 26.7 | 15.3 | 70.9 | 83.6 | 87.6 | 70.3 | 49.1 | 312.0 | 156.6 | 111.1 |
| **-0.50** | 9.3 | 7.3 | 3.9 | 20.7 | 9.0 | 71.5 | 89.2 | 87.6 | 69.9 | 48.2 | 326.0 | 160.3 | 114.0 |
| **-0.60** | 8.1 | 6.5 | 2.1 | 15.1 | 5.1 | 71.8 | 88.0 | 87.6 | 69.2 | 47.5 | 336.0 | 164.6 | 116.5 |
| **-0.70** | 7.2 | 5.7 | 1.0 | 8.9 | 2.7 | 71.4 | 85.6 | 86.9 | 67.3 | 46.5 | 347.2 | 168.4 | 119.0 |
| **-0.76** | 7.4 | 5.6 | 0.8 | 6.5 | 2.0 | 70.8 | 79.0 | 86.5 | 66.1 | 45.8 | 353.0 | 170.0 | 120.3 |

*Table 40. The 2023 Ford Fusion On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 0.8 | 0.7 | 4.8 | 3.3 | 10.2 | 12.6 | 7.1 | 9.7 | 6.0 | 8.5 | 5.7 | 6.0 | 5.7 | 4.9 | 4.7 |
| **0.70** | 1.4 | 0.8 | 0.7 | 4.5 | 3.2 | 9.9 | 12.1 | 5.8 | 7.6 | 5.7 | 7.0 | 4.8 | 5.3 | 4.6 | 3.9 | 4.0 |
| **0.60** | 1.4 | 0.8 | 0.7 | 4.2 | 3.0 | 9.4 | 11.8 | 4.6 | 5.7 | 5.3 | 5.2 | 3.7 | 4.4 | 3.3 | 2.9 | 3.0 |
| **0.50** | 1.4 | 0.8 | 0.7 | 4.0 | 2.9 | 8.7 | 11.7 | 4.0 | 4.7 | 5.0 | 4.2 | 3.0 | 3.7 | 2.6 | 2.2 | 2.4 |
| **0.40** | 1.4 | 0.8 | 0.7 | 3.9 | 2.8 | 7.1 | 11.7 | 3.5 | 3.7 | 4.6 | 3.0 | 2.0 | 2.7 | 1.8 | 1.4 | 1.5 |
| **0.30** | 1.4 | 0.8 | 0.7 | 3.8 | 2.8 | 5.7 | 11.4 | 3.1 | 3.0 | 4.1 | 2.3 | 1.5 | 2.0 | 1.3 | 1.1 | 1.1 |
| **0.20** | 1.4 | 0.8 | 0.7 | 3.7 | 2.8 | 4.4 | 10.6 | 2.8 | 2.6 | 3.4 | 1.7 | 1.1 | 1.4 | 0.9 | 0.8 | 0.8 |
| **0.10** | 1.4 | 0.8 | 0.7 | 3.6 | 2.8 | 3.0 | 9.9 | 2.6 | 2.3 | 2.8 | 1.3 | 0.9 | 1.0 | 0.7 | 0.6 | 0.6 |
| **0.00** | 1.4 | 0.8 | 0.7 | 3.5 | 2.8 | 2.5 | 8.9 | 2.5 | 2.1 | 2.3 | 1.1 | 0.7 | 0.8 | 0.6 | 0.5 | 0.4 |
| **-0.10** | 1.4 | 0.8 | 0.7 | 3.5 | 2.8 | 2.1 | 7.5 | 2.4 | 2.1 | 1.7 | 0.9 | 0.6 | 0.7 | 0.5 | 0.5 | 0.4 |
| **-0.20** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.9 | 6.6 | 2.4 | 1.9 | 1.4 | 0.8 | 0.6 | 0.6 | 0.5 | 0.4 | 0.4 |
| **-0.30** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 5.7 | 2.3 | 1.9 | 1.2 | 0.8 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **-0.40** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 5.0 | 2.3 | 2.0 | 1.1 | 0.7 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **-0.50** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 4.7 | 2.3 | 1.9 | 1.1 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.60** | 1.4 | 0.8 | 0.6 | 3.3 | 2.8 | 1.7 | 4.0 | 2.2 | 1.9 | 1.0 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.70** | 1.4 | 0.8 | 0.6 | 3.3 | 2.8 | 1.7 | 3.2 | 2.2 | 1.9 | 1.0 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.76** | 1.4 | 0.8 | 0.6 | 3.3 | 2.9 | 1.7 | 2.1 | 2.2 | 1.9 | 1.0 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 |

*Table 41. The 2023 Ford Fusion Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 160.9 | 135.6 | 8.5 | 25.3 | 28.7 | 49.1 | 36.3 | 15.4 | 11.4 | 7.6 | 109.8 | 21.3 | 16.8 |
| **0.70** | 158.6 | 128.8 | 8.5 | 25.5 | 28.9 | 49.7 | 36.6 | 15.8 | 11.6 | 7.8 | 113.3 | 21.5 | 16.9 |
| **0.60** | 145.8 | 119.2 | 8.3 | 25.6 | 29.2 | 50.3 | 36.8 | 16.3 | 11.7 | 8.1 | 118.3 | 21.8 | 17.0 |
| **0.50** | 148.0 | 112.9 | 8.2 | 25.7 | 29.4 | 50.9 | 37.6 | 16.7 | 11.9 | 8.3 | 121.3 | 22.1 | 16.7 |
| **0.40** | 121.1 | 82.7 | 8.0 | 25.5 | 29.4 | 51.5 | 38.5 | 17.4 | 12.2 | 8.5 | 125.0 | 22.5 | 17.1 |
| **0.30** | 109.8 | 70.3 | 7.8 | 25.5 | 29.1 | 52.1 | 39.2 | 18.0 | 12.5 | 8.7 | 130.0 | 22.7 | 17.2 |
| **0.20** | 90.3 | 60.6 | 7.5 | 25.2 | 28.5 | 52.4 | 39.9 | 18.6 | 12.7 | 9.0 | 136.2 | 22.8 | 17.3 |
| **0.10** | 74.4 | 49.2 | 7.1 | 24.7 | 27.4 | 52.9 | 40.2 | 19.3 | 13.1 | 9.1 | 142.4 | 23.1 | 17.3 |
| **0.00** | 64.6 | 42.4 | 6.7 | 24.0 | 25.9 | 53.2 | 42.9 | 19.9 | 13.5 | 9.3 | 147.8 | 23.4 | 17.3 |
| **-0.10** | 53.0 | 34.9 | 6.1 | 22.7 | 24.2 | 52.9 | 42.8 | 20.5 | 13.9 | 9.5 | 154.2 | 23.5 | 17.2 |
| **-0.20** | 45.4 | 30.8 | 5.5 | 21.4 | 22.2 | 53.3 | 44.6 | 21.0 | 14.5 | 9.7 | 162.5 | 24.1 | 17.3 |
| **-0.30** | 32.8 | 28.6 | 4.4 | 19.2 | 19.3 | 53.2 | 45.3 | 21.5 | 15.0 | 9.9 | 171.3 | 24.6 | 17.2 |
| **-0.40** | 27.9 | 27.3 | 3.4 | 16.8 | 16.6 | 52.6 | 45.3 | 22.0 | 15.4 | 10.1 | 179.4 | 25.0 | 17.1 |
| **-0.50** | 20.2 | 25.6 | 2.8 | 15.4 | 15.4 | 52.0 | 45.2 | 22.2 | 15.6 | 10.2 | 186.4 | 25.2 | 17.1 |
| **-0.60** | 15.8 | 23.9 | 1.7 | 12.0 | 12.3 | 50.0 | 44.8 | 22.5 | 16.0 | 10.3 | 195.6 | 25.7 | 17.1 |
| **-0.70** | 11.9 | 21.4 | 1.0 | 8.4 | 8.9 | 48.0 | 43.6 | 22.7 | 16.5 | 10.6 | 208.0 | 26.7 | 17.3 |
| **-0.76** | 8.9 | 15.9 | 0.5 | 4.5 | 5.2 | 43.6 | 40.8 | 23.3 | 16.8 | 10.9 | 225.7 | 28.2 | 18.4 |

*Table 42. The 2019 Ford Fusion On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 0.8 | 0.7 | 4.8 | 3.3 | 10.2 | 12.6 | 7.1 | 9.7 | 6.0 | 8.5 | 5.7 | 6.0 | 5.7 | 4.9 | 4.7 |
| **0.70** | 1.4 | 0.8 | 0.7 | 4.5 | 3.2 | 9.9 | 12.1 | 5.8 | 7.6 | 5.7 | 7.0 | 4.8 | 5.3 | 4.6 | 3.9 | 4.0 |
| **0.60** | 1.4 | 0.8 | 0.7 | 4.2 | 3.0 | 9.4 | 11.8 | 4.6 | 5.7 | 5.3 | 5.2 | 3.7 | 4.4 | 3.3 | 2.9 | 3.0 |
| **0.50** | 1.4 | 0.8 | 0.7 | 4.0 | 2.9 | 8.7 | 11.7 | 4.0 | 4.7 | 5.0 | 4.2 | 3.0 | 3.7 | 2.6 | 2.2 | 2.4 |
| **0.40** | 1.4 | 0.8 | 0.7 | 3.9 | 2.8 | 7.1 | 11.7 | 3.5 | 3.7 | 4.6 | 3.0 | 2.0 | 2.7 | 1.8 | 1.4 | 1.5 |
| **0.30** | 1.4 | 0.8 | 0.7 | 3.8 | 2.8 | 5.7 | 11.4 | 3.1 | 3.0 | 4.1 | 2.3 | 1.5 | 2.0 | 1.3 | 1.1 | 1.1 |
| **0.20** | 1.4 | 0.8 | 0.7 | 3.7 | 2.8 | 4.4 | 10.6 | 2.8 | 2.6 | 3.4 | 1.7 | 1.1 | 1.4 | 0.9 | 0.8 | 0.8 |
| **0.10** | 1.4 | 0.8 | 0.7 | 3.6 | 2.8 | 3.0 | 9.9 | 2.6 | 2.3 | 2.8 | 1.3 | 0.9 | 1.0 | 0.7 | 0.6 | 0.6 |
| **0.00** | 1.4 | 0.8 | 0.7 | 3.5 | 2.8 | 2.5 | 8.9 | 2.5 | 2.1 | 2.3 | 1.1 | 0.7 | 0.8 | 0.6 | 0.5 | 0.4 |
| **-0.10** | 1.4 | 0.8 | 0.7 | 3.5 | 2.8 | 2.1 | 7.5 | 2.4 | 2.1 | 1.7 | 0.9 | 0.6 | 0.7 | 0.5 | 0.5 | 0.4 |
| **-0.20** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.9 | 6.6 | 2.4 | 1.9 | 1.4 | 0.8 | 0.6 | 0.6 | 0.5 | 0.4 | 0.4 |
| **-0.30** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 5.7 | 2.3 | 1.9 | 1.2 | 0.8 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **-0.40** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 5.0 | 2.3 | 2.0 | 1.1 | 0.7 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **-0.50** | 1.4 | 0.8 | 0.7 | 3.4 | 2.8 | 1.7 | 4.7 | 2.3 | 1.9 | 1.1 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.60** | 1.4 | 0.8 | 0.6 | 3.3 | 2.8 | 1.7 | 4.0 | 2.2 | 1.9 | 1.0 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.70** | 1.4 | 0.8 | 0.6 | 3.3 | 2.8 | 1.7 | 3.2 | 2.2 | 1.9 | 1.0 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 |
| **-0.76** | 1.4 | 0.8 | 0.6 | 3.3 | 2.9 | 1.7 | 2.1 | 2.2 | 1.9 | 1.0 | 0.6 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 |

*Table 43. The 2019 Ford Fusion Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 160.9 | 135.6 | 8.5 | 25.3 | 28.7 | 49.1 | 36.3 | 15.4 | 11.4 | 7.6 | 109.8 | 21.3 | 16.8 |
| **0.70** | 158.6 | 128.8 | 8.5 | 25.5 | 28.9 | 49.7 | 36.6 | 15.8 | 11.6 | 7.8 | 113.3 | 21.5 | 16.9 |
| **0.60** | 145.8 | 119.2 | 8.3 | 25.6 | 29.2 | 50.3 | 36.8 | 16.3 | 11.7 | 8.1 | 118.3 | 21.8 | 17.0 |
| **0.50** | 148.0 | 112.9 | 8.2 | 25.7 | 29.4 | 50.9 | 37.6 | 16.7 | 11.9 | 8.3 | 121.3 | 22.1 | 16.7 |
| **0.40** | 121.1 | 82.7 | 8.0 | 25.5 | 29.4 | 51.5 | 38.5 | 17.4 | 12.2 | 8.5 | 125.0 | 22.5 | 17.1 |
| **0.30** | 109.8 | 70.3 | 7.8 | 25.5 | 29.1 | 52.1 | 39.2 | 18.0 | 12.5 | 8.7 | 130.0 | 22.7 | 17.2 |
| **0.20** | 90.3 | 60.6 | 7.5 | 25.2 | 28.5 | 52.4 | 39.9 | 18.6 | 12.7 | 9.0 | 136.2 | 22.8 | 17.3 |
| **0.10** | 74.4 | 49.2 | 7.1 | 24.7 | 27.4 | 52.9 | 40.2 | 19.3 | 13.1 | 9.1 | 142.4 | 23.1 | 17.3 |
| **0.00** | 64.6 | 42.4 | 6.7 | 24.0 | 25.9 | 53.2 | 42.9 | 19.9 | 13.5 | 9.3 | 147.8 | 23.4 | 17.3 |
| **-0.10** | 53.0 | 34.9 | 6.1 | 22.7 | 24.2 | 52.9 | 42.8 | 20.5 | 13.9 | 9.5 | 154.2 | 23.5 | 17.2 |
| **-0.20** | 45.4 | 30.8 | 5.5 | 21.4 | 22.2 | 53.3 | 44.6 | 21.0 | 14.5 | 9.7 | 162.5 | 24.1 | 17.3 |
| **-0.30** | 32.8 | 28.6 | 4.4 | 19.2 | 19.3 | 53.2 | 45.3 | 21.5 | 15.0 | 9.9 | 171.3 | 24.6 | 17.2 |
| **-0.40** | 27.9 | 27.3 | 3.4 | 16.8 | 16.6 | 52.6 | 45.3 | 22.0 | 15.4 | 10.1 | 179.4 | 25.0 | 17.1 |
| **-0.50** | 20.2 | 25.6 | 2.8 | 15.4 | 15.4 | 52.0 | 45.2 | 22.2 | 15.6 | 10.2 | 186.4 | 25.2 | 17.1 |
| **-0.60** | 15.8 | 23.9 | 1.7 | 12.0 | 12.3 | 50.0 | 44.8 | 22.5 | 16.0 | 10.3 | 195.6 | 25.7 | 17.1 |
| **-0.70** | 11.9 | 21.4 | 1.0 | 8.4 | 8.9 | 48.0 | 43.6 | 22.7 | 16.5 | 10.6 | 208.0 | 26.7 | 17.3 |
| **-0.76** | 8.9 | 15.9 | 0.5 | 4.5 | 5.2 | 43.6 | 40.8 | 23.3 | 16.8 | 10.9 | 225.7 | 28.2 | 18.4 |

*Table 44. The 2022 Hyundai Tucson On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.0 | 1.3 | 0.8 | 5.4 | 4.9 | 3.5 | 1.3 | 5.9 | 5.9 | 1.9 | 17.3 | 17.4 | 9.6 | 16.4 | 14.5 | 13.4 |
| **0.70** | 2.0 | 1.2 | 0.8 | 5.2 | 4.8 | 3.4 | 1.2 | 4.6 | 4.1 | 1.9 | 11.7 | 11.7 | 6.3 | 11.7 | 10.8 | 9.8 |
| **0.60** | 1.9 | 1.2 | 0.8 | 4.9 | 4.7 | 3.2 | 1.2 | 3.5 | 3.2 | 1.8 | 6.4 | 6.2 | 4.1 | 6.6 | 5.5 | 5.5 |
| **0.50** | 1.9 | 1.2 | 0.8 | 4.8 | 4.5 | 3.1 | 1.2 | 3.0 | 2.7 | 1.8 | 3.6 | 3.5 | 2.6 | 3.7 | 3.5 | 3.1 |
| **0.40** | 1.8 | 1.2 | 0.8 | 4.6 | 4.3 | 3.0 | 1.2 | 2.7 | 2.4 | 1.8 | 2.1 | 2.0 | 1.5 | 2.1 | 1.9 | 1.7 |
| **0.30** | 1.8 | 1.2 | 0.8 | 4.5 | 4.0 | 2.9 | 1.1 | 2.6 | 2.3 | 1.8 | 1.5 | 1.4 | 1.1 | 1.5 | 1.4 | 1.3 |
| **0.20** | 1.8 | 1.2 | 0.7 | 4.4 | 4.1 | 2.8 | 1.1 | 2.5 | 2.2 | 1.8 | 1.1 | 1.0 | 0.9 | 1.1 | 1.1 | 0.9 |
| **0.10** | 1.8 | 1.2 | 0.7 | 4.2 | 4.1 | 2.8 | 1.1 | 2.5 | 2.2 | 1.8 | 0.9 | 0.8 | 0.7 | 0.9 | 0.9 | 0.8 |
| **0.00** | 1.8 | 1.2 | 0.8 | 4.1 | 4.0 | 2.8 | 1.1 | 2.4 | 2.1 | 1.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.8 | 0.7 |
| **-0.10** | 1.8 | 1.2 | 0.8 | 4.1 | 3.9 | 2.7 | 1.1 | 2.3 | 2.0 | 1.8 | 0.8 | 0.7 | 0.6 | 0.8 | 0.8 | 0.7 |
| **-0.20** | 1.8 | 1.2 | 0.8 | 3.9 | 3.8 | 2.7 | 1.1 | 2.2 | 2.0 | 1.8 | 0.8 | 0.7 | 0.6 | 0.8 | 0.8 | 0.7 |
| **-0.30** | 1.8 | 1.2 | 0.8 | 4.0 | 3.7 | 2.6 | 1.1 | 2.3 | 1.9 | 1.8 | 0.7 | 0.7 | 0.5 | 0.7 | 0.7 | 0.6 |
| **-0.40** | 1.8 | 1.2 | 0.8 | 3.9 | 3.7 | 2.6 | 1.1 | 2.3 | 1.9 | 1.8 | 0.7 | 0.6 | 0.5 | 0.7 | 0.6 | 0.6 |
| **-0.50** | 1.8 | 1.2 | 0.8 | 3.9 | 3.8 | 2.6 | 1.1 | 2.2 | 1.9 | 1.9 | 0.7 | 0.6 | 0.5 | 0.7 | 0.7 | 0.5 |
| **-0.60** | 1.7 | 1.2 | 0.7 | 4.1 | 3.8 | 2.6 | 1.1 | 2.1 | 1.8 | 1.8 | 0.7 | 0.6 | 0.5 | 0.6 | 0.7 | 0.5 |
| **-0.70** | 1.7 | 1.2 | 0.7 | 4.2 | 4.0 | 2.6 | 1.1 | 2.2 | 1.8 | 1.8 | 0.6 | 0.6 | 0.5 | 0.7 | 0.7 | 0.5 |
| **-0.76** | 1.7 | 1.2 | 0.7 | 4.3 | 3.9 | 2.6 | 1.1 | 2.1 | 1.8 | 1.8 | 0.6 | 0.6 | 0.4 | 0.6 | 0.5 | 0.5 |

*Table 45. The 2022 Hyundai Tucson Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 667.1 | 503.2 | 37.4 | 73.7 | 74.5 | 163.7 | 175.2 | 152.5 | 114.5 | 85.2 | 324.0 | 141.1 | 124.7 |
| **0.70** | 658.2 | 455.0 | 38.1 | 75.2 | 76.0 | 166.8 | 179.9 | 155.1 | 116.4 | 85.9 | 332.0 | 145.4 | 125.9 |
| **0.60** | 624.3 | 423.8 | 38.7 | 77.4 | 76.9 | 173.6 | 185.5 | 160.8 | 119.1 | 88.1 | 349.0 | 150.1 | 130.4 |
| **0.50** | 561.0 | 350.6 | 38.9 | 79.0 | 75.7 | 180.2 | 192.2 | 165.7 | 121.7 | 89.8 | 365.0 | 155.1 | 133.4 |
| **0.40** | 487.5 | 236.6 | 39.0 | 81.0 | 74.4 | 187.2 | 199.2 | 170.7 | 124.9 | 91.4 | 382.9 | 162.5 | 137.2 |
| **0.30** | 435.0 | 200.8 | 38.7 | 81.9 | 70.7 | 192.7 | 204.5 | 174.6 | 127.1 | 92.7 | 396.7 | 166.9 | 140.8 |
| **0.20** | 300.3 | 142.7 | 37.8 | 82.0 | 64.7 | 199.2 | 211.0 | 180.2 | 129.9 | 94.1 | 413.9 | 172.6 | 145.5 |
| **0.10** | 178.6 | 68.0 | 35.9 | 81.2 | 59.9 | 205.9 | 220.1 | 185.9 | 133.4 | 96.1 | 432.3 | 180.8 | 151.2 |
| **0.00** | 99.2 | 45.0 | 32.8 | 79.5 | 55.9 | 210.0 | 227.2 | 190.9 | 135.9 | 97.5 | 447.6 | 186.4 | 156.4 |
| **-0.10** | 64.7 | 32.2 | 29.0 | 77.1 | 52.7 | 212.8 | 233.0 | 195.3 | 138.3 | 99.0 | 461.0 | 191.7 | 161.5 |
| **-0.20** | 37.7 | 23.7 | 22.4 | 72.3 | 48.5 | 215.2 | 239.3 | 199.9 | 140.6 | 100.2 | 478.0 | 197.9 | 167.3 |
| **-0.30** | 26.9 | 18.4 | 15.8 | 66.1 | 44.2 | 215.8 | 244.9 | 203.7 | 142.6 | 101.1 | 493.0 | 203.9 | 172.2 |
| **-0.40** | 18.8 | 13.0 | 9.6 | 55.4 | 37.8 | 214.6 | 249.4 | 207.6 | 144.6 | 101.8 | 509.4 | 210.7 | 177.2 |
| **-0.50** | 15.7 | 11.7 | 5.3 | 39.8 | 29.8 | 211.6 | 251.1 | 211.6 | 146.0 | 102.5 | 527.8 | 217.0 | 183.5 |
| **-0.60** | 14.8 | 10.8 | 3.3 | 27.1 | 21.7 | 207.0 | 247.0 | 214.2 | 146.4 | 102.7 | 544.0 | 222.3 | 189.3 |
| **-0.70** | 14.2 | 10.1 | 2.1 | 16.5 | 13.1 | 200.3 | 234.7 | 216.0 | 146.5 | 102.6 | 562.0 | 228.6 | 194.4 |
| **-0.76** | 14.0 | 10.0 | 1.8 | 13.3 | 10.8 | 196.3 | 227.1 | 216.4 | 146.2 | 102.5 | 569.9 | 231.2 | 196.4 |

*Table 46. The 2022 Subaru Outback On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.2 | 1.7 | 1.0 | 17.0 | 16.5 | 7.6 | 2.7 | 21.0 | 6.0 | 3.1 | 80.3 | 48.9 | 9.2 | 37.1 | - | 25.3 |
| **0.70** | 2.2 | 1.7 | 1.0 | 15.8 | 13.1 | 6.4 | 2.3 | 15.7 | 5.5 | 2.9 | 69.9 | 43.9 | 7.6 | 51.2 | - | 19.7 |
| **0.60** | 2.1 | 1.6 | 1.0 | 13.5 | 13.0 | 6.3 | 2.0 | 13.1 | 5.1 | 2.8 | 60.5 | 38.2 | 5.8 | 50.8 | - | 17.1 |
| **0.50** | 2.0 | 1.6 | 1.0 | 11.4 | 10.0 | 5.1 | 1.8 | 8.8 | 4.4 | 2.6 | 24.0 | 13.6 | 2.9 | 25.0 | - | 8.1 |
| **0.40** | 2.0 | 1.6 | 1.0 | 10.5 | 9.1 | 5.3 | 1.8 | 8.1 | 4.2 | 2.5 | 13.7 | 8.8 | 2.3 | 16.1 | - | 4.9 |
| **0.30** | 1.9 | 1.5 | 1.0 | 9.3 | 8.4 | 4.8 | 1.7 | 6.5 | 3.9 | 2.4 | 6.5 | 4.0 | 1.6 | 7.2 | - | 2.7 |
| **0.20** | 1.8 | 1.5 | 1.0 | 9.2 | 8.1 | 4.6 | 1.7 | 5.5 | 3.8 | 2.3 | 5.0 | 3.6 | 1.5 | 5.3 | - | 2.2 |
| **0.10** | 1.8 | 1.4 | 1.0 | 8.9 | 7.7 | 4.7 | 1.7 | 4.9 | 3.7 | 2.2 | 3.6 | 2.8 | 1.3 | 4.0 | - | 1.6 |
| **0.00** | 1.7 | 1.3 | 1.0 | 8.5 | 7.4 | 4.5 | 1.6 | 4.6 | 3.7 | 2.2 | 2.6 | 1.9 | 1.1 | 2.8 | - | 1.3 |
| **-0.10** | 1.7 | 1.3 | 1.0 | 8.1 | 7.1 | 4.7 | 1.6 | 4.5 | 3.7 | 2.1 | 2.1 | 1.8 | 1.1 | 2.3 | - | 1.1 |
| **-0.20** | 1.6 | 1.3 | 0.9 | 8.1 | 7.0 | 4.6 | 1.6 | 4.4 | 3.7 | 2.1 | 1.8 | 1.5 | 1.0 | 2.0 | - | 1.0 |
| **-0.30** | 1.6 | 1.2 | 0.9 | 8.0 | 6.9 | 4.4 | 1.6 | 4.2 | 3.7 | 2.1 | 1.6 | 1.2 | 1.0 | 1.7 | - | 0.9 |
| **-0.40** | 1.5 | 1.2 | 0.9 | 8.0 | 6.9 | 4.6 | 1.6 | 4.2 | 3.8 | 2.1 | 1.5 | 1.3 | 1.0 | 1.5 | - | 0.9 |
| **-0.50** | 1.5 | 1.2 | 0.9 | 7.9 | 6.9 | 4.3 | 1.6 | 4.1 | 3.8 | 2.1 | 1.4 | 1.1 | 1.0 | 1.4 | - | 0.8 |
| **-0.60** | 1.4 | 1.2 | 0.9 | 7.9 | 6.9 | 4.4 | 1.6 | 4.3 | 3.7 | 2.1 | 1.4 | 1.3 | 1.0 | 1.3 | - | 0.8 |
| **-0.70** | 1.4 | 1.1 | 0.9 | 7.8 | 6.9 | 4.4 | 1.6 | 4.3 | 3.7 | 2.1 | 1.4 | 1.3 | 1.0 | 1.3 | - | 0.8 |
| **-0.76** | 1.4 | 1.1 | 0.8 | 7.8 | 6.6 | 4.5 | 1.6 | 4.3 | 3.8 | 2.1 | 1.3 | 1.3 | 1.0 | 1.3 | - | 0.8 |

*Table 47. The 2022 Subaru Outback Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 585.7 | 153.7 | 19.0 | 35.1 | 30.5 | 57.3 | 63.2 | 52.4 | 47.8 | 30.6 | 136.4 | 68.6 | 43.7 |
| **0.70** | 578.0 | 187.2 | 18.1 | 36.7 | 31.7 | 60.6 | 64.4 | 53.0 | 47.7 | 30.4 | 134.6 | 68.2 | 43.5 |
| **0.60** | 528.6 | 168.5 | 18.7 | 37.4 | 32.0 | 58.4 | 65.2 | 52.9 | 47.8 | 30.4 | 136.2 | 69.5 | 43.7 |
| **0.50** | 401.5 | 114.6 | 20.6 | 41.9 | 34.7 | 63.8 | 63.9 | 54.0 | 48.3 | 31.1 | 143.5 | 73.1 | 45.6 |
| **0.40** | 576.5 | 82.7 | 21.3 | 44.9 | 36.3 | 68.0 | 65.6 | 54.2 | 48.5 | 31.2 | 146.9 | 74.9 | 46.8 |
| **0.30** | 562.0 | 134.5 | 22.8 | 49.6 | 39.3 | 69.5 | 56.8 | 54.3 | 48.7 | 31.3 | 151.9 | 78.8 | 48.3 |
| **0.20** | 563.9 | 102.5 | 23.7 | 51.7 | 40.6 | 73.7 | 60.0 | 54.4 | 48.7 | 31.4 | 154.3 | 80.4 | 49.2 |
| **0.10** | 533.2 | 74.2 | 23.8 | 54.8 | 41.1 | 64.5 | 61.8 | 54.5 | 48.5 | 31.3 | 157.4 | 82.5 | 50.2 |
| **0.00** | 378.3 | 36.2 | 23.2 | 58.1 | 41.6 | 69.4 | 71.9 | 54.4 | 48.2 | 31.2 | 162.4 | 86.2 | 51.6 |
| **-0.10** | 234.6 | 29.0 | 21.0 | 58.9 | 39.4 | 75.7 | 73.1 | 54.7 | 48.0 | 31.2 | 168.0 | 88.0 | 53.1 |
| **-0.20** | 111.4 | 23.4 | 19.0 | 58.4 | 37.0 | 68.3 | 73.6 | 54.8 | 47.8 | 31.1 | 173.2 | 90.0 | 54.1 |
| **-0.30** | 54.4 | 16.4 | 14.3 | 55.2 | 30.4 | 79.0 | 76.6 | 55.0 | 47.1 | 31.0 | 181.6 | 93.2 | 55.4 |
| **-0.40** | 34.5 | 14.1 | 9.7 | 50.8 | 25.6 | 115.8 | 78.1 | 55.2 | 46.6 | 30.8 | 187.7 | 95.4 | 56.5 |
| **-0.50** | 28.2 | 12.2 | 5.2 | 37.6 | 18.1 | 123.5 | 79.6 | 55.9 | 45.9 | 30.4 | 198.0 | 97.9 | 58.4 |
| **-0.60** | 21.7 | 11.3 | 3.0 | 25.3 | 12.2 | 129.2 | 81.3 | 56.4 | 45.3 | 30.0 | 206.4 | 100.1 | 59.8 |
| **-0.70** | 17.4 | 9.9 | 1.6 | 12.5 | 6.1 | 134.7 | 83.3 | 56.9 | 44.3 | 29.5 | 214.4 | 102.9 | 61.0 |
| **-0.76** | 16.9 | 9.9 | 1.4 | 10.7 | 5.2 | 135.5 | 83.4 | 57.2 | 43.8 | 29.3 | 217.8 | 103.8 | 61.6 |

*Table 48. The 2022 Tesla Model 3 On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 1.4 | 1.1 | 6.9 | 6.0 | 6.2 | 10.8 | 13.4 | 6.1 | 2.5 | 23.8 | 22.9 | 7.6 | 15.7 | 24.1 | 24.0 |
| **0.70** | 1.4 | 1.3 | 1.1 | 6.3 | 5.3 | 5.1 | 9.1 | 7.2 | 4.7 | 2.1 | 19.1 | 15.8 | 5.3 | 11.8 | 19.4 | 18.9 |
| **0.60** | 1.4 | 1.3 | 1.1 | 5.8 | 4.4 | 4.2 | 7.6 | 4.3 | 3.2 | 1.8 | 12.2 | 9.6 | 3.0 | 8.0 | 13.5 | 13.6 |
| **0.50** | 1.4 | 1.3 | 1.1 | 5.6 | 4.5 | 4.0 | 6.9 | 3.7 | 2.9 | 1.7 | 8.7 | 6.6 | 2.0 | 6.4 | 9.6 | 10.3 |
| **0.40** | 1.4 | 1.3 | 1.1 | 5.4 | 4.3 | 3.7 | 6.0 | 3.3 | 2.7 | 1.7 | 4.3 | 3.1 | 1.1 | 3.6 | 6.3 | 6.2 |
| **0.30** | 1.4 | 1.3 | 1.1 | 5.2 | 4.2 | 3.6 | 5.6 | 3.3 | 2.6 | 1.7 | 2.9 | 2.1 | 0.8 | 2.7 | 4.4 | 4.3 |
| **0.20** | 1.4 | 1.3 | 1.1 | 5.0 | 4.2 | 3.5 | 4.9 | 3.1 | 2.5 | 1.7 | 1.7 | 1.2 | 0.7 | 1.4 | 2.3 | 2.3 |
| **0.10** | 1.4 | 1.3 | 1.1 | 4.9 | 4.4 | 3.4 | 4.6 | 3.0 | 2.5 | 1.7 | 1.4 | 1.1 | 0.6 | 1.1 | 1.6 | 1.7 |
| **0.00** | 1.4 | 1.3 | 1.0 | 4.8 | 4.4 | 3.4 | 4.2 | 3.0 | 2.5 | 1.8 | 1.2 | 0.9 | 0.6 | 0.9 | 1.1 | 1.1 |
| **-0.10** | 1.5 | 1.3 | 1.0 | 4.8 | 4.4 | 3.4 | 4.1 | 3.0 | 2.5 | 1.9 | 1.2 | 0.9 | 0.6 | 0.8 | 0.9 | 0.8 |
| **-0.20** | 1.5 | 1.3 | 1.0 | 4.7 | 4.5 | 3.3 | 3.7 | 3.0 | 2.5 | 2.0 | 1.1 | 0.9 | 0.5 | 0.7 | 0.7 | 0.6 |
| **-0.30** | 1.5 | 1.3 | 0.9 | 4.7 | 4.6 | 3.2 | 3.7 | 2.9 | 2.5 | 2.0 | 1.1 | 0.8 | 0.6 | 0.7 | 0.7 | 0.6 |
| **-0.40** | 1.5 | 1.3 | 0.8 | 4.6 | 4.6 | 3.2 | 3.5 | 2.9 | 2.6 | 2.0 | 1.0 | 0.8 | 0.5 | 0.7 | 0.7 | 0.6 |
| **-0.50** | 1.5 | 1.3 | 0.8 | 4.6 | 4.4 | 3.1 | 3.4 | 3.0 | 2.7 | 2.0 | 1.0 | 0.8 | 0.5 | 0.7 | 0.7 | 0.6 |
| **-0.60** | 1.5 | 1.3 | 0.7 | 4.5 | 4.5 | 3.0 | 3.3 | 3.1 | 2.8 | 2.0 | 1.0 | 0.8 | 0.5 | 0.7 | 0.7 | 0.5 |
| **-0.70** | 1.5 | 1.3 | 0.6 | 4.4 | 4.4 | 3.0 | 3.2 | 3.2 | 2.9 | 2.0 | 0.9 | 0.8 | 0.5 | 0.7 | 0.7 | 0.5 |
| **-0.76** | 1.5 | 1.4 | 0.5 | 4.2 | 4.2 | 3.0 | 3.2 | 3.2 | 2.9 | 1.9 | 0.9 | 0.7 | 0.5 | 0.7 | 0.7 | 0.5 |

*Table 49. The 2022 Tesla Model 3 Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 698.5 | 484.3 | 26.6 | 68.5 | 56.6 | 88.0 | 71.5 | 87.4 | 83.9 | 54.9 | 193.8 | 128.1 | 77.6 |
| **0.70** | 635.9 | 439.3 | 30.8 | 72.7 | 66.0 | 98.2 | 76.0 | 91.5 | 89.1 | 58.3 | 207.7 | 135.7 | 80.9 |
| **0.60** | 529.2 | 348.0 | 30.0 | 78.7 | 72.6 | 102.3 | 75.2 | 89.8 | 90.4 | 58.0 | 211.9 | 137.3 | 80.3 |
| **0.50** | 490.6 | 297.2 | 33.7 | 83.0 | 75.8 | 109.0 | 76.8 | 92.6 | 91.4 | 59.7 | 218.6 | 140.1 | 82.2 |
| **0.40** | 359.1 | 223.1 | 33.5 | 87.1 | 80.4 | 119.8 | 79.9 | 95.2 | 98.6 | 61.2 | 228.4 | 148.2 | 84.7 |
| **0.30** | 341.2 | 190.7 | 32.5 | 87.2 | 81.6 | 130.6 | 77.9 | 99.3 | 100.2 | 63.0 | 234.2 | 151.0 | 87.2 |
| **0.20** | 246.1 | 109.0 | 31.1 | 86.7 | 80.6 | 147.7 | 85.1 | 103.9 | 110.7 | 65.3 | 243.4 | 159.7 | 90.0 |
| **0.10** | 172.1 | 86.9 | 29.4 | 84.5 | 78.6 | 163.3 | 85.8 | 110.3 | 113.7 | 67.6 | 248.5 | 162.0 | 93.2 |
| **0.00** | 98.2 | 45.3 | 27.2 | 81.3 | 74.8 | 179.8 | 91.4 | 116.1 | 126.5 | 69.8 | 257.2 | 167.6 | 96.8 |
| **-0.10** | 58.1 | 32.0 | 25.0 | 77.0 | 71.4 | 199.2 | 97.0 | 127.9 | 137.3 | 73.4 | 272.5 | 175.9 | 104.9 |
| **-0.20** | 27.4 | 16.5 | 21.0 | 69.9 | 64.4 | 212.2 | 102.0 | 134.0 | 155.6 | 73.3 | 273.1 | 177.7 | 106.0 |
| **-0.30** | 21.5 | 13.0 | 18.9 | 65.5 | 60.7 | 218.1 | 106.6 | 144.2 | 161.0 | 75.4 | 276.7 | 179.6 | 109.0 |
| **-0.40** | 15.0 | 9.8 | 14.5 | 55.5 | 50.3 | 224.1 | 114.3 | 160.1 | 174.2 | 79.7 | 287.1 | 188.9 | 113.8 |
| **-0.50** | 13.6 | 8.7 | 11.9 | 48.5 | 45.4 | 222.0 | 120.7 | 179.4 | 175.0 | 84.8 | 293.4 | 189.8 | 118.2 |
| **-0.60** | 12.9 | 7.6 | 7.4 | 35.1 | 33.2 | 216.2 | 129.3 | 200.0 | 173.8 | 90.0 | 307.9 | 195.6 | 123.1 |
| **-0.70** | 12.1 | 7.4 | 5.2 | 27.1 | 26.5 | 207.3 | 135.0 | 214.9 | 171.5 | 95.5 | 320.2 | 197.3 | 127.4 |
| **-0.76** | 11.7 | 7.3 | 3.1 | 17.8 | 17.7 | 193.8 | 137.0 | 224.7 | 165.4 | 101.7 | 340.4 | 202.4 | 135.6 |

*Table 50. The 2022 Toyota Camry On-Vehicle Tested Aim Effects – Test Locations Above and at the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.8 | 1.4 | 0.7 | 8.5 | 7.5 | 4.8 | 2.4 | 11.2 | 4.7 | 2.4 | 31.6 | 23.0 | 4.6 | 33.1 | 29.1 | 26.2 |
| **0.70** | 1.8 | 1.3 | 0.7 | 8.0 | 7.2 | 4.4 | 2.2 | 9.2 | 4.3 | 2.2 | 25.5 | 17.9 | 3.7 | 27.1 | 23.5 | 22.0 |
| **0.60** | 1.7 | 1.3 | 0.7 | 7.1 | 6.3 | 4.0 | 2.0 | 7.0 | 3.8 | 2.0 | 13.5 | 9.0 | 2.4 | 16.4 | 16.1 | 15.0 |
| **0.50** | 1.6 | 1.3 | 0.8 | 6.2 | 5.5 | 3.7 | 1.9 | 5.5 | 3.2 | 1.9 | 7.0 | 4.9 | 1.7 | 9.8 | 10.0 | 9.4 |
| **0.40** | 1.6 | 1.2 | 0.8 | 5.7 | 5.1 | 3.5 | 1.8 | 4.5 | 2.8 | 1.8 | 4.1 | 3.1 | 1.3 | 5.8 | 6.0 | 5.8 |
| **0.30** | 1.5 | 1.2 | 0.8 | 5.3 | 4.8 | 3.4 | 1.7 | 3.9 | 2.6 | 1.7 | 2.8 | 2.3 | 1.0 | 3.7 | 3.7 | 3.5 |
| **0.20** | 1.4 | 1.1 | 0.8 | 5.1 | 4.5 | 3.3 | 1.7 | 3.4 | 2.3 | 1.6 | 2.2 | 1.8 | 0.9 | 2.6 | 2.4 | 2.4 |
| **0.10** | 1.4 | 1.1 | 0.8 | 4.9 | 4.4 | 3.2 | 1.7 | 3.0 | 2.2 | 1.6 | 1.7 | 1.5 | 0.8 | 2.0 | 1.9 | 1.8 |
| **0.00** | 1.3 | 1.1 | 0.8 | 4.7 | 4.3 | 3.2 | 1.7 | 2.7 | 2.1 | 1.6 | 1.4 | 1.3 | 0.7 | 1.5 | 1.5 | 1.4 |
| **-0.10** | 1.3 | 1.0 | 0.8 | 4.6 | 4.2 | 3.2 | 1.7 | 2.6 | 2.1 | 1.5 | 1.2 | 1.1 | 0.6 | 1.3 | 1.2 | 1.2 |
| **-0.20** | 1.3 | 1.0 | 0.8 | 4.6 | 4.1 | 3.1 | 1.7 | 2.5 | 2.1 | 1.5 | 1.0 | 1.0 | 0.6 | 1.2 | 1.0 | 1.0 |
| **-0.30** | 1.2 | 1.0 | 0.8 | 4.6 | 4.1 | 3.1 | 1.7 | 2.5 | 2.1 | 1.5 | 0.9 | 0.9 | 0.6 | 1.0 | 1.0 | 0.9 |
| **-0.40** | 1.2 | 1.0 | 0.8 | 4.6 | 4.1 | 3.1 | 1.6 | 2.5 | 2.1 | 1.5 | 0.8 | 0.9 | 0.6 | 0.9 | 0.9 | 0.8 |
| **-0.50** | 1.2 | 0.9 | 0.7 | 4.5 | 4.0 | 3.1 | 1.6 | 2.5 | 2.1 | 1.5 | 0.8 | 0.8 | 0.5 | 0.9 | 0.8 | 0.7 |
| **-0.60** | 1.1 | 0.9 | 0.7 | 4.5 | 4.1 | 3.1 | 1.7 | 2.5 | 2.1 | 1.5 | 0.8 | 0.8 | 0.5 | 0.8 | 0.8 | 0.7 |
| **-0.70** | 1.1 | 0.9 | 0.7 | 4.6 | 4.1 | 3.2 | 1.7 | 2.5 | 2.1 | 1.5 | 0.7 | 0.7 | 0.5 | 0.8 | 0.7 | 0.7 |
| **-0.76** | 1.1 | 0.9 | 0.7 | 4.6 | 4.1 | 3.2 | 1.7 | 2.5 | 2.2 | 1.5 | 0.7 | 0.7 | 0.5 | 0.8 | 0.7 | 0.6 |

*Table 51. The 2022 Toyota Camry Lab Tested Aim Effects – Test Locations Below the Horizon*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 558.7 | 263.5 | 28.0 | 48.8 | 43.1 | 85.6 | 95.0 | 70.8 | 63.5 | 41.4 | 172.7 | 97.8 | 70.8 |
| **0.70** | 543.9 | 235.8 | 26.7 | 50.1 | 43.7 | 87.4 | 95.8 | 71.2 | 63.3 | 41.4 | 176.5 | 99.1 | 71.9 |
| **0.60** | 528.5 | 200.8 | 28.5 | 54.4 | 45.3 | 92.0 | 97.9 | 72.5 | 63.4 | 41.5 | 184.3 | 102.3 | 74.1 |
| **0.50** | 496.9 | 148.7 | 30.6 | 59.1 | 46.7 | 98.3 | 100.3 | 73.3 | 63.3 | 41.6 | 192.4 | 105.7 | 75.9 |
| **0.40** | 468.8 | 104.6 | 30.8 | 63.4 | 47.5 | 104.1 | 102.4 | 73.7 | 63.1 | 41.6 | 200.0 | 108.6 | 77.6 |
| **0.30** | 403.7 | 68.9 | 31.8 | 67.3 | 48.1 | 111.7 | 104.5 | 74.0 | 62.7 | 41.5 | 208.9 | 111.5 | 79.6 |
| **0.20** | 300.3 | 44.7 | 31.2 | 70.5 | 49.0 | 111.2 | 107.0 | 74.1 | 62.2 | 41.4 | 216.3 | 114.3 | 81.2 |
| **0.10** | 226.9 | 31.5 | 32.5 | 72.9 | 48.3 | 126.8 | 109.0 | 74.5 | 61.6 | 41.1 | 224.9 | 116.8 | 83.3 |
| **0.00** | 111.0 | 22.2 | 31.7 | 74.9 | 47.4 | 136.1 | 112.2 | 74.9 | 60.9 | 40.7 | 233.5 | 120.1 | 85.2 |
| **-0.10** | 78.1 | 17.8 | 31.7 | 74.7 | 44.7 | 142.6 | 114.3 | 76.0 | 60.6 | 40.3 | 244.2 | 122.5 | 87.4 |
| **-0.20** | 50.2 | 14.7 | 28.2 | 74.9 | 41.3 | 155.3 | 115.7 | 77.0 | 60.2 | 39.9 | 253.7 | 125.0 | 89.5 |
| **-0.30** | 33.6 | 12.2 | 21.9 | 71.5 | 37.2 | 164.3 | 116.2 | 78.5 | 59.9 | 39.6 | 266.5 | 127.4 | 92.2 |
| **-0.40** | 25.8 | 10.5 | 15.4 | 64.1 | 30.3 | 172.4 | 114.5 | 79.7 | 59.4 | 39.5 | 278.1 | 130.5 | 94.5 |
| **-0.50** | 20.0 | 9.5 | 10.3 | 48.6 | 22.7 | 178.9 | 112.1 | 81.4 | 58.8 | 39.5 | 290.8 | 133.2 | 97.0 |
| **-0.60** | 16.7 | 8.8 | 6.3 | 33.8 | 14.3 | 182.9 | 106.8 | 83.2 | 57.8 | 39.6 | 303.7 | 136.3 | 99.4 |
| **-0.70** | 14.6 | 8.1 | 4.1 | 23.2 | 8.9 | 185.8 | 100.4 | 84.8 | 56.7 | 39.8 | 314.3 | 139.2 | 101.3 |
| **-0.76** | 13.3 | 8.0 | 3.1 | 16.0 | 6.8 | 188.2 | 95.8 | 86.5 | 55.6 | 40.0 | 323.9 | 141.2 | 103.1 |

# Appendix D: Aim Effects Data – Lab Testing Method

*Table 52. The 2022 Chevrolet Equinox Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 2.4 | 0.4 | 5.5 | 6.0 | 16.9 | 20.7 | 7.0 | 13.4 | 13.0 | 17.8 | 10.4 | 11.7 | 38.0 | - | 42.2 |
| **0.70** | 1.5 | 2.2 | 0.4 | 5.4 | 5.8 | 16.8 | 19.1 | 4.8 | 9.3 | 11.2 | 10.1 | 6.6 | 9.9 | 26.0 | - | 32.0 |
| **0.60** | 1.4 | 2.0 | 0.4 | 5.4 | 5.6 | 12.6 | 16.9 | 3.9 | 6.3 | 9.6 | 5.6 | 4.0 | 7.6 | 15.0 | - | 19.9 |
| **0.50** | 1.5 | 1.8 | 0.4 | 5.3 | 5.6 | 9.2 | 15.3 | 3.3 | 4.7 | 8.3 | 2.9 | 2.5 | 5.6 | 7.5 | - | 10.7 |
| **0.40** | 1.4 | 1.6 | 0.4 | 5.2 | 5.5 | 7.2 | 13.8 | 3.1 | 3.4 | 7.1 | 1.7 | 1.6 | 3.8 | 4.0 | - | 5.5 |
| **0.30** | 1.4 | 1.5 | 0.5 | 5.1 | 5.5 | 5.7 | 12.4 | 2.9 | 2.7 | 6.1 | 1.2 | 1.1 | 2.5 | 2.3 | - | 2.9 |
| **0.20** | 1.4 | 1.4 | 0.5 | 5.1 | 5.4 | 4.9 | 11.4 | 2.8 | 2.2 | 5.1 | 0.9 | 0.9 | 1.7 | 1.5 | - | 1.7 |
| **0.10** | 1.4 | 1.3 | 0.5 | 5.0 | 5.4 | 4.4 | 10.4 | 2.7 | 2.0 | 4.3 | 0.8 | 0.7 | 1.1 | 1.2 | - | 1.2 |
| **0.00** | 1.4 | 1.3 | 0.6 | 5.0 | 5.4 | 4.2 | 9.5 | 2.6 | 1.9 | 3.4 | 0.7 | 0.7 | 0.9 | 1.0 | - | 1.0 |
| **-0.10** | 1.3 | 1.3 | 0.6 | 5.0 | 5.4 | 4.1 | 8.7 | 2.6 | 1.8 | 2.8 | 0.7 | 0.6 | 0.7 | 0.9 | - | 0.9 |
| **-0.20** | 1.3 | 1.2 | 0.6 | 5.0 | 5.5 | 4.0 | 8.0 | 2.6 | 1.7 | 2.4 | 0.6 | 0.6 | 0.6 | 0.8 | - | 0.8 |
| **-0.30** | 1.3 | 1.2 | 0.6 | 5.1 | 5.6 | 4.0 | 7.4 | 2.6 | 1.7 | 2.0 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.8 |
| **-0.40** | 1.2 | 1.2 | 0.6 | 5.4 | 6.0 | 3.9 | 6.8 | 2.6 | 1.7 | 1.8 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.8 |
| **-0.50** | 1.2 | 1.1 | 0.6 | 5.6 | 6.4 | 4.0 | 6.2 | 2.7 | 1.8 | 1.6 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.7 |
| **-0.60** | 1.2 | 1.1 | 0.6 | 6.3 | 7.2 | 4.0 | 5.7 | 2.8 | 1.8 | 1.5 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.70** | 1.2 | 1.1 | 0.6 | 6.8 | 7.9 | 4.1 | 5.1 | 3.1 | 1.9 | 1.5 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.76** | 1.2 | 1.1 | 0.6 | 6.7 | 7.9 | 4.1 | 4.6 | 3.1 | 1.9 | 1.5 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |

*Table 53. The 2022 Chevrolet Equinox Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 415.9 | 192.5 | 15.7 | 29.1 | 21.7 | 74.3 | 71.8 | 85.7 | 56.3 | 59.5 | 182.5 | 92.8 | 91.1 |
| **0.70** | 400.3 | 168.1 | 16.1 | 29.1 | 21.7 | 76.3 | 73.0 | 86.7 | 57.6 | 59.6 | 191.9 | 95.3 | 95.4 |
| **0.60** | 373.8 | 135.7 | 16.3 | 29.9 | 22.2 | 78.3 | 73.5 | 88.4 | 57.9 | 61.1 | 202.8 | 100.4 | 98.2 |
| **0.50** | 343.0 | 117.5 | 16.5 | 30.5 | 21.9 | 80.3 | 74.8 | 89.5 | 59.0 | 61.3 | 212.9 | 103.0 | 102.8 |
| **0.40** | 289.9 | 99.6 | 16.7 | 31.2 | 22.2 | 82.2 | 75.6 | 91.0 | 59.4 | 62.8 | 222.7 | 108.1 | 105.1 |
| **0.30** | 228.5 | 89.9 | 16.7 | 31.6 | 21.6 | 84.2 | 76.7 | 91.8 | 60.6 | 63.0 | 232.7 | 110.4 | 109.4 |
| **0.20** | 158.2 | 79.2 | 16.6 | 32.2 | 21.6 | 86.1 | 77.4 | 93.5 | 60.7 | 64.5 | 242.4 | 115.7 | 111.7 |
| **0.10** | 104.7 | 70.2 | 16.2 | 32.4 | 20.6 | 88.3 | 78.6 | 94.0 | 62.0 | 64.6 | 252.5 | 118.2 | 116.1 |
| **0.00** | 67.4 | 58.7 | 15.6 | 32.7 | 20.0 | 90.3 | 79.1 | 95.8 | 62.0 | 66.1 | 263.6 | 123.6 | 117.9 |
| **-0.10** | 43.1 | 48.1 | 14.8 | 32.0 | 17.9 | 92.6 | 80.4 | 96.2 | 62.8 | 66.1 | 274.9 | 126.2 | 122.2 |
| **-0.20** | 27.2 | 37.7 | 13.3 | 31.2 | 15.9 | 94.2 | 80.9 | 98.0 | 62.2 | 67.2 | 284.7 | 131.1 | 124.4 |
| **-0.30** | 18.1 | 28.7 | 11.1 | 29.2 | 12.6 | 96.0 | 82.1 | 98.3 | 62.5 | 66.7 | 296.0 | 133.2 | 128.7 |
| **-0.40** | 12.4 | 21.2 | 7.7 | 26.6 | 9.7 | 97.3 | 82.2 | 99.7 | 61.0 | 67.5 | 306.5 | 138.1 | 130.7 |
| **-0.50** | 9.6 | 16.2 | 4.5 | 21.3 | 6.8 | 98.6 | 83.2 | 99.8 | 60.3 | 66.4 | 317.6 | 139.7 | 135.4 |
| **-0.60** | 7.7 | 11.6 | 2.2 | 16.1 | 4.7 | 99.1 | 83.1 | 101.1 | 57.2 | 67.0 | 327.8 | 144.0 | 137.2 |
| **-0.70** | 6.6 | 8.9 | 1.2 | 9.8 | 3.0 | 98.8 | 83.6 | 100.3 | 55.2 | 65.2 | 339.2 | 145.0 | 141.7 |
| **-0.76** | 6.0 | 6.8 | 0.7 | 5.5 | 1.8 | 96.9 | 83.7 | 100.3 | 54.3 | 65.4 | 343.2 | 145.0 | 141.7 |

*Table 54. The 2023 Ford F-150 Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 3.0 | 3.8 | 0.8 | 17.1 | 17.3 | 25.7 | 8.8 | 41.6 | 6.4 | 4.5 | 55.8 | 17.9 | 14.3 | 58.4 | - | 84.0 |
| **0.70** | 3.0 | 3.8 | 0.8 | 15.3 | 15.6 | 24.1 | 8.8 | 26.9 | 5.4 | 4.0 | 49.2 | 11.1 | 8.3 | 52.7 | - | 69.8 |
| **0.60** | 2.9 | 3.9 | 0.7 | 14.0 | 14.2 | 20.0 | 7.3 | 17.9 | 4.9 | 3.6 | 39.0 | 7.0 | 5.2 | 45.4 | - | 54.1 |
| **0.50** | 2.9 | 4.0 | 0.7 | 13.2 | 13.3 | 16.5 | 6.3 | 13.0 | 4.6 | 3.3 | 24.1 | 4.9 | 3.5 | 31.7 | - | 36.9 |
| **0.40** | 2.9 | 4.1 | 0.7 | 12.4 | 12.6 | 14.3 | 5.6 | 10.4 | 4.3 | 3.1 | 13.5 | 3.3 | 2.5 | 17.3 | - | 20.5 |
| **0.30** | 2.8 | 4.1 | 0.7 | 11.9 | 12.1 | 12.9 | 5.1 | 8.8 | 4.1 | 2.9 | 8.0 | 2.5 | 2.0 | 10.3 | - | 12.3 |
| **0.20** | 2.8 | 4.0 | 0.7 | 11.8 | 11.8 | 11.8 | 4.8 | 7.7 | 3.9 | 2.7 | 5.4 | 2.1 | 1.6 | 6.7 | - | 8.1 |
| **0.10** | 2.8 | 3.8 | 0.7 | 11.6 | 11.5 | 10.9 | 4.4 | 7.1 | 3.8 | 2.6 | 3.9 | 1.8 | 1.4 | 4.5 | - | 5.5 |
| **0.00** | 2.7 | 3.8 | 0.7 | 11.3 | 11.1 | 10.3 | 4.3 | 6.7 | 3.8 | 2.5 | 3.0 | 1.6 | 1.2 | 3.4 | - | 4.0 |
| **-0.10** | 2.6 | 3.7 | 0.7 | 10.9 | 10.8 | 10.0 | 4.3 | 6.4 | 3.8 | 2.4 | 2.5 | 1.5 | 1.2 | 2.8 | - | 3.2 |
| **-0.20** | 2.6 | 3.7 | 0.7 | 10.9 | 10.9 | 9.6 | 4.2 | 6.1 | 3.6 | 2.3 | 2.2 | 1.4 | 1.1 | 2.4 | - | 2.7 |
| **-0.30** | 2.5 | 3.7 | 0.8 | 10.8 | 10.9 | 9.2 | 4.2 | 6.0 | 3.6 | 2.3 | 2.0 | 1.4 | 1.0 | 2.1 | - | 2.4 |
| **-0.40** | 2.5 | 3.7 | 0.8 | 10.8 | 10.8 | 9.1 | 4.1 | 5.9 | 3.5 | 2.2 | 1.8 | 1.3 | 1.0 | 2.0 | - | 2.2 |
| **-0.50** | 2.3 | 3.6 | 0.8 | 10.8 | 10.8 | 9.1 | 4.1 | 5.7 | 3.5 | 2.1 | 1.7 | 1.3 | 1.0 | 1.9 | - | 2.1 |
| **-0.60** | 2.2 | 3.5 | 0.8 | 10.9 | 11.1 | 9.1 | 4.1 | 5.5 | 3.4 | 2.1 | 1.7 | 1.3 | 0.9 | 1.8 | - | 2.0 |
| **-0.70** | 2.1 | 3.3 | 0.8 | 11.1 | 11.1 | 9.2 | 4.2 | 5.5 | 3.4 | 2.1 | 1.6 | 1.2 | 0.9 | 1.7 | - | 1.9 |
| **-0.76** | 2.0 | 3.3 | 0.8 | 11.1 | 11.1 | 9.3 | 4.1 | 5.5 | 3.4 | 2.1 | 1.6 | 1.2 | 0.9 | 1.7 | | 1.9 |

*Table 55. The 2023 Ford F-150 Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 493.8 | 145.1 | 15.1 | 27.2 | 22.7 | 47.0 | 32.6 | 49.1 | 20.0 | 28.1 | 89.8 | 32.8 | 47.0 |
| **0.70** | 482.9 | 107.7 | 16.1 | 27.2 | 22.7 | 50.1 | 32.9 | 51.0 | 20.4 | 29.0 | 90.7 | 33.3 | 47.6 |
| **0.60** | 467.1 | 90.2 | 16.9 | 28.7 | 22.7 | 53.6 | 34.4 | 52.7 | 21.3 | 29.8 | 93.2 | 34.6 | 49.3 |
| **0.50** | 435.2 | 65.7 | 17.6 | 29.8 | 22.6 | 57.8 | 35.3 | 54.3 | 21.5 | 31.0 | 95.7 | 35.8 | 50.7 |
| **0.40** | 397.5 | 50.7 | 18.6 | 30.7 | 22.0 | 63.0 | 36.9 | 54.3 | 21.8 | 31.5 | 98.9 | 36.2 | 51.7 |
| **0.30** | 349.7 | 38.1 | 19.1 | 31.3 | 21.5 | 68.8 | 37.7 | 55.5 | 22.3 | 32.1 | 102.1 | 37.2 | 53.1 |
| **0.20** | 312.1 | 29.2 | 19.4 | 31.7 | 20.7 | 74.2 | 40.4 | 56.1 | 22.7 | 31.7 | 107.5 | 38.0 | 55.5 |
| **0.10** | 255.3 | 21.0 | 19.3 | 33.0 | 19.8 | 79.5 | 42.3 | 57.8 | 23.3 | 32.1 | 113.1 | 39.6 | 57.8 |
| **0.00** | 164.0 | 16.1 | 18.9 | 33.2 | 18.1 | 85.1 | 45.8 | 61.2 | 23.8 | 32.6 | 115.4 | 40.8 | 59.7 |
| **-0.10** | 91.0 | 12.8 | 18.0 | 32.9 | 16.4 | 89.8 | 47.8 | 65.6 | 24.5 | 32.8 | 120.3 | 42.9 | 60.9 |
| **-0.20** | 53.1 | 10.5 | 16.8 | 31.7 | 14.3 | 93.6 | 51.3 | 70.0 | 25.3 | 32.9 | 126.3 | 43.9 | 63.2 |
| **-0.30** | 34.9 | 8.7 | 15.3 | 30.4 | 12.5 | 97.1 | 53.2 | 75.1 | 26.0 | 33.6 | 133.7 | 45.3 | 65.7 |
| **-0.40** | 24.3 | 7.8 | 13.6 | 27.7 | 9.8 | 98.5 | 55.7 | 79.5 | 26.4 | 33.3 | 141.1 | 45.8 | 68.8 |
| **-0.50** | 18.4 | 7.2 | 10.9 | 24.0 | 6.4 | 99.7 | 57.3 | 87.9 | 27.0 | 34.2 | 148.2 | 47.2 | 72.2 |
| **-0.60** | 14.9 | 6.7 | 7.0 | 20.2 | 3.9 | 98.7 | 59.4 | 94.1 | 27.6 | 34.3 | 156.8 | 49.0 | 75.9 |
| **-0.70** | 12.8 | 6.4 | 3.9 | 17.8 | 2.6 | 98.1 | 60.2 | 101.5 | 27.9 | 35.6 | 162.6 | 50.8 | 77.7 |
| **-0.76** | 11.1 | 6.2 | 2.3 | 14.7 | 1.7 | 95.7 | 61.2 | 101.6 | 28.0 | 35.9 | 167.8 | 50.8 | 79.6 |

*Table 56. The 2019 Ford Fusion Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.8 | 1.0 | 0.4 | 3.7 | 3.4 | 2.5 | 3.2 | 5.0 | 4.1 | 3.2 | 6.2 | 5.2 | 3.5 | 7.7 | 6.7 | 6.1 |
| **0.70** | 0.8 | 1.0 | 0.4 | 3.5 | 3.2 | 2.3 | 3.0 | 3.5 | 3.1 | 3.0 | 4.6 | 4.0 | 2.8 | 5.6 | 4.8 | 4.4 |
| **0.60** | 0.8 | 1.0 | 0.4 | 3.4 | 3.1 | 2.1 | 3.0 | 2.6 | 2.4 | 2.6 | 3.3 | 2.9 | 2.3 | 3.9 | 3.3 | 2.9 |
| **0.50** | 0.8 | 0.9 | 0.4 | 3.4 | 3.0 | 2.0 | 2.9 | 2.1 | 1.9 | 2.2 | 2.3 | 2.0 | 1.8 | 2.7 | 2.2 | 1.9 |
| **0.40** | 0.8 | 0.9 | 0.4 | 3.4 | 2.9 | 2.0 | 2.9 | 1.8 | 1.5 | 1.8 | 1.5 | 1.3 | 1.2 | 1.9 | 1.5 | 1.3 |
| **0.30** | 0.8 | 0.9 | 0.4 | 3.3 | 2.9 | 2.0 | 2.9 | 1.6 | 1.3 | 1.4 | 1.1 | 0.9 | 0.9 | 1.3 | 1.0 | 0.9 |
| **0.20** | 0.7 | 0.9 | 0.4 | 3.3 | 2.9 | 2.0 | 2.9 | 1.5 | 1.2 | 1.0 | 0.8 | 0.7 | 0.6 | 0.9 | 0.8 | 0.7 |
| **0.10** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 2.8 | 1.4 | 1.1 | 0.8 | 0.6 | 0.5 | 0.5 | 0.7 | 0.6 | 0.5 |
| **0.00** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 2.8 | 1.4 | 1.1 | 0.7 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 | 0.5 |
| **-0.10** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 2.8 | 1.3 | 1.1 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.5 | 0.4 |
| **-0.20** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 2.8 | 1.3 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.30** | 0.7 | 0.9 | 0.4 | 3.1 | 2.8 | 1.9 | 2.7 | 1.3 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.40** | 0.7 | 0.9 | 0.4 | 3.1 | 2.7 | 1.9 | 2.7 | 1.3 | 1.0 | 0.6 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.50** | 0.7 | 0.8 | 0.4 | 3.1 | 2.7 | 1.9 | 2.7 | 1.3 | 1.0 | 0.5 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.60** | 0.7 | 0.8 | 0.3 | 3.0 | 2.7 | 1.9 | 2.6 | 1.2 | 1.0 | 0.5 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.70** | 0.7 | 0.8 | 0.3 | 3.0 | 2.6 | 1.9 | 2.6 | 1.2 | 1.0 | 0.5 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.76** | 0.6 | 0.8 | 0.3 | 3.0 | 2.6 | 1.9 | 2.6 | 1.2 | 1.0 | 0.5 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.4 |

*Table 57. The 2023 Ford Fusion Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 171.8 | 72.1 | 13.8 | 23.8 | 12.1 | 51.4 | 13.6 | 34.0 | 6.0 | 9.7 | 49.2 | 11.4 | 21.7 |
| **0.70** | 163.3 | 70.3 | 13.8 | 23.8 | 12.1 | 51.4 | 14.1 | 33.8 | 6.1 | 9.9 | 49.3 | 11.3 | 21.8 |
| **0.60** | 146.9 | 65.2 | 13.8 | 24.2 | 12.5 | 52.8 | 14.2 | 35.4 | 6.2 | 10.3 | 51.7 | 11.3 | 22.2 |
| **0.50** | 131.7 | 60.3 | 13.6 | 24.3 | 12.3 | 53.4 | 15.1 | 35.4 | 6.5 | 10.5 | 52.3 | 11.4 | 22.4 |
| **0.40** | 109.2 | 51.1 | 13.4 | 24.6 | 12.5 | 54.7 | 15.3 | 37.4 | 6.6 | 11.0 | 55.1 | 11.4 | 22.7 |
| **0.30** | 88.0 | 40.4 | 12.8 | 24.2 | 12.1 | 54.9 | 16.2 | 37.5 | 6.9 | 11.2 | 55.1 | 11.6 | 22.6 |
| **0.20** | 66.4 | 30.2 | 12.1 | 24.1 | 12.3 | 56.2 | 16.3 | 39.7 | 7.1 | 11.7 | 58.5 | 11.7 | 23.1 |
| **0.10** | 51.8 | 23.8 | 11.2 | 23.4 | 11.8 | 56.1 | 17.3 | 39.4 | 7.5 | 11.9 | 58.7 | 12.0 | 23.1 |
| **0.00** | 40.6 | 19.4 | 10.2 | 22.8 | 11.7 | 56.8 | 17.5 | 41.0 | 7.7 | 12.4 | 62.1 | 12.3 | 23.6 |
| **-0.10** | 31.9 | 15.9 | 8.9 | 21.6 | 11.0 | 56.2 | 18.4 | 40.9 | 8.0 | 12.6 | 62.3 | 12.6 | 23.6 |
| **-0.20** | 26.0 | 13.9 | 7.4 | 20.3 | 10.7 | 56.7 | 18.6 | 42.2 | 8.3 | 13.2 | 66.0 | 12.9 | 24.1 |
| **-0.30** | 21.1 | 12.3 | 5.8 | 18.4 | 9.7 | 55.5 | 19.7 | 41.7 | 8.7 | 13.2 | 66.3 | 13.4 | 24.4 |
| **-0.40** | 17.8 | 11.3 | 4.2 | 16.6 | 9.0 | 55.3 | 19.7 | 42.6 | 8.9 | 13.7 | 69.9 | 13.6 | 25.0 |
| **-0.50** | 14.1 | 10.2 | 2.9 | 13.9 | 7.5 | 53.2 | 21.0 | 41.9 | 9.3 | 13.8 | 70.3 | 13.8 | 25.5 |
| **-0.60** | 11.1 | 9.2 | 2.0 | 11.1 | 6.3 | 52.2 | 21.1 | 42.5 | 9.4 | 14.2 | 74.4 | 13.9 | 26.3 |
| **-0.70** | 8.5 | 7.9 | 1.4 | 8.1 | 4.9 | 49.4 | 22.3 | 41.4 | 9.8 | 14.2 | 74.5 | 14.1 | 26.9 |
| **-0.76** | 6.9 | 6.1 | 0.9 | 5.7 | 3.9 | 47.3 | 22.3 | 41.9 | 9.9 | 14.5 | 76.1 | 14.2 | 28.1 |

*Table 58. The 2022 Hyundai Tucson Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 1.7 | 0.7 | 4.6 | 4.8 | 3.9 | 2.4 | 5.0 | 2.2 | 2.1 | 11.1 | 8.2 | 9.1 | 23.1 | 23.9 | 23.0 |
| **0.70** | 1.3 | 1.6 | 0.7 | 4.4 | 4.7 | 3.8 | 2.3 | 3.4 | 1.8 | 1.5 | 7.6 | 4.9 | 6.1 | 17.1 | 17.7 | 17.0 |
| **0.60** | 1.3 | 1.6 | 0.6 | 4.3 | 4.5 | 3.7 | 2.3 | 2.6 | 1.6 | 1.3 | 4.5 | 3.1 | 3.6 | 9.7 | 9.9 | 9.7 |
| **0.50** | 1.2 | 1.5 | 0.6 | 4.1 | 4.3 | 3.6 | 2.2 | 2.3 | 1.5 | 1.3 | 2.6 | 1.7 | 1.6 | 5.1 | 5.0 | 4.9 |
| **0.40** | 1.2 | 1.6 | 0.6 | 4.0 | 4.1 | 3.5 | 2.1 | 2.2 | 1.4 | 1.3 | 1.6 | 1.2 | 0.9 | 2.7 | 2.7 | 2.6 |
| **0.30** | 1.2 | 1.5 | 0.6 | 3.9 | 3.9 | 3.3 | 2.0 | 2.2 | 1.4 | 1.3 | 1.0 | 0.9 | 0.6 | 1.6 | 1.6 | 1.6 |
| **0.20** | 1.2 | 1.6 | 0.6 | 3.8 | 3.8 | 3.3 | 2.0 | 2.1 | 1.4 | 1.2 | 0.8 | 0.7 | 0.5 | 1.1 | 1.1 | 1.1 |
| **0.10** | 1.2 | 1.5 | 0.6 | 3.8 | 3.7 | 3.2 | 1.9 | 2.1 | 1.5 | 1.1 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.8 |
| **0.00** | 1.2 | 1.6 | 0.6 | 3.7 | 3.6 | 3.1 | 1.9 | 2.0 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.10** | 1.3 | 1.5 | 0.6 | 3.7 | 3.6 | 3.0 | 1.8 | 1.9 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.20** | 1.3 | 1.6 | 0.6 | 3.6 | 3.4 | 3.0 | 1.8 | 1.8 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 |
| **-0.30** | 1.3 | 1.4 | 0.6 | 3.5 | 3.3 | 3.1 | 1.7 | 1.8 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.40** | 1.3 | 1.4 | 0.7 | 3.5 | 3.3 | 3.1 | 1.7 | 1.7 | 1.5 | 1.0 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.50** | 1.2 | 1.2 | 0.7 | 3.5 | 3.5 | 3.3 | 1.7 | 1.7 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.60** | 1.2 | 1.2 | 0.7 | 3.5 | 3.6 | 3.4 | 1.6 | 1.6 | 1.5 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.70** | 1.1 | 1.1 | 0.6 | 3.6 | 3.7 | 3.5 | 1.6 | 1.6 | 1.5 | 1.1 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.76** | 1.0 | 1.1 | 0.6 | 3.7 | 3.8 | 3.6 | 1.6 | 1.6 | 1.5 | 1.1 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 |

*Table 59. The 2022 Hyundai Tucson Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 550.0 | 333.5 | 39.1 | 71.6 | 59.0 | 157.6 | 134.0 | 184.3 | 75.1 | 124.5 | 282.2 | 95.7 | 213.6 |
| **0.70** | 538.4 | 275.1 | 40.4 | 71.6 | 59.0 | 157.6 | 137.7 | 191.1 | 76.2 | 128.1 | 288.1 | 98.7 | 221.7 |
| **0.60** | 524.6 | 236.9 | 41.6 | 74.4 | 61.0 | 165.2 | 143.3 | 199.9 | 78.9 | 132.0 | 301.8 | 101.8 | 230.0 |
| **0.50** | 489.2 | 166.0 | 42.5 | 76.8 | 63.4 | 171.9 | 148.4 | 208.1 | 80.2 | 137.5 | 313.4 | 105.7 | 237.6 |
| **0.40** | 443.8 | 118.4 | 43.1 | 78.5 | 65.1 | 179.6 | 154.3 | 216.9 | 83.2 | 141.5 | 327.0 | 108.5 | 246.5 |
| **0.30** | 363.3 | 76.8 | 43.2 | 78.2 | 66.6 | 187.5 | 159.8 | 227.3 | 84.5 | 147.2 | 340.3 | 112.9 | 255.7 |
| **0.20** | 265.9 | 38.6 | 43.0 | 76.9 | 66.4 | 195.4 | 165.4 | 236.4 | 87.2 | 151.3 | 355.6 | 115.7 | 265.4 |
| **0.10** | 148.4 | 26.1 | 42.1 | 72.7 | 65.0 | 202.7 | 171.1 | 246.0 | 88.5 | 156.3 | 369.1 | 120.6 | 274.5 |
| **0.00** | 77.3 | 14.8 | 41.2 | 68.4 | 61.4 | 210.3 | 177.6 | 255.4 | 91.2 | 160.3 | 388.2 | 123.5 | 286.5 |
| **-0.10** | 42.4 | 11.4 | 38.8 | 63.2 | 56.2 | 216.2 | 182.5 | 264.2 | 92.3 | 165.0 | 401.3 | 128.0 | 296.8 |
| **-0.20** | 26.3 | 10.3 | 35.7 | 58.5 | 49.9 | 220.0 | 189.6 | 272.9 | 94.4 | 167.8 | 419.8 | 131.2 | 310.0 |
| **-0.30** | 17.7 | 9.2 | 29.8 | 54.2 | 43.3 | 218.7 | 194.2 | 281.8 | 95.4 | 172.1 | 436.7 | 135.7 | 320.6 |
| **-0.40** | 13.0 | 8.7 | 22.3 | 49.2 | 36.0 | 214.9 | 200.6 | 290.7 | 97.3 | 175.2 | 456.2 | 139.3 | 333.5 |
| **-0.50** | 11.0 | 8.2 | 12.5 | 43.8 | 30.4 | 201.5 | 205.0 | 299.9 | 97.7 | 179.4 | 474.1 | 145.2 | 345.1 |
| **-0.60** | 9.8 | 7.4 | 6.5 | 36.4 | 23.0 | 189.0 | 212.4 | 307.8 | 98.8 | 182.2 | 494.3 | 148.1 | 357.2 |
| **-0.70** | 9.3 | 6.9 | 3.5 | 27.0 | 16.6 | 173.3 | 215.4 | 315.3 | 98.4 | 186.2 | 510.7 | 154.3 | 368.0 |
| **-0.76** | 8.9 | 6.4 | 2.1 | 15.4 | 9.3 | 160.6 | 222.3 | 319.2 | 99.7 | 187.9 | 522.6 | 157.9 | 381.9 |

*Table 60. The 2022 Subaru Outback Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.9 | 2.0 | 0.7 | 12.1 | 12.8 | 7.7 | 2.6 | 16.3 | 6.1 | 4.5 | 34.2 | 12.3 | 8.4 | 73.7 | - | 74.4 |
| **0.70** | 1.9 | 1.9 | 0.7 | 10.3 | 11.0 | 7.0 | 2.6 | 11.1 | 4.9 | 3.6 | 27.6 | 9.0 | 6.5 | 62.0 | - | 60.1 |
| **0.60** | 1.8 | 1.8 | 0.7 | 9.5 | 10.0 | 6.5 | 2.5 | 8.3 | 4.2 | 3.0 | 16.9 | 5.5 | 4.8 | 43.3 | - | 39.4 |
| **0.50** | 1.7 | 1.7 | 0.7 | 9.0 | 9.3 | 6.1 | 2.5 | 6.7 | 3.7 | 2.6 | 9.0 | 3.5 | 3.6 | 21.9 | - | 22.4 |
| **0.40** | 1.7 | 1.7 | 0.7 | 8.6 | 8.9 | 5.9 | 2.5 | 5.6 | 3.4 | 2.3 | 5.0 | 2.2 | 2.5 | 11.0 | - | 12.2 |
| **0.30** | 1.6 | 1.6 | 0.7 | 8.4 | 8.5 | 5.7 | 2.4 | 4.8 | 3.2 | 2.2 | 3.2 | 1.7 | 1.7 | 6.4 | - | 6.9 |
| **0.20** | 1.5 | 1.6 | 0.7 | 8.2 | 8.3 | 5.6 | 2.4 | 4.3 | 2.9 | 2.0 | 2.4 | 1.4 | 1.3 | 4.2 | - | 4.4 |
| **0.10** | 1.5 | 1.5 | 0.7 | 8.0 | 8.0 | 5.4 | 2.4 | 4.0 | 2.8 | 2.0 | 1.9 | 1.2 | 1.2 | 3.0 | - | 3.3 |
| **0.00** | 1.4 | 1.4 | 0.7 | 7.8 | 7.8 | 5.4 | 2.4 | 3.8 | 2.8 | 1.9 | 1.6 | 1.0 | 1.0 | 2.3 | - | 2.5 |
| **-0.10** | 1.3 | 1.4 | 0.7 | 7.7 | 7.6 | 5.3 | 2.4 | 3.7 | 2.7 | 1.8 | 1.3 | 0.9 | 1.0 | 1.9 | - | 2.0 |
| **-0.20** | 1.3 | 1.3 | 0.7 | 7.7 | 7.5 | 5.3 | 2.4 | 3.6 | 2.6 | 1.7 | 1.1 | 0.9 | 0.9 | 1.5 | - | 1.6 |
| **-0.30** | 1.2 | 1.2 | 0.7 | 7.7 | 7.5 | 5.2 | 2.4 | 3.6 | 2.6 | 1.7 | 1.0 | 0.8 | 0.8 | 1.3 | - | 1.4 |
| **-0.40** | 1.2 | 1.1 | 0.7 | 7.7 | 7.5 | 5.3 | 2.3 | 3.5 | 2.6 | 1.7 | 1.0 | 0.8 | 0.8 | 1.2 | - | 1.2 |
| **-0.50** | 1.1 | 1.1 | 0.7 | 7.6 | 7.4 | 5.3 | 2.3 | 3.4 | 2.5 | 1.6 | 0.9 | 0.8 | 0.7 | 1.1 | - | 1.1 |
| **-0.60** | 1.1 | 1.0 | 0.7 | 7.5 | 7.3 | 5.2 | 2.2 | 3.4 | 2.5 | 1.6 | 0.9 | 0.8 | 0.7 | 1.1 | - | 1.1 |
| **-0.70** | 1.0 | 1.0 | 0.7 | 7.4 | 7.2 | 5.1 | 2.2 | 3.3 | 2.5 | 1.5 | 0.9 | 0.8 | 0.7 | 1.0 | - | 1.0 |
| **-0.76** | 1.0 | 0.9 | 0.6 | 7.3 | 7.1 | 5.1 | 2.2 | 3.4 | 2.5 | 1.6 | 0.9 | 0.8 | 0.7 | 1.0 | - | 1.0 |

*Table 61. The 2022 Subaru Outback Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 452.3 | 181.5 | 16.5 | 27.9 | 22.4 | 59.9 | 52.5 | 60.9 | 34.1 | 39.5 | 133.3 | 46.9 | 64.9 |
| **0.70** | 456.3 | 157.3 | 17.4 | 27.9 | 22.4 | 62.9 | 53.0 | 62.5 | 34.6 | 40.4 | 136.9 | 47.1 | 65.6 |
| **0.60** | 462.7 | 135.0 | 18.7 | 29.6 | 23.3 | 66.1 | 54.6 | 64.5 | 35.5 | 41.0 | 143.3 | 48.8 | 67.6 |
| **0.50** | 436.8 | 109.8 | 20.3 | 31.7 | 24.3 | 69.5 | 55.5 | 67.2 | 36.0 | 42.2 | 148.3 | 50.0 | 70.3 |
| **0.40** | 402.9 | 93.4 | 22.2 | 33.5 | 24.6 | 73.1 | 56.5 | 68.8 | 36.8 | 42.6 | 153.8 | 51.9 | 72.3 |
| **0.30** | 346.5 | 82.6 | 24.4 | 36.0 | 24.6 | 77.0 | 57.0 | 71.4 | 37.1 | 43.2 | 160.4 | 52.9 | 75.1 |
| **0.20** | 273.4 | 65.6 | 26.6 | 38.5 | 23.7 | 81.4 | 57.5 | 73.2 | 37.8 | 43.0 | 166.6 | 54.6 | 77.5 |
| **0.10** | 166.2 | 49.9 | 28.2 | 41.7 | 22.2 | 85.8 | 57.2 | 75.6 | 37.7 | 43.3 | 173.4 | 55.8 | 80.2 |
| **0.00** | 92.1 | 33.8 | 29.3 | 44.3 | 19.7 | 91.3 | 57.2 | 78.0 | 38.0 | 43.3 | 179.2 | 57.7 | 81.7 |
| **-0.10** | 51.3 | 21.7 | 29.4 | 47.4 | 17.2 | 97.8 | 56.7 | 80.9 | 37.6 | 43.5 | 185.7 | 58.8 | 84.8 |
| **-0.20** | 33.2 | 15.0 | 28.8 | 48.8 | 14.6 | 104.4 | 56.7 | 82.7 | 37.6 | 43.2 | 192.9 | 60.8 | 86.4 |
| **-0.30** | 24.2 | 11.8 | 26.9 | 49.5 | 12.8 | 112.6 | 56.6 | 85.9 | 37.3 | 43.3 | 199.1 | 62.2 | 88.6 |
| **-0.40** | 19.0 | 10.1 | 22.8 | 47.6 | 10.3 | 121.5 | 56.7 | 87.9 | 37.3 | 42.9 | 206.7 | 64.1 | 90.6 |
| **-0.50** | 15.5 | 8.7 | 14.7 | 45.3 | 8.8 | 131.0 | 56.8 | 91.6 | 36.6 | 43.1 | 213.5 | 65.8 | 93.6 |
| **-0.60** | 13.2 | 7.9 | 7.3 | 40.4 | 6.8 | 139.6 | 57.2 | 93.8 | 36.2 | 42.6 | 221.4 | 67.9 | 95.6 |
| **-0.70** | 11.2 | 7.2 | 3.6 | 34.4 | 5.0 | 148.8 | 57.1 | 99.2 | 35.4 | 42.8 | 230.7 | 69.8 | 99.0 |
| **-0.76** | 9.9 | 6.7 | 2.1 | 24.6 | 3.2 | 155.4 | 58.2 | 102.9 | 35.1 | 42.4 | 238.6 | 72.7 | 101.8 |

*Table 62. The 2022 Tesla Model 3 Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.8 | 1.2 | 0.3 | 3.5 | 3.9 | 5.3 | 5.1 | 2.2 | 1.6 | 1.7 | 5.6 | 4.9 | 3.6 | 6.9 | 6.2 | 5.4 |
| **0.70** | 0.8 | 1.2 | 0.3 | 3.5 | 3.9 | 5.3 | 4.9 | 2.2 | 1.6 | 1.7 | 5.6 | 4.9 | 3.6 | 6.9 | 6.2 | 5.4 |
| **0.60** | 0.8 | 1.1 | 0.3 | 3.5 | 3.8 | 5.3 | 4.8 | 1.7 | 1.3 | 1.3 | 3.5 | 3.1 | 2.3 | 4.2 | 3.7 | 3.2 |
| **0.50** | 0.8 | 1.1 | 0.3 | 3.5 | 3.8 | 5.2 | 4.7 | 1.5 | 1.1 | 1.0 | 2.1 | 1.9 | 1.5 | 2.4 | 2.1 | 1.8 |
| **0.40** | 0.8 | 1.1 | 0.3 | 3.6 | 3.9 | 5.3 | 4.6 | 1.4 | 1.0 | 0.9 | 1.3 | 1.2 | 1.0 | 1.2 | 1.1 | 1.0 |
| **0.30** | 0.8 | 1.1 | 0.3 | 3.7 | 4.0 | 5.4 | 4.6 | 1.3 | 1.0 | 0.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.7 | 0.6 |
| **0.20** | 0.8 | 1.1 | 0.3 | 3.8 | 4.0 | 5.5 | 4.6 | 1.2 | 1.0 | 0.8 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 |
| **0.10** | 0.8 | 1.0 | 0.3 | 3.8 | 4.1 | 5.6 | 4.6 | 1.2 | 0.9 | 0.7 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **0.00** | 0.8 | 1.0 | 0.3 | 3.9 | 4.0 | 5.6 | 4.6 | 1.1 | 0.9 | 0.7 | 0.4 | 0.4 | 0.3 | 0.4 | 0.5 | 0.5 |
| **-0.10** | 0.8 | 1.0 | 0.3 | 3.8 | 4.0 | 5.5 | 4.5 | 1.1 | 0.9 | 0.7 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 |
| **-0.20** | 0.9 | 1.0 | 0.3 | 3.7 | 3.8 | 5.4 | 4.3 | 1.0 | 0.9 | 0.7 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 |
| **-0.30** | 0.9 | 1.0 | 0.3 | 3.6 | 3.7 | 5.1 | 4.2 | 1.0 | 0.8 | 0.7 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.40** | 0.9 | 1.0 | 0.3 | 3.4 | 3.5 | 4.9 | 4.0 | 1.0 | 0.8 | 0.6 | 0.3 | 0.3 | 0.2 | 0.4 | 0.4 | 0.5 |
| **-0.50** | 1.0 | 1.0 | 0.3 | 3.3 | 3.3 | 4.7 | 3.8 | 0.9 | 0.8 | 0.6 | 0.3 | 0.3 | 0.2 | 0.4 | 0.4 | 0.5 |
| **-0.60** | 1.0 | 1.1 | 0.3 | 3.1 | 3.1 | 4.4 | 3.5 | 0.9 | 0.8 | 0.6 | 0.3 | 0.3 | 0.2 | 0.4 | 0.5 | 0.5 |
| **-0.70** | 1.0 | 1.1 | 0.3 | 2.9 | 2.9 | 4.1 | 3.2 | 0.9 | 0.8 | 0.6 | 0.3 | 0.3 | 0.2 | 0.3 | 0.5 | 0.5 |
| **-0.76** | 1.0 | 1.1 | 0.3 | 2.7 | 2.7 | 3.6 | 3.1 | 0.9 | 0.7 | 0.6 | 0.3 | 0.3 | 0.2 | 0.3 | 0.5 | 0.5 |

*Table 63. The 2022 Tesla Model 3 Lab Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 353.5 | 226.2 | 28.0 | 44.3 | 35.0 | 80.0 | 72.9 | 107.6 | 50.9 | 91.1 | 217.7 | 85.0 | 111.1 |
| **0.70** | 319.0 | 205.0 | 28.0 | 48.1 | 36.6 | 80.0 | 73.0 | 110.5 | 50.9 | 90.8 | 226.0 | 88.2 | 115.9 |
| **0.60** | 275.9 | 177.9 | 28.5 | 52.1 | 38.7 | 82.4 | 72.8 | 116.2 | 50.9 | 94.3 | 233.1 | 91.4 | 120.8 |
| **0.50** | 228.5 | 146.4 | 28.3 | 54.2 | 38.4 | 85.3 | 74.2 | 121.6 | 51.3 | 97.5 | 242.1 | 94.5 | 126.2 |
| **0.40** | 176.2 | 113.6 | 27.4 | 55.2 | 38.4 | 88.4 | 74.4 | 128.0 | 51.7 | 102.9 | 248.8 | 97.8 | 131.2 |
| **0.30** | 127.5 | 84.8 | 26.0 | 54.6 | 36.5 | 91.3 | 75.4 | 134.9 | 51.9 | 108.9 | 257.8 | 102.5 | 136.9 |
| **0.20** | 81.2 | 58.2 | 24.0 | 52.6 | 35.0 | 96.5 | 76.5 | 144.0 | 52.1 | 117.9 | 266.7 | 106.3 | 142.5 |
| **0.10** | 49.7 | 39.6 | 21.9 | 49.5 | 32.2 | 100.9 | 78.9 | 153.4 | 52.2 | 126.9 | 276.1 | 112.7 | 147.9 |
| **0.00** | 27.6 | 25.6 | 19.1 | 46.1 | 29.9 | 107.0 | 81.2 | 166.8 | 52.0 | 139.2 | 283.9 | 117.7 | 154.9 |
| **-0.10** | 15.6 | 17.1 | 16.0 | 41.9 | 26.6 | 110.4 | 84.2 | 180.5 | 52.2 | 153.0 | 293.0 | 123.8 | 160.5 |
| **-0.20** | 10.1 | 12.4 | 12.5 | 36.7 | 23.0 | 114.4 | 88.5 | 201.1 | 51.6 | 171.1 | 300.9 | 129.9 | 167.5 |
| **-0.30** | 7.4 | 9.1 | 9.2 | 30.6 | 18.7 | 114.1 | 92.0 | 219.3 | 50.9 | 194.5 | 312.5 | 136.3 | 173.7 |
| **-0.40** | 6.3 | 7.4 | 6.1 | 24.1 | 14.6 | 113.7 | 96.4 | 242.5 | 49.7 | 223.4 | 322.3 | 142.0 | 180.4 |
| **-0.50** | 5.7 | 6.2 | 3.7 | 17.9 | 10.7 | 109.1 | 99.2 | 258.9 | 48.8 | 256.6 | 339.9 | 147.6 | 189.0 |
| **-0.60** | 5.3 | 5.5 | 2.1 | 12.1 | 7.2 | 105.0 | 102.8 | 280.7 | 47.2 | 285.7 | 354.8 | 152.9 | 195.5 |
| **-0.70** | 5.1 | 4.9 | 1.1 | 7.6 | 4.6 | 96.7 | 102.5 | 282.1 | 45.6 | 308.4 | 367.2 | 158.2 | 200.8 |
| **-0.76** | 4.9 | 4.5 | 0.7 | 7.6 | 4.6 | 88.4 | 102.3 | 284.8 | 44.0 | 316.6 | 374.8 | 158.2 | 200.8 |

*Table 64. The 2022 Toyota Camry Lab Tested Aim Effects – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.3 | 1.6 | 0.6 | 6.0 | 5.3 | 6.1 | 3.5 | 12.7 | 6.5 | 3.2 | 23.7 | 17.7 | 5.6 | 41.0 | 43.5 | 43.2 |
| **0.70** | 1.3 | 1.5 | 0.6 | 5.2 | 4.6 | 5.2 | 2.9 | 8.3 | 4.9 | 2.4 | 19.4 | 13.6 | 3.9 | 35.2 | 39.2 | 39.5 |
| **0.60** | 1.3 | 1.5 | 0.6 | 4.6 | 4.1 | 4.6 | 2.6 | 6.2 | 3.9 | 2.0 | 12.3 | 8.9 | 2.7 | 25.3 | 31.5 | 31.8 |
| **0.50** | 1.2 | 1.4 | 0.6 | 4.2 | 3.8 | 4.2 | 2.4 | 4.7 | 3.2 | 1.8 | 5.7 | 4.8 | 1.9 | 15.2 | 19.0 | 19.6 |
| **0.40** | 1.2 | 1.3 | 0.6 | 4.0 | 3.7 | 4.0 | 2.3 | 3.8 | 2.7 | 1.6 | 3.3 | 2.9 | 1.3 | 7.6 | 9.2 | 9.5 |
| **0.30** | 1.1 | 1.3 | 0.6 | 3.8 | 3.6 | 3.8 | 2.2 | 3.1 | 2.4 | 1.4 | 2.2 | 1.9 | 1.0 | 4.4 | 5.2 | 5.2 |
| **0.20** | 1.1 | 1.2 | 0.6 | 3.6 | 3.5 | 3.6 | 2.1 | 2.7 | 2.1 | 1.3 | 1.6 | 1.4 | 0.8 | 2.9 | 3.2 | 3.3 |
| **0.10** | 1.0 | 1.2 | 0.6 | 3.6 | 3.5 | 3.6 | 2.1 | 2.3 | 1.9 | 1.2 | 1.2 | 1.1 | 0.6 | 2.1 | 2.3 | 2.3 |
| **0.00** | 1.0 | 1.1 | 0.6 | 3.6 | 3.5 | 3.5 | 2.0 | 2.1 | 1.7 | 1.2 | 1.0 | 0.9 | 0.6 | 1.6 | 1.7 | 1.7 |
| **-0.10** | 0.9 | 1.1 | 0.6 | 3.5 | 3.5 | 3.4 | 2.0 | 2.0 | 1.7 | 1.1 | 0.8 | 0.8 | 0.5 | 1.3 | 1.3 | 1.3 |
| **-0.20** | 0.9 | 1.0 | 0.6 | 3.5 | 3.5 | 3.4 | 1.9 | 1.9 | 1.6 | 1.1 | 0.7 | 0.7 | 0.5 | 1.0 | 1.1 | 1.1 |
| **-0.30** | 0.8 | 1.0 | 0.6 | 3.5 | 3.4 | 3.3 | 1.8 | 1.8 | 1.5 | 1.1 | 0.6 | 0.6 | 0.4 | 0.9 | 0.9 | 0.9 |
| **-0.40** | 0.8 | 0.9 | 0.6 | 3.4 | 3.3 | 3.2 | 1.8 | 1.8 | 1.5 | 1.1 | 0.6 | 0.5 | 0.4 | 0.7 | 0.8 | 0.8 |
| **-0.50** | 0.7 | 0.9 | 0.6 | 3.4 | 3.4 | 3.2 | 1.9 | 1.8 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.60** | 0.7 | 0.8 | 0.6 | 3.4 | 3.4 | 3.2 | 1.8 | 1.8 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.70** | 0.6 | 0.8 | 0.5 | 3.4 | 3.4 | 3.1 | 1.8 | 1.7 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.76** | 0.6 | 0.7 | 0.5 | 3.4 | 3.4 | 3.1 | 1.8 | 1.7 | 1.5 | 1.1 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 |

*Table 65. The 2022 Toyota Camry Tested Aim Effects – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 391.0 | 175.3 | 22.5 | 39.3 | 30.6 | 70.1 | 76.9 | 80.7 | 51.6 | 50.6 | 135.6 | 82.0 | 89.2 |
| **0.70** | 406.7 | 150.4 | 24.2 | 39.3 | 30.6 | 73.6 | 80.0 | 83.4 | 52.5 | 51.6 | 139.1 | 88.0 | 92.2 |
| **0.60** | 426.6 | 127.2 | 26.4 | 42.0 | 32.3 | 77.2 | 82.9 | 87.4 | 53.7 | 53.1 | 145.8 | 92.7 | 97.3 |
| **0.50** | 429.8 | 113.5 | 28.8 | 44.7 | 33.9 | 81.2 | 86.3 | 90.1 | 55.1 | 54.4 | 152.3 | 98.0 | 101.7 |
| **0.40** | 426.9 | 103.5 | 31.2 | 48.1 | 35.9 | 84.8 | 89.0 | 94.8 | 56.2 | 56.3 | 160.3 | 102.2 | 106.3 |
| **0.30** | 408.6 | 97.3 | 33.7 | 51.1 | 37.5 | 88.9 | 92.2 | 99.3 | 57.0 | 57.8 | 167.0 | 107.7 | 110.1 |
| **0.20** | 367.3 | 82.0 | 35.4 | 54.0 | 39.1 | 93.5 | 95.2 | 104.6 | 57.7 | 59.1 | 174.4 | 112.9 | 114.4 |
| **0.10** | 294.3 | 59.2 | 37.0 | 55.9 | 40.1 | 98.7 | 98.7 | 109.9 | 58.4 | 59.6 | 181.5 | 118.0 | 118.2 |
| **0.00** | 223.7 | 35.8 | 37.6 | 58.5 | 40.7 | 104.4 | 101.1 | 116.6 | 58.1 | 60.1 | 187.7 | 122.9 | 123.0 |
| **-0.10** | 143.9 | 22.4 | 37.6 | 59.3 | 39.8 | 110.7 | 105.6 | 122.8 | 58.3 | 59.3 | 195.7 | 128.3 | 127.0 |
| **-0.20** | 101.0 | 15.8 | 36.3 | 60.5 | 37.9 | 118.5 | 108.6 | 130.9 | 58.0 | 59.2 | 202.8 | 132.3 | 131.1 |
| **-0.30** | 83.1 | 12.4 | 34.7 | 59.2 | 33.7 | 125.7 | 112.6 | 137.8 | 57.4 | 58.3 | 209.1 | 137.3 | 134.2 |
| **-0.40** | 74.9 | 10.3 | 30.5 | 57.3 | 29.8 | 131.4 | 115.2 | 147.3 | 56.6 | 59.3 | 216.5 | 140.8 | 138.4 |
| **-0.50** | 70.9 | 8.9 | 22.9 | 52.4 | 24.8 | 134.7 | 118.7 | 156.4 | 55.9 | 59.0 | 223.4 | 145.6 | 140.9 |
| **-0.60** | 68.0 | 7.8 | 13.6 | 47.7 | 19.7 | 136.5 | 120.2 | 168.6 | 55.2 | 59.7 | 229.2 | 149.2 | 145.4 |
| **-0.70** | 67.5 | 7.0 | 6.6 | 39.8 | 13.6 | 135.5 | 119.8 | 177.7 | 55.0 | 59.9 | 235.5 | 152.8 | 148.4 |
| **-0.76** | 66.9 | 6.5 | 3.8 | 29.0 | 9.2 | 134.3 | 119.5 | 177.3 | 54.3 | 59.5 | 238.5 | 153.1 | 148.5 |

# Appendix E: Height Effects Data With SAE J599 Offsets

*Table 66. The 2022 Chevrolet Equinox Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 0.9 | 1.8 | 0.3 | 419.1 | 431.2 | 301.3 | 92.7 | 162.3 | 66.0 | 45.4 | 3.4 | 2.7 | 5.9 | 9.6 | - | 13.2 |
| **52** | 0.8 | 1.9 | 0.3 | 391.2 | 421.2 | 286.4 | 82.3 | 116.9 | 51.1 | 32.6 | 2.0 | 1.7 | 4.2 | 5.3 | - | 7.3 |
| **50** | 0.8 | 2.0 | 0.3 | 293.2 | 332.1 | 231.9 | 70.1 | 55.5 | 38.8 | 22.1 | 1.2 | 1.1 | 2.7 | 2.8 | - | 3.7 |
| **48** | 0.8 | 1.8 | 0.3 | 156.9 | 149.8 | 139.0 | 57.9 | 16.8 | 24.6 | 15.5 | 0.8 | 0.7 | 1.7 | 1.6 | - | 2.0 |
| **46** | 0.8 | 1.8 | 0.3 | 69.8 | 70.7 | 82.7 | 48.3 | 9.7 | 18.0 | 13.6 | 0.8 | 0.8 | 1.8 | 1.7 | - | 2.1 |
| **44** | 0.8 | 1.4 | 0.3 | 11.4 | 18.5 | 44.5 | 35.3 | 3.9 | 8.3 | 10.4 | 0.6 | 0.6 | 1.2 | 1.2 | - | 1.3 |
| **42** | 0.8 | 1.1 | 0.4 | 4.3 | 5.7 | 23.4 | 23.9 | 2.5 | 4.0 | 7.7 | 0.5 | 0.5 | 0.8 | 0.9 | - | 0.9 |
| **40** | 0.8 | 0.9 | 0.4 | 3.7 | 4.1 | 9.3 | 15.9 | 2.1 | 2.0 | 5.5 | 0.5 | 0.4 | 0.6 | 0.7 | - | 0.7 |
| **38** | 0.8 | 0.8 | 0.4 | 3.5 | 3.9 | 3.9 | 11.4 | 1.9 | 1.3 | 3.8 | 0.4 | 0.4 | 0.4 | 0.7 | - | 0.6 |
| **36** | 0.7 | 0.7 | 0.4 | 3.4 | 3.8 | 2.7 | 8.6 | 1.8 | 1.0 | 2.3 | 0.4 | 0.4 | 0.4 | 0.6 | - | 0.6 |
| **34** | 0.8 | 0.8 | 0.4 | 3.4 | 3.8 | 2.9 | 9.5 | 1.9 | 1.3 | 3.8 | 0.5 | 0.5 | 0.8 | 0.9 | - | 0.9 |
| **32** | 0.7 | 0.7 | 0.4 | 3.3 | 3.9 | 2.6 | 7.3 | 1.8 | 1.0 | 2.3 | 0.5 | 0.4 | 0.6 | 0.7 | - | 0.7 |
| **30** | 0.7 | 0.7 | 0.4 | 3.8 | 4.5 | 2.5 | 5.6 | 1.8 | 1.0 | 1.4 | 0.4 | 0.4 | 0.4 | 0.7 | - | 0.6 |
| **28** | 0.6 | 0.6 | 0.4 | 5.1 | 6.3 | 2.7 | 4.0 | 1.9 | 1.0 | 1.0 | 0.4 | 0.4 | 0.4 | 0.6 | - | 0.6 |
| **26** | 0.6 | 0.6 | 0.4 | 6.9 | 8.8 | 3.2 | 2.7 | 2.2 | 1.1 | 0.8 | 0.4 | 0.4 | 0.3 | 0.6 | - | 0.6 |
| **24** | 0.6 | 0.6 | 0.4 | 7.5 | 9.0 | 3.5 | 1.6 | 3.3 | 1.4 | 0.7 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.6 |
| **22** | 0.6 | 0.5 | 0.4 | 6.2 | 6.2 | 3.2 | 1.0 | 5.1 | 1.6 | 0.8 | 0.4 | 0.3 | 0.3 | 0.6 | - | 0.5 |

*Table 67. The 2022 Chevrolet Equinox Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| **Mounting Height (inches)** | **Test Point Illuminance Values in lux** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 234.0 | 203.9 | 15.8 | 32.0 | 21.4 | 73.9 | 67.3 | 78.1 | 52.0 | 53.8 | - | - | - |
| **52** | 257.4 | 219.6 | 15.4 | 32.2 | 20.7 | 76.3 | 69.1 | 80.9 | 53.7 | 55.7 | - | - | - |
| **50** | 279.2 | 233.6 | 15.0 | 32.4 | 20.0 | 78.8 | 70.8 | 83.5 | 55.1 | 57.2 | - | - | - |
| **48** | 299.9 | 247.3 | 14.4 | 32.5 | 19.6 | 81.0 | 72.1 | 85.8 | 56.4 | 58.7 | - | - | - |
| **46** | 313.2 | 255.7 | 15.0 | 32.5 | 19.9 | 81.4 | 72.6 | 86.7 | 56.9 | 59.3 | - | - | - |
| **44** | 335.4 | 267.2 | 14.6 | 32.3 | 18.7 | 83.7 | 74.2 | 88.9 | 58.0 | 60.6 | - | - | - |
| **42** | 356.2 | 279.6 | 13.8 | 31.8 | 17.0 | 86.2 | 75.6 | 91.0 | 59.3 | 62.1 | 65.6 | 19.3 | 18.5 |
| **40** | 377.5 | 289.3 | 13.0 | 31.2 | 16.1 | 88.7 | 77.1 | 93.1 | 60.2 | 63.6 | 184.7 | 92.1 | 90.9 |
| **38** | 397.1 | 287.2 | 11.9 | 30.3 | 14.1 | 91.4 | 78.5 | 94.8 | 61.2 | 64.9 | 218.4 | 103.9 | 102.4 |
| **36** | 420.9 | 275.6 | 10.8 | 28.8 | 11.7 | 93.4 | 80.2 | 96.3 | 61.9 | 65.7 | 249.6 | 115.9 | 113.3 |
| **34** | 412.7 | 279.2 | 15.8 | 32.6 | 19.6 | 88.2 | 78.2 | 93.8 | 61.1 | 64.1 | 243.1 | 114.6 | 111.1 |
| **32** | 430.8 | 254.5 | 15.4 | 32.1 | 18.2 | 90.8 | 79.6 | 95.7 | 62.0 | 65.4 | 277.4 | 126.6 | 121.6 |
| **30** | 415.3 | 194.8 | 15.0 | 31.6 | 16.6 | 93.1 | 80.9 | 97.7 | 61.6 | 66.3 | 311.6 | 137.6 | 132.4 |
| **28** | 347.0 | 119.8 | 14.4 | 30.9 | 14.9 | 95.2 | 81.8 | 99.1 | 60.3 | 66.5 | 345.2 | 146.7 | 141.4 |
| **26** | 176.7 | 81.2 | 13.8 | 29.5 | 13.0 | 96.6 | 82.8 | 100.0 | 58.1 | 66.1 | 375.8 | 151.5 | 151.1 |
| **24** | 50.3 | 50.8 | 13.0 | 27.8 | 10.9 | 98.0 | 83.2 | 100.0 | 54.0 | 64.4 | 402.1 | 157.1 | 158.1 |
| **22** | 13.3 | 23.8 | 11.9 | 26.0 | 8.8 | 98.2 | 81.5 | 99.8 | 48.8 | 62.2 | 431.9 | 159.1 | 163.4 |

*Table 68. The 2023 Ford F-150 Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 2.3 | 3.0 | 0.6 | 565.6 | 580.8 | 312.8 | 68.1 | 336.4 | 117.3 | 61.2 | 41.9 | 7.6 | 7.1 | 61.7 | - | 82.6 |
| **52** | 2.4 | 3.1 | 0.6 | 528.5 | 552.7 | 347.5 | 65.7 | 301.2 | 81.4 | 45.0 | 26.3 | 4.6 | 4.3 | 42.2 | - | 59.6 |
| **50** | 2.6 | 3.4 | 0.6 | 447.9 | 471.9 | 366.1 | 66.9 | 236.0 | 35.7 | 20.8 | 13.0 | 3.0 | 2.8 | 21.3 | - | 30.5 |
| **48** | 2.6 | 3.5 | 0.6 | 341.8 | 287.5 | 350.9 | 56.2 | 161.6 | 13.4 | 9.6 | 7.4 | 2.3 | 2.0 | 12.4 | - | 16.6 |
| **46** | 2.6 | 3.5 | 0.6 | 260.1 | 199.0 | 278.0 | 30.6 | 86.0 | 9.1 | 6.9 | 6.9 | 2.2 | 1.9 | 11.4 | - | 15.6 |
| **44** | 2.6 | 3.7 | 0.6 | 53.0 | 49.7 | 76.6 | 16.6 | 25.8 | 5.5 | 4.5 | 4.6 | 1.8 | 1.5 | 7.1 | - | 9.2 |
| **42** | 2.5 | 3.7 | 0.6 | 18.7 | 18.5 | 30.0 | 12.8 | 11.6 | 4.3 | 3.3 | 3.2 | 1.5 | 1.3 | 4.5 | - | 5.7 |
| **40** | 2.4 | 3.5 | 0.6 | 12.4 | 12.5 | 15.3 | 9.3 | 7.7 | 3.7 | 2.8 | 2.5 | 1.4 | 1.1 | 3.4 | - | 4.0 |
| **38** | 2.3 | 3.4 | 0.6 | 10.5 | 10.6 | 10.4 | 6.2 | 6.4 | 3.5 | 2.4 | 2.1 | 1.3 | 1.0 | 2.7 | - | 3.1 |
| **36** | 2.2 | 3.3 | 0.7 | 9.6 | 9.6 | 8.6 | 4.0 | 5.7 | 3.2 | 2.3 | 1.8 | 1.2 | 0.9 | 2.3 | - | 2.5 |
| **34** | 2.3 | 3.4 | 0.6 | 9.6 | 9.6 | 8.8 | 4.1 | 6.1 | 3.4 | 2.3 | 2.7 | 1.4 | 1.2 | 3.7 | - | 4.4 |
| **32** | 2.2 | 3.3 | 0.6 | 9.5 | 9.5 | 8.0 | 3.2 | 5.6 | 3.2 | 2.2 | 2.2 | 1.3 | 1.0 | 2.9 | - | 3.3 |
| **30** | 2.1 | 3.3 | 0.6 | 10.0 | 10.0 | 8.2 | 3.1 | 5.3 | 3.1 | 2.1 | 1.9 | 1.2 | 0.9 | 2.4 | - | 2.7 |
| **28** | 1.9 | 3.1 | 0.7 | 10.5 | 10.5 | 8.4 | 3.0 | 5.2 | 3.0 | 2.0 | 1.7 | 1.2 | 0.9 | 2.1 | - | 2.3 |
| **26** | 1.6 | 2.9 | 0.7 | 11.8 | 11.3 | 9.4 | 3.3 | 5.1 | 3.1 | 2.0 | 1.6 | 1.1 | 0.9 | 2.0 | - | 2.1 |
| **24** | 1.4 | 2.8 | 0.7 | 13.4 | 12.9 | 10.2 | 3.6 | 5.3 | 3.3 | 2.1 | 1.5 | 1.1 | 0.9 | 1.9 | - | 1.9 |
| **22** | - | - | 0.7 | 13.7 | 13.2 | 10.5 | 3.6 | 5.5 | 3.5 | 2.1 | 1.5 | 1.1 | 0.8 | 1.8 | - | 1.8 |

*Table 69. The 2023 Ford F-150 Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 145.7 | 117.8 | 18.9 | 36.1 | 19.1 | 47.0 | 31.6 | 39.2 | 19.3 | 22.6 | - | - | - |
| **52** | 157.7 | 137.2 | 18.6 | 36.6 | 17.8 | 51.2 | 33.9 | 40.5 | 20.4 | 23.7 | - | - | - |
| **50** | 174.0 | 152.1 | 18.0 | 37.1 | 16.4 | 56.6 | 35.9 | 42.8 | 21.5 | 25.1 | - | - | - |
| **48** | 180.9 | 174.2 | 17.6 | 37.3 | 15.3 | 63.0 | 37.6 | 45.3 | 22.3 | 25.9 | - | - | - |
| **46** | 196.3 | 185.4 | 18.2 | 37.2 | 16.0 | 63.6 | 38.3 | 46.0 | 22.4 | 26.2 | - | - | - |
| **44** | 211.4 | 202.5 | 17.7 | 37.1 | 14.7 | 70.7 | 40.2 | 47.9 | 23.2 | 26.5 | 92.2 | 12.7 | 12.5 |
| **42** | 242.3 | 235.2 | 17.1 | 36.5 | 13.0 | 79.2 | 44.4 | 49.3 | 24.0 | 26.5 | 114.7 | 35.2 | 36.4 |
| **40** | 299.0 | 271.5 | 16.5 | 35.8 | 11.6 | 87.8 | 48.7 | 52.3 | 25.2 | 26.8 | 123.3 | 39.6 | 39.5 |
| **38** | 382.6 | 289.3 | 15.9 | 35.2 | 10.3 | 95.5 | 53.0 | 56.9 | 26.5 | 26.5 | 138.1 | 44.4 | 44.3 |
| **36** | 461.4 | 277.0 | 15.3 | 33.8 | 8.4 | 102.7 | 56.9 | 61.2 | 28.2 | 26.6 | 152.2 | 50.4 | 50.5 |
| **34** | 440.0 | 282.6 | 19.3 | 37.2 | 15.9 | 84.9 | 50.7 | 54.5 | 25.7 | 26.8 | 148.3 | 49.0 | 48.6 |
| **32** | 495.9 | 252.1 | 18.9 | 37.1 | 14.5 | 92.8 | 55.4 | 58.9 | 27.4 | 26.4 | 168.6 | 52.9 | 55.7 |
| **30** | 538.6 | 174.8 | 18.5 | 36.4 | 12.9 | 100.0 | 58.7 | 62.7 | 28.8 | 26.5 | 194.5 | 58.6 | 62.1 |
| **28** | 486.0 | 97.7 | 17.9 | 35.8 | 11.6 | 105.4 | 61.2 | 67.8 | 29.8 | 26.4 | 207.9 | 62.5 | 69.3 |
| **26** | 347.1 | 33.0 | 17.4 | 35.0 | 10.1 | 110.1 | 64.0 | 72.3 | 30.9 | 26.8 | 240.1 | 67.4 | 74.4 |
| **24** | 122.7 | 12.6 | 16.8 | 33.8 | 8.4 | 113.7 | 65.5 | 75.1 | 32.2 | 27.5 | 264.1 | 72.5 | 79.3 |
| **22** | 29.8 | 7.8 | 16.3 | 32.3 | 6.5 | 114.4 | 66.4 | 79.2 | 33.2 | 28.0 | 307.6 | 75.7 | 80.3 |

*Table 70. The 2019 Ford Fusion Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 0.6 | 0.8 | 0.3 | 73.9 | 93.3 | 40.4 | 71.5 | 19.9 | 12.9 | 8.4 | 1.2 | 1.0 | 0.8 | 1.6 | 1.2 | 1.0 |
| **52** | 0.6 | 0.8 | 0.3 | 50.8 | 69.1 | 34.5 | 48.3 | 11.2 | 8.0 | 7.5 | 1.0 | 0.8 | 0.6 | 1.2 | 0.9 | 0.7 |
| **50** | 0.6 | 0.8 | 0.3 | 24.5 | 36.7 | 24.1 | 22.4 | 6.8 | 4.5 | 5.9 | 0.8 | 0.7 | 0.5 | 1.0 | 0.7 | 0.6 |
| **48** | 0.6 | 0.8 | 0.3 | 11.0 | 17.1 | 13.4 | 9.5 | 4.1 | 2.6 | 4.0 | 0.7 | 0.5 | 0.4 | 0.8 | 0.6 | 0.5 |
| **46** | 0.6 | 0.8 | 0.3 | 7.4 | 11.6 | 9.5 | 6.5 | 3.5 | 2.2 | 3.6 | 0.7 | 0.6 | 0.4 | 0.9 | 0.7 | 0.6 |
| **44** | 0.6 | 0.7 | 0.3 | 4.2 | 5.6 | 4.1 | 3.9 | 2.4 | 1.5 | 2.2 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5 |
| **42** | 0.6 | 0.7 | 0.3 | 3.3 | 3.7 | 2.3 | 3.2 | 1.9 | 1.1 | 1.3 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **40** | 0.5 | 0.7 | 0.3 | 3.0 | 3.0 | 1.9 | 2.9 | 1.6 | 1.0 | 0.8 | 0.5 | 0.4 | 0.3 | 0.5 | 0.5 | 0.4 |
| **38** | 0.5 | 0.7 | 0.3 | 2.8 | 2.7 | 1.7 | 2.8 | 1.4 | 0.9 | 0.6 | 0.4 | 0.4 | 0.2 | 0.5 | 0.4 | 0.4 |
| **36** | 0.5 | 0.7 | 0.3 | 2.7 | 2.6 | 1.7 | 2.7 | 1.3 | 0.9 | 0.5 | 0.4 | 0.4 | 0.2 | 0.4 | 0.4 | 0.4 |
| **34** | 0.5 | 0.7 | 0.3 | 3.0 | 2.6 | 1.7 | 3.0 | 1.6 | 1.1 | 1.5 | 0.7 | 0.6 | 0.5 | 0.9 | 0.6 | 0.5 |
| **32** | 0.5 | 0.7 | 0.3 | 2.9 | 2.5 | 1.6 | 3.0 | 1.5 | 1.0 | 0.9 | 0.6 | 0.5 | 0.4 | 0.7 | 0.5 | 0.4 |
| **30** | 0.5 | 0.7 | 0.3 | 2.8 | 2.5 | 1.5 | 2.9 | 1.3 | 0.9 | 0.7 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **28** | 0.5 | 0.7 | 0.3 | 2.8 | 2.4 | 1.5 | 2.8 | 1.3 | 0.9 | 0.5 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **26** | 0.5 | 0.7 | 0.3 | 2.7 | 2.3 | 1.5 | 2.8 | 1.3 | 0.9 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **24** | 0.5 | 0.6 | 0.3 | 2.6 | 2.3 | 1.5 | 2.7 | 1.2 | 0.9 | 0.4 | 0.4 | 0.4 | 0.2 | 0.5 | 0.4 | 0.3 |
| **22** | 0.5 | 0.6 | 0.3 | 2.6 | 2.2 | 1.5 | 2.6 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |

*Table 71. The 2019 Ford Fusion Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 89.7 | 43.9 | 12.0 | 27.7 | 13.9 | 41.7 | 11.4 | 13.5 | 5.5 | 6.5 | - | - | - |
| **52** | 101.9 | 48.0 | 11.7 | 27.8 | 13.9 | 44.2 | 11.9 | 14.3 | 5.6 | 6.5 | - | - | - |
| **50** | 114.8 | 52.7 | 11.1 | 27.9 | 14.1 | 46.7 | 12.5 | 15.1 | 5.7 | 6.6 | - | - | - |
| **48** | 129.9 | 58.5 | 10.6 | 27.8 | 13.7 | 49.5 | 13.1 | 16.0 | 5.8 | 6.7 | - | - | - |
| **46** | 140.6 | 61.7 | 11.0 | 27.9 | 13.7 | 50.2 | 13.2 | 16.8 | 5.8 | 6.8 | - | - | - |
| **44** | 157.2 | 64.7 | 10.4 | 27.7 | 13.7 | 53.1 | 14.0 | 17.8 | 5.9 | 7.0 | - | - | - |
| **42** | 177.4 | 68.8 | 9.9 | 27.2 | 13.3 | 55.9 | 14.7 | 18.9 | 6.1 | 7.2 | - | - | - |
| **40** | 196.9 | 73.3 | 9.1 | 26.5 | 13.0 | 58.7 | 15.7 | 20.0 | 6.3 | 7.5 | - | - | - |
| **38** | 212.5 | 77.7 | 8.4 | 25.8 | 12.8 | 61.9 | 16.7 | 21.4 | 6.6 | 7.8 | - | - | - |
| **36** | 222.7 | 80.0 | 7.6 | 24.4 | 12.0 | 63.8 | 17.8 | 22.8 | 7.0 | 8.1 | 107.5 | 3.1 | 4.9 |
| **34** | 195.2 | 79.4 | 11.6 | 28.1 | 13.3 | 66.1 | 15.9 | 19.8 | 6.7 | 8.3 | 121.8 | 33.9 | 37.1 |
| **32** | 198.3 | 81.1 | 11.0 | 27.7 | 12.7 | 69.1 | 16.9 | 21.4 | 7.1 | 8.8 | 110.3 | 12.5 | 15.9 |
| **30** | 182.9 | 74.9 | 10.4 | 27.0 | 12.6 | 71.8 | 18.0 | 23.2 | 7.5 | 9.3 | 131.7 | 12.8 | 16.5 |
| **28** | 146.4 | 62.7 | 9.9 | 26.1 | 12.1 | 72.8 | 19.1 | 25.2 | 8.0 | 9.8 | 156.6 | 14.0 | 16.9 |
| **26** | 83.2 | 33.7 | 9.1 | 24.9 | 11.6 | 73.7 | 20.4 | 27.2 | 8.6 | 10.3 | 183.2 | 15.3 | 17.3 |
| **24** | 39.2 | 18.3 | 8.2 | 23.2 | 11.1 | 73.2 | 21.7 | 28.8 | 9.4 | 10.6 | 211.8 | 15.7 | 18.0 |
| **22** | 14.5 | 12.7 | 7.5 | 21.3 | 10.2 | 71.5 | 23.0 | 30.0 | 10.1 | 10.9 | 244.2 | 15.8 | 19.6 |

*Table 72. The 2022 Hyundai Tucson Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.8 | 2.2 | 0.5 | 201.5 | 237.5 | 186.7 | 84.9 | 28.8 | 19.0 | 21.0 | 1.2 | 0.9 | 0.6 | 1.9 | 1.9 | 1.8 |
| **52** | 1.8 | 2.0 | 0.5 | 141.2 | 178.7 | 132.4 | 48.7 | 13.8 | 8.4 | 9.4 | 1.0 | 0.8 | 0.5 | 1.4 | 1.4 | 1.4 |
| **50** | 1.7 | 1.9 | 0.5 | 69.8 | 81.2 | 57.6 | 20.7 | 7.1 | 3.9 | 3.9 | 0.8 | 0.7 | 0.4 | 1.1 | 1.1 | 1.0 |
| **48** | 1.5 | 1.7 | 0.5 | 26.0 | 27.6 | 19.6 | 7.6 | 4.1 | 2.3 | 1.9 | 0.7 | 0.6 | 0.4 | 0.9 | 0.9 | 0.9 |
| **46** | 1.4 | 1.7 | 0.5 | 17.1 | 17.1 | 12.3 | 5.3 | 3.9 | 2.2 | 1.9 | 0.8 | 0.6 | 0.4 | 1.0 | 1.0 | 1.0 |
| **44** | 1.2 | 1.6 | 0.5 | 8.2 | 7.7 | 5.4 | 2.2 | 2.6 | 1.8 | 1.2 | 0.7 | 0.6 | 0.4 | 0.8 | 0.9 | 0.8 |
| **42** | 1.1 | 1.4 | 0.5 | 5.3 | 5.2 | 3.7 | 1.4 | 2.0 | 1.6 | 1.1 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **40** | 1.0 | 1.3 | 0.5 | 4.2 | 4.4 | 3.4 | 1.2 | 1.8 | 1.5 | 1.1 | 0.5 | 0.5 | 0.4 | 0.6 | 0.7 | 0.7 |
| **38** | 0.9 | 1.3 | 0.5 | 3.9 | 4.1 | 3.3 | 1.2 | 1.7 | 1.5 | 1.1 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **36** | 0.9 | 1.3 | 0.5 | 3.6 | 3.7 | 3.0 | 1.2 | 1.6 | 1.5 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 |
| **34** | 0.9 | 1.3 | 0.5 | 3.9 | 4.2 | 3.3 | 1.2 | 1.9 | 1.5 | 1.1 | 0.9 | 0.7 | 0.4 | 1.2 | 1.2 | 1.1 |
| **32** | 0.9 | 1.2 | 0.5 | 3.7 | 3.8 | 3.1 | 1.2 | 1.7 | 1.5 | 1.1 | 0.7 | 0.6 | 0.4 | 0.9 | 0.9 | 0.9 |
| **30** | 0.9 | 1.2 | 0.5 | 3.4 | 3.5 | 2.9 | 1.1 | 1.6 | 1.5 | 1.1 | 0.6 | 0.5 | 0.4 | 0.8 | 0.8 | 0.8 |
| **28** | 0.9 | 1.3 | 0.5 | 3.3 | 3.3 | 2.7 | 1.1 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **26** | 0.9 | 1.3 | 0.5 | 3.2 | 3.1 | 2.6 | 1.0 | 1.5 | 1.5 | 1.0 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **24** | 1.0 | 1.3 | 0.5 | 3.1 | 2.9 | 2.5 | 1.0 | 1.4 | 1.4 | 1.0 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **22** | 1.0 | 1.1 | 0.5 | 3.0 | 2.8 | 2.6 | 0.9 | 1.3 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |

*Table 73. The 2022 Hyundai Tucson Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 203.6 | 164.0 | 43.1 | 71.2 | 61.6 | 97.9 | 64.4 | 87.5 | 46.3 | 55.1 | - | - | - |
| **52** | 237.5 | 189.5 | 43.4 | 74.3 | 64.2 | 105.3 | 70.1 | 96.7 | 50.4 | 59.7 | - | - | - |
| **50** | 273.8 | 217.3 | 43.6 | 77.3 | 66.3 | 113.1 | 77.1 | 106.7 | 54.5 | 64.8 | - | - | - |
| **48** | 311.2 | 249.3 | 43.3 | 80.1 | 69.2 | 121.9 | 85.2 | 116.4 | 58.5 | 70.2 | - | - | - |
| **46** | 336.1 | 270.2 | 43.4 | 79.8 | 69.1 | 126.1 | 90.4 | 121.3 | 60.8 | 73.7 | - | - | - |
| **44** | 377.5 | 302.5 | 43.2 | 82.4 | 71.2 | 136.9 | 100.8 | 130.5 | 65.5 | 80.1 | - | - | - |
| **42** | 421.6 | 332.3 | 42.8 | 84.4 | 73.1 | 148.1 | 111.8 | 140.1 | 70.4 | 87.2 | - | - | - |
| **40** | 470.8 | 368.3 | 42.3 | 85.9 | 73.8 | 160.0 | 123.1 | 151.5 | 75.3 | 94.9 | - | - | - |
| **38** | 525.1 | 408.0 | 41.5 | 87.0 | 73.0 | 172.7 | 135.1 | 163.5 | 80.4 | 102.0 | - | - | - |
| **36** | 583.5 | 439.3 | 40.3 | 87.0 | 70.9 | 185.8 | 147.6 | 176.8 | 85.8 | 108.8 | - | - | - |
| **34** | 565.4 | 432.8 | 43.4 | 84.5 | 73.0 | 168.7 | 139.0 | 167.1 | 82.0 | 103.8 | 98.3 | 42.1 | 46.5 |
| **32** | 611.7 | 439.8 | 43.1 | 85.8 | 73.9 | 181.7 | 151.2 | 180.4 | 87.1 | 110.5 | 122.5 | 54.8 | 59.1 |
| **30** | 629.1 | 380.2 | 42.8 | 87.0 | 73.0 | 195.5 | 163.8 | 193.8 | 92.7 | 117.0 | 319.2 | 109.0 | 144.5 |
| **28** | 574.5 | 225.3 | 42.1 | 87.1 | 70.9 | 210.0 | 176.1 | 208.6 | 97.8 | 123.5 | 384.6 | 124.8 | 168.0 |
| **26** | 348.9 | 70.0 | 41.4 | 86.4 | 66.2 | 223.5 | 189.5 | 225.2 | 102.8 | 129.7 | 476.1 | 143.2 | 195.2 |
| **24** | 63.4 | 11.6 | 40.1 | 84.4 | 60.7 | 235.8 | 203.3 | 239.6 | 107.1 | 135.3 | 569.5 | 164.8 | 225.3 |
| **22** | 15.3 | 7.0 | 38.2 | 80.2 | 53.9 | 246.3 | 215.9 | 254.4 | 111.0 | 140.4 | 664.4 | 188.0 | 260.2 |

*Table 74. The 2022 Subaru Outback Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.7 | 1.8 | 0.6 | 546.4 | 508.3 | 213.3 | 52.6 | 194.9 | 48.5 | 35.6 | 9.3 | 2.8 | 3.7 | 21.2 | - | 21.3 |
| **52** | 1.6 | 1.7 | 0.6 | 575.6 | 587.9 | 219.1 | 45.8 | 170.4 | 34.9 | 28.7 | 5.4 | 1.9 | 2.4 | 11.1 | - | 12.0 |
| **50** | 1.6 | 1.6 | 0.6 | 498.5 | 597.5 | 185.8 | 36.7 | 119.4 | 20.2 | 14.3 | 3.6 | 1.4 | 1.7 | 6.9 | - | 7.3 |
| **48** | 1.5 | 1.5 | 0.6 | 306.8 | 341.8 | 111.5 | 18.5 | 34.4 | 9.6 | 6.6 | 2.8 | 1.2 | 1.3 | 4.8 | - | 5.0 |
| **46** | 1.5 | 1.5 | 0.6 | 144.7 | 147.3 | 49.7 | 9.6 | 21.9 | 7.2 | 5.3 | 2.8 | 1.2 | 1.4 | 5.0 | - | 5.3 |
| **44** | 1.3 | 1.4 | 0.6 | 33.3 | 35.8 | 15.5 | 2.8 | 9.8 | 4.4 | 3.3 | 2.2 | 1.1 | 1.1 | 3.5 | - | 3.7 |
| **42** | 1.2 | 1.2 | 0.6 | 15.4 | 16.2 | 8.6 | 1.6 | 6.1 | 3.4 | 2.4 | 1.7 | 0.9 | 1.0 | 2.6 | - | 2.8 |
| **40** | 1.1 | 1.2 | 0.6 | 9.0 | 9.5 | 5.8 | 1.5 | 4.4 | 2.8 | 1.9 | 1.4 | 0.8 | 0.9 | 2.1 | - | 2.3 |
| **38** | 1.0 | 1.0 | 0.6 | 7.4 | 7.7 | 4.8 | 1.4 | 3.6 | 2.5 | 1.7 | 1.2 | 0.7 | 0.8 | 1.7 | - | 1.8 |
| **36** | 0.9 | 0.9 | 0.6 | 6.9 | 6.8 | 4.4 | 1.3 | 3.3 | 2.3 | 1.5 | 1.0 | 0.7 | 0.7 | 1.4 | - | 1.5 |
| **34** | 0.7 | 1.0 | 0.6 | 5.7 | 6.1 | 4.5 | 0.6 | 3.3 | 2.0 | 1.2 | 1.5 | 1.1 | 0.7 | 1.9 | - | 1.8 |
| **32** | 0.6 | 1.0 | 0.6 | 5.4 | 5.6 | 4.3 | 0.6 | 2.9 | 2.2 | 1.1 | 1.2 | 1.0 | 0.6 | 1.6 | - | 1.5 |
| **30** | 0.5 | 1.0 | 0.6 | 5.3 | 5.4 | 4.0 | 0.5 | 2.7 | 2.3 | 1.0 | 1.1 | 0.9 | 0.6 | 1.4 | - | 1.3 |
| **28** | 0.4 | 0.9 | 0.6 | 5.1 | 5.3 | 3.7 | 0.5 | 2.6 | 2.2 | 0.9 | 0.9 | 0.8 | 0.6 | 1.2 | - | 1.2 |
| **26** | 0.4 | 0.8 | 0.6 | 4.9 | 5.3 | 3.7 | 0.4 | 2.5 | 2.2 | 0.9 | 0.8 | 0.8 | 0.6 | 1.1 | - | 1.1 |
| **24** | 0.4 | 0.7 | 0.6 | 4.8 | 5.0 | 3.7 | 0.4 | 2.4 | 2.2 | 0.8 | 0.8 | 0.7 | 0.6 | 1.0 | - | 1.0 |
| **22** | 0.3 | 0.7 | 0.5 | 4.5 | 4.5 | 3.6 | 0.4 | 2.4 | 2.3 | 0.9 | 0.7 | 0.7 | 0.6 | 0.9 | - | 0.9 |

*Table 75. The 2022 Subaru Outback Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 146.5 | 131.9 | 29.2 | 37.1 | 25.4 | 57.8 | 48.8 | 46.3 | 31.7 | 30.0 | - | - | - |
| **52** | 161.9 | 145.7 | 29.7 | 38.8 | 24.5 | 61.6 | 50.8 | 48.6 | 33.0 | 31.7 | - | - | - |
| **50** | 182.0 | 155.9 | 29.9 | 41.6 | 23.3 | 66.1 | 52.6 | 50.7 | 34.4 | 33.2 | - | - | - |
| **48** | 208.2 | 166.4 | 29.9 | 43.8 | 21.5 | 71.0 | 54.3 | 53.8 | 35.8 | 34.5 | - | - | - |
| **46** | 226.6 | 176.5 | 29.9 | 42.9 | 22.3 | 71.8 | 55.2 | 55.0 | 36.5 | 35.1 | - | - | - |
| **44** | 251.1 | 191.3 | 29.9 | 45.1 | 20.4 | 77.1 | 57.4 | 57.9 | 38.0 | 36.6 | - | - | - |
| **42** | 273.6 | 201.6 | 29.7 | 47.7 | 18.6 | 82.8 | 59.4 | 60.7 | 39.2 | 38.0 | - | - | - |
| **40** | 295.9 | 212.9 | 29.2 | 50.0 | 17.0 | 88.5 | 60.7 | 63.0 | 40.1 | 38.9 | 120.7 | 25.3 | 24.2 |
| **38** | 325.4 | 227.8 | 28.4 | 51.5 | 15.4 | 95.0 | 60.9 | 63.8 | 40.5 | 39.0 | 136.2 | 53.0 | 52.8 |
| **36** | 375.7 | 239.3 | 27.4 | 53.3 | 14.0 | 103.0 | 60.7 | 64.7 | 40.6 | 39.1 | 154.1 | 58.1 | 57.9 |
| **34** | 468.6 | 309.1 | 25.4 | 50.9 | 37.2 | 109.6 | 73.0 | 99.6 | 46.2 | 60.9 | 216.8 | 65.5 | 79.2 |
| **32** | 534.0 | 286.2 | 25.2 | 52.1 | 36.2 | 116.1 | 75.4 | 103.9 | 46.7 | 62.4 | 248.7 | 72.8 | 88.0 |
| **30** | 621.0 | 224.4 | 24.8 | 53.2 | 34.8 | 121.8 | 77.0 | 107.7 | 47.3 | 63.7 | 277.2 | 79.6 | 97.3 |
| **28** | 625.1 | 169.5 | 24.3 | 53.2 | 33.2 | 128.3 | 78.8 | 111.9 | 47.4 | 64.8 | 306.4 | 86.0 | 107.7 |
| **26** | 418.3 | 80.6 | 23.2 | 53.2 | 30.7 | 134.1 | 81.2 | 116.5 | 47.6 | 65.9 | 344.4 | 92.6 | 119.2 |
| **24** | 62.9 | 16.4 | 22.1 | 52.6 | 27.8 | 137.8 | 84.2 | 120.7 | 47.5 | 66.5 | 403.1 | 100.2 | 132.1 |
| **22** | 17.5 | 5.9 | 20.6 | 50.2 | 24.1 | 140.9 | 87.8 | 125.0 | 46.9 | 66.4 | 471.2 | 106.3 | 145.1 |

*Table 76. The 2022 Tesla Model 3 Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 0.5 | 1.5 | 0.3 | 230.8 | 188.4 | 225.2 | 164.9 | 18.9 | 23.7 | 13.2 | 0.8 | 0.9 | 1.1 | 0.8 | 0.9 | 1.1 |
| **52** | 0.5 | 1.2 | 0.3 | 144.2 | 121.2 | 147.6 | 114.5 | 10.2 | 13.3 | 7.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.8 |
| **50** | 0.5 | 0.9 | 0.3 | 68.1 | 60.7 | 75.3 | 61.0 | 5.3 | 6.8 | 3.9 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.7 |
| **48** | 0.5 | 0.8 | 0.3 | 21.5 | 21.7 | 27.7 | 22.5 | 2.6 | 3.3 | 2.0 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.6 |
| **46** | 0.5 | 0.8 | 0.3 | 11.5 | 12.1 | 16.5 | 14.2 | 2.3 | 2.8 | 1.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 |
| **44** | 0.5 | 0.8 | 0.3 | 5.5 | 6.0 | 6.7 | 7.9 | 1.7 | 1.8 | 1.1 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 |
| **42** | 0.5 | 0.7 | 0.2 | 4.4 | 5.1 | 4.4 | 5.0 | 1.5 | 1.4 | 0.9 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 |
| **40** | 0.5 | 0.7 | 0.2 | 4.0 | 4.8 | 3.8 | 3.4 | 1.5 | 1.2 | 0.7 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **38** | 0.5 | 0.7 | 0.2 | 3.8 | 4.6 | 3.6 | 3.0 | 1.5 | 1.1 | 0.7 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **36** | 0.5 | 0.6 | 0.2 | 3.7 | 4.7 | 3.7 | 2.8 | 1.5 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **34** | 0.5 | 0.7 | 0.3 | 3.8 | 4.6 | 3.6 | 2.9 | 1.5 | 1.2 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 |
| **32** | 0.5 | 0.6 | 0.2 | 3.7 | 4.7 | 3.7 | 2.8 | 1.5 | 1.1 | 0.7 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 |
| **30** | 0.5 | 0.6 | 0.2 | 3.7 | 4.9 | 4.0 | 2.6 | 1.5 | 1.0 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 |
| **28** | 0.5 | 0.6 | 0.2 | 3.6 | 5.0 | 4.1 | 2.4 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **26** | 0.6 | 0.6 | 0.2 | 3.4 | 4.8 | 4.0 | 2.2 | 1.5 | 0.9 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **24** | 0.6 | 0.6 | 0.2 | 3.1 | 4.5 | 3.7 | 2.0 | 1.5 | 0.8 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **22** | 0.6 | 0.6 | 0.2 | 2.8 | 4.0 | 3.3 | 1.9 | 1.6 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |

*Table 77. The 2022 Tesla Model 3 Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 154.5 | 151.7 | 20.6 | 45.0 | 48.4 | 54.4 | 65.8 | 61.7 | 42.8 | 38.3 | - | - | - |
| **52** | 171.7 | 170.0 | 19.6 | 48.2 | 51.8 | 58.5 | 70.4 | 67.4 | 45.8 | 41.4 | - | - | - |
| **50** | 188.8 | 184.9 | 18.5 | 50.1 | 54.5 | 63.1 | 75.2 | 72.2 | 48.9 | 44.5 | - | - | - |
| **48** | 208.1 | 197.1 | 17.6 | 51.5 | 56.2 | 69.0 | 81.3 | 77.4 | 51.0 | 48.0 | - | - | - |
| **46** | 219.8 | 202.6 | 18.1 | 51.4 | 56.1 | 71.0 | 84.6 | 80.3 | 52.3 | 49.7 | - | - | - |
| **44** | 234.5 | 216.1 | 17.4 | 51.6 | 56.7 | 79.7 | 89.2 | 85.9 | 55.0 | 52.5 | - | - | - |
| **42** | 248.0 | 243.1 | 15.7 | 51.4 | 56.4 | 89.0 | 94.5 | 91.6 | 58.2 | 54.9 | - | - | - |
| **40** | 264.4 | 294.9 | 13.9 | 50.1 | 54.6 | 100.5 | 99.0 | 97.7 | 60.2 | 57.1 | - | - | - |
| **38** | 277.8 | 387.4 | 12.6 | 48.4 | 52.2 | 116.1 | 102.6 | 104.5 | 62.3 | 59.8 | - | - | - |
| **36** | 283.2 | 449.6 | 10.7 | 45.8 | 49.1 | 138.2 | 106.7 | 113.9 | 64.3 | 65.9 | - | 4.6 | 4.1 |
| **34** | 282.4 | 441.0 | 18.3 | 51.7 | 56.4 | 107.9 | 103.6 | 105.5 | 62.7 | 60.5 | 104.9 | 46.5 | 49.0 |
| **32** | 263.9 | 432.9 | 17.6 | 50.6 | 55.4 | 125.3 | 107.8 | 115.8 | 64.7 | 67.1 | 193.3 | 90.0 | 76.9 |
| **30** | 208.3 | 353.0 | 16.1 | 48.8 | 53.2 | 150.9 | 114.8 | 132.6 | 66.8 | 77.5 | 229.9 | 112.8 | 94.0 |
| **28** | 122.7 | 237.5 | 14.9 | 46.6 | 50.3 | 177.5 | 125.1 | 156.5 | 69.7 | 94.0 | 267.9 | 130.4 | 109.9 |
| **26** | 56.2 | 94.2 | 13.0 | 43.8 | 47.3 | 202.9 | 143.0 | 194.2 | 72.9 | 118.6 | 308.6 | 149.9 | 129.8 |
| **24** | 18.8 | 19.1 | 11.2 | 40.7 | 43.4 | 214.4 | 168.6 | 252.0 | 75.9 | 155.9 | 354.3 | 168.6 | 155.2 |
| **22** | 7.9 | 5.4 | 9.8 | 35.7 | 38.3 | 213.0 | 189.8 | 323.9 | 78.6 | 207.8 | 414.0 | 185.0 | 176.7 |

*Table 78. The 2022 Toyota Camry Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.6 | 1.8 | 0.5 | 330.9 | 353.1 | 237.5 | 52.0 | 82.9 | 17.2 | 18.9 | 2.5 | 1.7 | 1.5 | 7.1 | 8.3 | 8.7 |
| **52** | 1.6 | 1.8 | 0.5 | 292.5 | 352.6 | 229.8 | 45.8 | 47.6 | 10.6 | 11.0 | 2.0 | 1.3 | 1.1 | 5.0 | 5.8 | 6.0 |
| **50** | 1.5 | 1.7 | 0.5 | 206.8 | 299.2 | 195.5 | 36.9 | 19.3 | 6.6 | 5.9 | 1.6 | 1.1 | 0.9 | 3.7 | 4.2 | 4.3 |
| **48** | 1.5 | 1.6 | 0.5 | 98.3 | 141.9 | 104.1 | 20.4 | 10.0 | 4.3 | 3.7 | 1.3 | 1.0 | 0.8 | 2.9 | 3.2 | 3.3 |
| **46** | 1.4 | 1.6 | 0.5 | 56.7 | 73.8 | 57.0 | 11.3 | 8.6 | 3.8 | 3.4 | 1.4 | 1.0 | 0.8 | 3.2 | 3.6 | 3.7 |
| **44** | 1.4 | 1.5 | 0.5 | 21.2 | 25.8 | 20.7 | 5.1 | 5.7 | 2.8 | 2.6 | 1.2 | 0.9 | 0.7 | 2.5 | 2.8 | 2.9 |
| **42** | 1.3 | 1.5 | 0.5 | 11.9 | 13.6 | 11.2 | 3.3 | 4.1 | 2.3 | 2.0 | 1.1 | 0.8 | 0.6 | 2.1 | 2.3 | 2.3 |
| **40** | 1.3 | 1.4 | 0.5 | 7.7 | 8.5 | 6.9 | 2.4 | 3.2 | 2.0 | 1.6 | 0.9 | 0.7 | 0.6 | 1.7 | 1.8 | 1.9 |
| **38** | 1.2 | 1.3 | 0.5 | 5.7 | 6.2 | 4.9 | 2.0 | 2.6 | 1.8 | 1.4 | 0.8 | 0.6 | 0.5 | 1.4 | 1.5 | 1.5 |
| **36** | 1.1 | 1.2 | 0.5 | 4.8 | 5.2 | 4.0 | 1.8 | 2.2 | 1.6 | 1.3 | 0.8 | 0.6 | 0.5 | 1.2 | 1.3 | 1.3 |
| **34** | 1.2 | 1.4 | 0.5 | 5.6 | 6.0 | 4.8 | 1.9 | 3.1 | 2.0 | 1.6 | 1.3 | 1.0 | 0.8 | 3.0 | 3.3 | 3.4 |
| **32** | 1.1 | 1.3 | 0.5 | 4.7 | 5.1 | 4.0 | 1.8 | 2.6 | 1.7 | 1.4 | 1.2 | 0.9 | 0.7 | 2.5 | 2.7 | 2.8 |
| **30** | 1.1 | 1.2 | 0.5 | 4.3 | 4.6 | 3.6 | 1.7 | 2.2 | 1.6 | 1.3 | 1.0 | 0.8 | 0.6 | 2.0 | 2.1 | 2.2 |
| **28** | 1.0 | 1.1 | 0.5 | 4.2 | 4.3 | 3.3 | 1.6 | 2.0 | 1.5 | 1.2 | 0.9 | 0.7 | 0.6 | 1.6 | 1.7 | 1.8 |
| **26** | 0.9 | 1.0 | 0.5 | 4.1 | 4.1 | 3.2 | 1.5 | 1.9 | 1.5 | 1.1 | 0.8 | 0.6 | 0.5 | 1.4 | 1.5 | 1.5 |
| **24** | 0.8 | 0.9 | 0.5 | 4.0 | 3.9 | 3.0 | 1.5 | 1.8 | 1.4 | 1.1 | 0.7 | 0.6 | 0.5 | 1.2 | 1.2 | 1.3 |
| **22** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |

*Table 79. The 2022 Toyota Camry Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 142.5 | 128.4 | 35.5 | 42.8 | 34.5 | 60.6 | 52.7 | 53.2 | 34.2 | 35.0 | - | - | - |
| **52** | 158.5 | 142.1 | 36.7 | 45.5 | 35.6 | 64.7 | 56.8 | 57.1 | 36.8 | 37.4 | - | - | - |
| **50** | 178.9 | 154.0 | 37.9 | 48.1 | 36.7 | 69.4 | 60.6 | 60.8 | 39.3 | 39.6 | - | - | - |
| **48** | 203.3 | 166.4 | 39.1 | 51.5 | 36.9 | 74.0 | 64.6 | 64.6 | 41.7 | 41.8 | - | - | - |
| **46** | 218.3 | 176.0 | 38.3 | 50.8 | 36.9 | 75.7 | 66.6 | 66.1 | 42.8 | 42.9 | - | - | - |
| **44** | 241.8 | 193.1 | 39.2 | 54.8 | 36.7 | 81.6 | 69.8 | 69.2 | 45.1 | 45.2 | - | - | - |
| **42** | 266.8 | 209.3 | 39.5 | 58.4 | 35.7 | 87.6 | 72.4 | 72.1 | 47.5 | 47.5 | - | - | - |
| **40** | 290.3 | 225.4 | 39.8 | 62.0 | 33.9 | 94.3 | 75.7 | 77.0 | 49.7 | 50.3 | - | - | - |
| **38** | 318.1 | 240.7 | 40.0 | 66.3 | 31.6 | 102.4 | 79.3 | 82.0 | 51.9 | 52.9 | - | - | - |
| **36** | 368.8 | 247.0 | 39.6 | 69.4 | 28.0 | 110.7 | 82.5 | 86.3 | 53.8 | 55.0 | 18.7 | 15.3 | 15.8 |
| **34** | 348.9 | 245.8 | 37.7 | 56.7 | 36.6 | 97.9 | 79.5 | 82.2 | 52.1 | 53.0 | 110.4 | 48.5 | 51.9 |
| **32** | 415.4 | 233.1 | 38.9 | 60.2 | 34.6 | 105.6 | 82.9 | 86.8 | 53.8 | 55.1 | 173.9 | 70.2 | 73.8 |
| **30** | 489.3 | 171.4 | 39.4 | 64.6 | 32.4 | 115.1 | 84.6 | 91.2 | 55.0 | 56.2 | 205.1 | 82.3 | 84.0 |
| **28** | 494.4 | 113.5 | 39.7 | 67.9 | 29.8 | 126.8 | 85.1 | 96.6 | 55.0 | 56.2 | 238.6 | 95.9 | 95.9 |
| **26** | 365.9 | 84.0 | 39.9 | 70.7 | 26.8 | 141.3 | 86.0 | 101.6 | 55.0 | 55.7 | 277.5 | 107.8 | 106.1 |
| **24** | 74.4 | 27.2 | 39.8 | 71.9 | 23.8 | 159.4 | 87.1 | 107.6 | 54.3 | 54.5 | 329.6 | 119.0 | 117.4 |
| **22** | 25.7 | 11.0 | 39.4 | 71.8 | 20.3 | 179.9 | 88.1 | 114.8 | 53.0 | 53.4 | 387.9 | 131.0 | 130.2 |

*Table 80. The 2018 Ford F-150 Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.1 | 1.1 | 0.4 | 101.3 | 101.9 | 53.7 | 7.6 | 16.1 | 7.5 | 4.5 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| **52** | 1.1 | 1.0 | 0.4 | 79.0 | 74.0 | 35.8 | 6.1 | 10.6 | 5.3 | 3.5 | 1.0 | 0.9 | 0.7 | 1.3 | 1.3 | 1.2 |
| **50** | 1.0 | 1.0 | 0.4 | 48.7 | 43.6 | 18.3 | 4.9 | 6.5 | 3.9 | 2.7 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **48** | 1.0 | 1.0 | 0.4 | 20.7 | 18.7 | 8.9 | 3.9 | 4.5 | 3.0 | 2.2 | 0.7 | 0.7 | 0.5 | 0.9 | 0.9 | 0.8 |
| **46** | 1.0 | 0.9 | 0.4 | 15.7 | 14.0 | 7.5 | 3.6 | 4.3 | 2.9 | 2.2 | 0.8 | 0.8 | 0.6 | 1.0 | 1.0 | 0.9 |
| **44** | 0.9 | 0.9 | 0.4 | 8.3 | 7.2 | 5.0 | 2.8 | 3.1 | 2.3 | 1.8 | 0.7 | 0.7 | 0.5 | 0.9 | 0.9 | 0.8 |
| **42** | 0.9 | 0.9 | 0.4 | 5.5 | 4.8 | 3.8 | 2.3 | 2.3 | 1.8 | 1.5 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **40** | 0.9 | 0.8 | 0.4 | 4.0 | 3.5 | 3.0 | 1.9 | 1.9 | 1.6 | 1.3 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.6 |
| **38** | 0.8 | 0.8 | 0.4 | 3.2 | 3.0 | 2.6 | 1.7 | 1.6 | 1.4 | 1.2 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| **36** | 0.8 | 0.8 | 0.4 | 2.8 | 2.8 | 2.3 | 1.5 | 1.4 | 1.2 | 1.0 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **34** | 0.9 | 0.8 | 0.4 | 3.5 | 3.2 | 2.8 | 1.8 | 2.1 | 1.7 | 1.4 | 1.0 | 0.9 | 0.7 | 1.3 | 1.3 | 1.2 |
| **32** | 0.8 | 0.8 | 0.4 | 2.9 | 2.9 | 2.4 | 1.6 | 1.7 | 1.4 | 1.2 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **30** | 0.8 | 0.8 | 0.4 | 2.7 | 2.7 | 2.3 | 1.4 | 1.5 | 1.3 | 1.1 | 0.7 | 0.7 | 0.5 | 0.9 | 0.9 | 0.8 |
| **28** | 0.8 | 0.7 | 0.4 | 2.5 | 2.5 | 2.2 | 1.3 | 1.3 | 1.2 | 1.0 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **26** | 0.8 | 0.7 | 0.4 | 2.4 | 2.5 | 2.1 | 1.2 | 1.2 | 1.1 | 0.9 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.6 |
| **24** | 0.7 | 0.7 | 0.4 | 2.3 | 2.4 | 2.0 | 1.2 | 1.1 | 1.0 | 0.9 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| **22** | 0.7 | 0.7 | 0.4 | 2.3 | 2.3 | 1.9 | 1.1 | 1.1 | 0.9 | 0.9 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.5 |

*Table 81. The 2018 Ford F-150 Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 36.9 | 44.1 | 26.2 | 37.4 | 29.0 | 28.5 | 22.1 | 19.4 | 7.9 | 3.2 | 3.8 | 36.9 | 44.1 |
| **52** | 37.6 | 46.7 | 26.9 | 42.3 | 31.8 | 31.6 | 24.2 | 21.1 | 9.5 | 3.8 | 4.3 | 37.6 | 46.7 |
| **50** | 38.8 | 49.0 | 27.4 | 48.0 | 34.6 | 34.6 | 26.3 | 22.9 | 11.9 | 4.7 | 5.2 | 38.8 | 49.0 |
| **48** | 39.8 | 51.7 | 27.6 | 54.7 | 37.9 | 37.6 | 28.2 | 24.7 | 15.3 | 5.8 | 7.3 | 39.8 | 51.7 |
| **46** | 39.6 | 51.9 | 27.7 | 58.4 | 39.7 | 39.0 | 29.3 | 25.8 | 19.4 | 7.0 | 9.5 | 39.6 | 51.9 |
| **44** | 39.8 | 54.2 | 28.0 | 66.8 | 42.9 | 42.1 | 31.1 | 28.0 | 27.8 | 9.6 | 11.9 | 39.8 | 54.2 |
| **42** | 40.0 | 56.8 | 28.0 | 76.7 | 46.5 | 45.6 | 32.8 | 29.9 | 37.0 | 14.6 | 15.6 | 40.0 | 56.8 |
| **40** | 39.9 | 58.7 | 28.2 | 88.9 | 50.0 | 50.7 | 34.9 | 32.0 | 48.9 | 20.6 | 20.2 | 39.9 | 58.7 |
| **38** | 38.1 | 60.5 | 27.8 | 99.9 | 53.6 | 56.9 | 37.0 | 33.9 | 61.9 | 28.2 | 26.1 | 38.1 | 60.5 |
| **36** | 36.8 | 61.2 | 27.3 | 112.9 | 57.7 | 62.3 | 39.2 | 35.7 | 76.1 | 35.5 | 33.1 | 36.8 | 61.2 |
| **34** | 39.8 | 57.5 | 28.1 | 99.1 | 55.3 | 59.4 | 37.8 | 34.8 | 79.1 | 36.9 | 34.1 | 39.8 | 57.5 |
| **32** | 40.2 | 59.6 | 28.0 | 111.7 | 59.5 | 64.7 | 40.5 | 36.5 | 95.4 | 43.7 | 41.4 | 40.2 | 59.6 |
| **30** | 39.8 | 60.9 | 27.6 | 128.0 | 63.3 | 70.8 | 41.9 | 37.6 | 112.3 | 51.5 | 49.5 | 39.8 | 60.9 |
| **28** | 38.6 | 61.4 | 27.0 | 141.8 | 67.1 | 74.9 | 41.9 | 37.5 | 137.6 | 64.1 | 58.1 | 38.6 | 61.4 |
| **26** | 37.4 | 61.5 | 26.1 | 155.0 | 71.7 | 76.8 | 41.5 | 36.8 | 168.3 | 77.2 | 67.9 | 37.4 | 61.5 |
| **24** | 35.7 | 60.6 | 24.9 | 168.1 | 74.4 | 78.2 | 40.4 | 35.5 | 202.3 | 92.8 | 81.0 | 35.7 | 60.6 |
| **22** | 33.0 | 57.7 | 23.3 | 179.9 | 72.9 | 79.4 | 38.9 | 33.7 | 254.5 | 110.8 | 95.7 | 33.0 | 57.7 |

*Table 82. The 2018 Toyota Camry Lab Tested Height Effects With SAE J599 Offsets – Test Locations Above the Horizon*

| Mounting Height (inches) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **54** | 1.1 | 1.1 | 0.2 | 213.0 | 212.0 | 125.4 | 43.9 | 23.8 | 10.1 | 8.5 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| **52** | 1.1 | 1.0 | 0.2 | 162.7 | 170.7 | 99.0 | 36.9 | 15.0 | 7.2 | 6.2 | 1.2 | 1.0 | 0.7 | 3.5 | 3.2 | 2.6 |
| **50** | 1.1 | 1.0 | 0.2 | 89.7 | 97.2 | 53.0 | 19.0 | 9.0 | 4.5 | 3.5 | 1.0 | 0.8 | 0.6 | 2.9 | 2.7 | 2.2 |
| **48** | 1.1 | 1.0 | 0.2 | 37.9 | 39.6 | 22.5 | 6.8 | 6.0 | 3.0 | 2.1 | 0.8 | 0.7 | 0.5 | 2.3 | 2.2 | 1.8 |
| **46** | 1.0 | 1.0 | 0.2 | 30.2 | 31.5 | 18.1 | 5.4 | 5.8 | 2.9 | 2.1 | 0.9 | 0.8 | 0.6 | 2.8 | 2.6 | 2.1 |
| **44** | 1.0 | 0.9 | 0.3 | 16.7 | 17.9 | 10.5 | 3.5 | 4.0 | 2.2 | 1.4 | 0.8 | 0.7 | 0.5 | 2.3 | 2.2 | 1.8 |
| **42** | 0.9 | 0.9 | 0.3 | 9.4 | 10.0 | 6.1 | 2.4 | 2.7 | 1.6 | 1.0 | 0.7 | 0.6 | 0.4 | 1.9 | 1.8 | 1.5 |
| **40** | 0.8 | 0.9 | 0.3 | 5.7 | 5.9 | 3.9 | 1.7 | 2.0 | 1.2 | 0.7 | 0.6 | 0.5 | 0.4 | 1.5 | 1.4 | 1.2 |
| **38** | 0.8 | 0.9 | 0.3 | 3.7 | 4.0 | 2.7 | 1.2 | 1.5 | 0.9 | 0.6 | 0.5 | 0.4 | 0.3 | 1.2 | 1.2 | 1.0 |
| **36** | 0.8 | 0.8 | 0.3 | 2.8 | 3.0 | 2.2 | 1.1 | 1.1 | 0.7 | 0.5 | 0.4 | 0.4 | 0.3 | 1.0 | 1.0 | 0.9 |
| **34** | 0.8 | 0.9 | 0.3 | 4.4 | 4.6 | 3.1 | 1.4 | 2.4 | 1.4 | 0.9 | 1.2 | 1.0 | 0.7 | 3.5 | 3.2 | 2.6 |
| **32** | 0.8 | 0.9 | 0.3 | 3.1 | 3.4 | 2.4 | 1.1 | 1.7 | 1.1 | 0.7 | 1.0 | 0.8 | 0.6 | 2.9 | 2.7 | 2.2 |
| **30** | 0.8 | 0.8 | 0.3 | 2.5 | 2.6 | 2.0 | 1.1 | 1.3 | 0.8 | 0.5 | 0.8 | 0.7 | 0.5 | 2.4 | 2.3 | 1.9 |
| **28** | 0.7 | 0.8 | 0.3 | 2.1 | 2.2 | 1.8 | 1.1 | 1.0 | 0.6 | 0.4 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **26** | 0.7 | 0.8 | 0.3 | 1.8 | 1.9 | 1.6 | 1.0 | 0.8 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 1.6 | 1.5 | 1.2 |
| **24** | 0.7 | 0.7 | 0.3 | 1.6 | 1.7 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.0 |
| **22** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 1.1 | 1.0 | 0.9 |

*Table 83. The 2018 Toyota Camry Lab Tested Height Effects With SAE J599 Offsets – Test Locations at and Below*

| Mounting Height (inches) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **54** | 120.6 | 104.1 | 51.6 | 71.0 | 52.7 | 56.5 | 36.6 | 40.3 | 25.2 | 28.8 | 31.7 | 11.3 | 11.3 |
| **52** | 148.1 | 119.4 | 53.5 | 76.1 | 54.4 | 64.9 | 41.7 | 46.5 | 28.7 | 33.0 | 37.8 | 12.2 | 12.4 |
| **50** | 181.2 | 137.4 | 54.9 | 80.8 | 55.3 | 75.7 | 46.7 | 52.4 | 32.6 | 36.5 | 40.6 | 14.2 | 14.5 |
| **48** | 221.8 | 157.7 | 56.3 | 86.1 | 56.7 | 86.7 | 53.0 | 58.6 | 36.4 | 40.1 | 44.0 | 15.5 | 16.2 |
| **46** | 251.7 | 174.2 | 55.7 | 86.5 | 57.0 | 91.8 | 56.2 | 62.3 | 39.1 | 42.0 | 48.4 | 17.3 | 18.1 |
| **44** | 298.3 | 203.9 | 57.4 | 90.8 | 56.6 | 105.9 | 62.8 | 69.4 | 42.9 | 45.5 | 55.2 | 19.6 | 20.5 |
| **42** | 348.6 | 223.0 | 58.7 | 96.4 | 56.7 | 120.6 | 70.3 | 76.1 | 46.6 | 49.3 | 61.3 | 22.5 | 24.2 |
| **40** | 397.7 | 234.3 | 59.6 | 100.3 | 55.0 | 138.8 | 77.6 | 84.0 | 50.6 | 53.4 | 74.3 | 25.8 | 28.3 |
| **38** | 453.6 | 239.0 | 60.2 | 104.8 | 53.7 | 155.3 | 86.2 | 93.9 | 54.1 | 57.1 | 82.8 | 30.5 | 33.4 |
| **36** | 493.2 | 230.0 | 60.8 | 108.7 | 50.3 | 172.5 | 96.5 | 104.4 | 57.9 | 61.0 | 95.3 | 35.9 | 40.3 |
| **34** | 485.0 | 235.1 | 57.0 | 97.7 | 56.2 | 153.8 | 90.6 | 98.1 | 56.0 | 58.9 | 98.6 | 37.6 | 42.6 |
| **32** | 512.4 | 222.1 | 58.5 | 102.4 | 54.6 | 171.1 | 100.8 | 110.0 | 59.6 | 63.3 | 117.3 | 46.9 | 53.0 |
| **30** | 502.4 | 190.3 | 59.5 | 106.3 | 52.4 | 188.2 | 111.5 | 122.5 | 64.8 | 67.2 | 145.7 | 59.5 | 65.3 |
| **28** | 356.1 | 153.2 | 60.0 | 110.3 | 49.2 | 208.9 | 124.4 | 136.4 | 69.8 | 70.4 | 187.3 | 76.3 | 85.5 |
| **26** | 187.3 | 85.2 | 60.7 | 113.4 | 43.5 | 229.1 | 136.7 | 150.4 | 74.2 | 73.2 | 238.8 | 98.7 | 107.0 |
| **24** | 68.3 | 33.0 | 61.1 | 115.6 | 37.1 | 250.3 | 146.0 | 167.1 | 77.7 | 76.2 | 308.6 | 120.9 | 126.5 |
| **22** | 19.8 | 10.0 | 60.8 | 116.0 | 29.8 | 270.1 | 154.3 | 179.2 | 82.5 | 80.9 | 413.8 | 140.3 | 146.1 |

# Appendix F: Compound Mounting Height and Aim Data

*Table 84. The 2022 Toyota Camry Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.3 | 1.2 | 0.5 | 7.5 | 9.0 | 4.2 | 4.6 | 2.6 | 1.7 | 2.0 | 0.9 | 0.8 | 1.7 | 1.5 | - | 1.7 |
| **0.70** | 1.3 | 1.2 | 0.5 | 7.6 | 9.2 | 4.5 | 4.1 | 2.6 | 1.7 | 2.0 | 0.9 | 0.8 | 1.7 | 1.5 | - | 1.7 |
| **0.60** | 1.3 | 1.2 | 0.5 | 8.1 | 10.1 | 4.6 | 3.6 | 2.6 | 1.8 | 1.8 | 0.8 | 0.7 | 1.1 | 1.2 | - | 1.2 |
| **0.50** | 1.2 | 1.1 | 0.6 | 8.8 | 10.4 | 4.8 | 3.2 | 2.6 | 1.8 | 1.6 | 0.7 | 0.7 | 0.9 | 1.0 | - | 1.0 |
| **0.40** | 1.2 | 1.1 | 0.6 | 9.2 | 10.9 | 4.8 | 2.8 | 2.8 | 1.9 | 1.6 | 0.7 | 0.6 | 0.7 | 0.9 | - | 0.8 |
| **0.30** | 1.2 | 1.1 | 0.6 | 9.4 | 10.6 | 5.0 | 2.5 | 3.1 | 2.1 | 1.5 | 0.6 | 0.6 | 0.6 | 0.8 | - | 0.8 |
| **0.20** | 1.2 | 1.1 | 0.6 | 9.1 | 10.0 | 4.9 | 2.3 | 3.7 | 2.2 | 1.4 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.8 |
| **0.10** | 1.1 | 1.1 | 0.6 | 8.7 | 8.9 | 4.8 | 2.1 | 4.5 | 2.4 | 1.5 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.7 |
| **0.00** | 1.1 | 1.1 | 0.6 | 8.1 | 7.7 | 4.6 | 1.9 | 5.5 | 2.4 | 1.5 | 0.6 | 0.5 | 0.5 | 0.8 | - | 0.7 |
| **-0.10** | - | - | 0.6 | 7.3 | 6.5 | 4.4 | 1.8 | 6.4 | 2.3 | 1.5 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.20** | - | - | 0.6 | 6.6 | 5.8 | 4.2 | 1.8 | 7.2 | 2.2 | 1.6 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.30** | - | - | 0.6 | 5.9 | 5.1 | 4.0 | 1.7 | 7.8 | 2.1 | 1.6 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.40** | - | - | 0.6 | 5.3 | 4.8 | 3.8 | 1.7 | 8.0 | 2.0 | 1.6 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.50** | - | - | 0.6 | 4.8 | 4.5 | 3.6 | 1.6 | 7.6 | 2.0 | 1.7 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.60** | - | - | 0.5 | 4.3 | 4.3 | 3.5 | 1.6 | 7.0 | 1.9 | 1.7 | 0.7 | 0.6 | 0.5 | 0.8 | - | 0.7 |
| **-0.70** | - | - | 0.5 | 4.0 | 4.1 | 3.3 | 1.6 | 6.1 | 2.0 | 1.8 | 0.7 | 0.6 | 0.5 | 0.9 | - | 0.8 |
| **-0.76** | - | - | 0.5 | 3.9 | 4.0 | 3.3 | 1.6 | 5.2 | 2.0 | 1.8 | 0.9 | 0.6 | 0.6 | 1.0 | - | 0.9 |

*Table 85. The 2022 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 415.9 | 192.5 | 16.5 | 31.6 | 21.6 | 88.3 | 80.5 | 96.3 | 62.9 | 66.1 | 367.7 | 152.4 | 149.1 |
| **0.70** | 400.3 | 168.1 | 16.7 | 31.6 | 21.6 | 90.3 | 81.0 | 98.0 | 62.3 | 67.3 | 370.9 | 153.4 | 152.1 |
| **0.60** | 373.8 | 135.7 | 16.7 | 32.2 | 21.6 | 92.6 | 82.2 | 98.4 | 62.5 | 66.7 | 381.5 | 156.0 | 154.1 |
| **0.50** | 343.0 | 117.5 | 16.6 | 32.4 | 20.6 | 94.3 | 82.2 | 99.7 | 61.0 | 67.6 | 388.5 | 156.7 | 157.0 |
| **0.40** | 289.9 | 99.6 | 16.2 | 32.7 | 20.0 | 96.1 | 83.2 | 99.9 | 60.3 | 66.5 | 398.1 | 159.4 | 158.3 |
| **0.30** | 228.5 | 89.9 | 15.6 | 32.0 | 17.9 | 97.3 | 83.2 | 101.2 | 57.3 | 67.0 | 405.3 | 159.1 | 161.6 |
| **0.20** | 158.2 | 79.2 | 14.8 | 31.2 | 15.9 | 98.7 | 83.7 | 100.4 | 55.2 | 65.2 | 415.6 | 161.0 | 162.4 |
| **0.10** | 104.7 | 70.2 | 13.3 | 29.2 | 12.6 | 99.1 | 82.6 | 100.8 | 51.3 | 64.6 | 423.3 | 160.3 | 165.1 |
| **0.00** | 67.4 | 58.7 | 11.1 | 26.6 | 9.7 | 98.8 | 81.4 | 99.8 | 48.6 | 62.0 | 434.0 | 161.7 | 165.4 |
| **-0.10** | 43.1 | 48.1 | 7.7 | 21.3 | 6.8 | 96.9 | 77.7 | 99.8 | 44.1 | 60.8 | 441.0 | 159.1 | 167.7 |
| **-0.20** | 27.2 | 37.7 | 4.5 | 16.1 | 4.7 | 94.1 | 73.4 | 96.9 | 41.4 | 57.2 | 453.4 | 158.8 | 167.2 |
| **-0.30** | 18.1 | 28.7 | 2.2 | 9.8 | 3.0 | 89.4 | 66.8 | 95.1 | 37.1 | 55.0 | 459.7 | 154.0 | 168.6 |
| **-0.40** | 12.4 | 21.1 | 1.2 | 5.5 | 1.8 | 80.6 | 60.0 | 90.1 | 33.9 | 50.6 | 472.0 | 152.0 | 167.1 |
| **-0.50** | 9.6 | 16.2 | 0.7 | 2.7 | 1.1 | 68.4 | 52.2 | 85.8 | 29.4 | 48.0 | 478.4 | 144.7 | 167.1 |
| **-0.60** | 7.6 | 11.6 | 0.4 | 1.5 | 0.7 | 50.2 | 44.6 | 77.1 | 25.5 | 43.3 | 490.1 | 141.6 | 163.8 |
| **-0.70** | 6.6 | 8.9 | 0.3 | 1.0 | 0.5 | 30.8 | 37.5 | 68.7 | 21.2 | 40.0 | 495.1 | 133.7 | 163.4 |
| **-0.76** | 6.0 | 6.8 | 0.3 | 0.7 | 0.4 | 30.8 | 37.5 | 68.7 | 21.2 | 40.0 | 503.8 | 133.2 | 163.6 |

*Table 86. The 2022 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 2.5 | 0.4 | 11.4 | 17.8 | 44.1 | 35.5 | 39.4 | 35.2 | 20.0 | 26.9 | 15.4 | 13.9 | 47.9 | - | 50.3 |
| **0.70** | 1.4 | 2.6 | 0.4 | 11.4 | 16.9 | 42.7 | 31.8 | 20.5 | 27.6 | 16.8 | 21.7 | 13.6 | 13.0 | 42.0 | - | 45.1 |
| **0.60** | 1.4 | 2.5 | 0.4 | 7.9 | 11.2 | 36.3 | 28.1 | 11.6 | 20.0 | 14.7 | 12.9 | 9.2 | 11.3 | 32.1 | - | 35.8 |
| **0.50** | 1.4 | 2.4 | 0.4 | 6.4 | 7.9 | 29.3 | 24.6 | 7.0 | 13.4 | 13.0 | 7.4 | 6.2 | 9.7 | 21.3 | - | 25.0 |
| **0.40** | 1.4 | 2.2 | 0.4 | 5.8 | 6.5 | 22.9 | 21.4 | 4.8 | 9.3 | 11.2 | 4.0 | 3.7 | 7.6 | 11.9 | - | 15.4 |
| **0.30** | 1.4 | 2.0 | 0.4 | 5.5 | 5.9 | 16.8 | 19.1 | 3.8 | 6.3 | 9.6 | 2.3 | 2.4 | 5.6 | 6.1 | - | 8.4 |
| **0.20** | 1.5 | 1.8 | 0.5 | 5.4 | 5.6 | 12.6 | 16.9 | 3.3 | 4.7 | 8.3 | 1.5 | 1.6 | 3.8 | 3.3 | - | 4.3 |
| **0.10** | 1.4 | 1.6 | 0.5 | 5.4 | 5.6 | 9.2 | 15.3 | 3.1 | 3.4 | 7.1 | 1.0 | 1.1 | 2.5 | 2.0 | - | 2.4 |
| **0.00** | 1.4 | 1.5 | 0.5 | 5.2 | 5.5 | 7.2 | 13.8 | 2.9 | 2.7 | 6.1 | 0.8 | 0.8 | 1.7 | 1.4 | - | 1.5 |
| **-0.10** | 1.4 | 1.4 | 0.6 | 5.2 | 5.5 | 5.7 | 12.4 | 2.8 | 2.2 | 5.1 | 0.7 | 0.7 | 1.1 | 1.1 | - | 1.1 |
| **-0.20** | 1.4 | 1.3 | 0.6 | 5.1 | 5.5 | 4.9 | 11.4 | 2.7 | 2.0 | 4.3 | 0.7 | 0.7 | 0.9 | 0.9 | - | 0.9 |
| **-0.30** | 1.4 | 1.3 | 0.6 | 5.1 | 5.4 | 4.4 | 10.4 | 2.6 | 1.9 | 3.4 | 0.6 | 0.6 | 0.7 | 0.8 | - | 0.8 |
| **-0.40** | 1.3 | 1.3 | 0.6 | 5.0 | 5.4 | 4.2 | 9.5 | 2.6 | 1.8 | 2.8 | 0.6 | 0.6 | 0.6 | 0.8 | - | 0.8 |
| **-0.50** | 1.3 | 1.2 | 0.6 | 5.0 | 5.4 | 4.1 | 8.7 | 2.6 | 1.7 | 2.4 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.8 |
| **-0.60** | 1.3 | 1.2 | 0.6 | 4.9 | 5.6 | 4.0 | 8.0 | 2.6 | 1.7 | 2.0 | 0.6 | 0.6 | 0.5 | 0.8 | - | 0.7 |
| **-0.70** | 1.2 | 1.2 | 0.6 | 5.0 | 5.7 | 4.0 | 7.4 | 2.6 | 1.7 | 1.8 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |
| **-0.76** | 1.2 | 1.1 | 0.6 | 5.1 | 5.6 | 3.9 | 6.9 | 2.7 | 1.8 | 1.6 | 0.6 | 0.5 | 0.5 | 0.7 | - | 0.7 |

*Table 87. The 2022 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 415.9 | 192.5 | 15.7 | 28.5 | 21.9 | 72.6 | 69.9 | 82.4 | 54.6 | 57.2 | - | - | - |
| **0.70** | 400.3 | 168.1 | 15.7 | 28.5 | 21.9 | 72.6 | 70.7 | 83.2 | 55.2 | 57.4 | - | - | - |
| **0.60** | 373.8 | 135.7 | 16.0 | 29.1 | 21.7 | 74.3 | 71.6 | 84.8 | 56.0 | 58.3 | - | - | - |
| **0.50** | 343.0 | 117.5 | 16.3 | 29.9 | 22.2 | 76.3 | 72.6 | 86.2 | 56.8 | 59.4 | - | - | - |
| **0.40** | 289.9 | 99.6 | 16.5 | 30.5 | 21.9 | 78.3 | 73.3 | 87.5 | 57.6 | 60.1 | 172.5 | 87.8 | 87.9 |
| **0.30** | 228.5 | 89.9 | 16.7 | 31.2 | 22.2 | 80.3 | 74.1 | 89.0 | 58.4 | 61.1 | 182.3 | 92.7 | 91.0 |
| **0.20** | 158.2 | 79.2 | 16.7 | 31.6 | 21.6 | 82.1 | 75.1 | 90.1 | 59.0 | 61.9 | 191.7 | 95.2 | 95.3 |
| **0.10** | 104.7 | 70.2 | 16.6 | 32.2 | 21.6 | 84.2 | 76.0 | 91.5 | 59.8 | 62.7 | 202.5 | 100.3 | 98.1 |
| **0.00** | 67.4 | 58.7 | 16.2 | 32.4 | 20.6 | 86.1 | 77.0 | 92.3 | 60.5 | 63.5 | 212.6 | 102.9 | 102.7 |
| **-0.10** | 43.1 | 48.1 | 15.6 | 32.7 | 20.0 | 88.3 | 77.9 | 93.9 | 61.2 | 64.4 | 222.4 | 107.9 | 105.0 |
| **-0.20** | 27.2 | 37.7 | 14.8 | 32.0 | 17.9 | 90.3 | 78.7 | 94.7 | 61.7 | 65.2 | 232.5 | 110.3 | 109.3 |
| **-0.30** | 18.1 | 28.7 | 13.3 | 31.2 | 15.9 | 92.6 | 79.6 | 96.0 | 62.3 | 65.8 | 242.1 | 115.6 | 111.6 |
| **-0.40** | 12.4 | 21.1 | 11.1 | 29.2 | 12.6 | 94.2 | 80.6 | 96.7 | 62.4 | 66.5 | 252.2 | 118.0 | 115.9 |
| **-0.50** | 9.6 | 16.2 | 7.7 | 26.5 | 9.7 | 96.0 | 81.4 | 98.2 | 62.3 | 66.9 | 263.3 | 123.4 | 117.7 |
| **-0.60** | 7.6 | 11.6 | 4.5 | 21.3 | 6.8 | 97.3 | 82.2 | 98.7 | 61.8 | 67.0 | 274.6 | 126.0 | 122.0 |
| **-0.70** | 6.6 | 8.9 | 2.2 | 16.1 | 4.6 | 98.6 | 82.7 | 99.8 | 61.0 | 67.1 | 284.4 | 131.0 | 124.2 |
| **-0.76** | 6.0 | 6.8 | 1.2 | 9.8 | 3.0 | 99.1 | 83.1 | 99.8 | 60.3 | 66.4 | 295.7 | 131.3 | 125.2 |

*Table 88. The 2022 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.0 | 1.7 | 0.5 | 417.4 | 417.0 | 308.6 | 103.7 | 205.5 | 122.7 | 88.4 | 54.2 | 43.4 | 30.2 | 63.5 | - | 62.6 |
| **0.70** | 2.2 | 1.7 | 0.5 | 417.4 | 417.0 | 308.6 | 103.7 | 206.7 | 122.6 | 87.9 | 53.8 | 42.9 | 28.2 | 63.6 | - | 62.5 |
| **0.60** | 2.2 | 1.7 | 0.5 | 420.2 | 422.1 | 304.8 | 99.5 | 204.3 | 118.4 | 82.9 | 51.4 | 39.0 | 25.7 | 63.0 | - | 62.2 |
| **0.50** | 2.2 | 1.8 | 0.5 | 421.6 | 427.2 | 309.0 | 98.1 | 202.9 | 111.0 | 76.8 | 48.3 | 35.3 | 22.6 | 61.5 | - | 60.4 |
| **0.40** | 2.1 | 1.9 | 0.4 | 420.4 | 431.9 | 304.0 | 93.4 | 195.2 | 104.7 | 70.0 | 43.2 | 28.7 | 19.5 | 58.9 | - | 58.7 |
| **0.30** | 1.9 | 2.0 | 0.4 | 417.6 | 435.0 | 306.1 | 91.5 | 186.7 | 93.0 | 63.0 | 36.2 | 22.0 | 16.3 | 54.7 | - | 55.2 |
| **0.20** | 1.7 | 2.1 | 0.4 | 412.0 | 435.1 | 297.2 | 86.2 | 172.6 | 82.0 | 55.5 | 26.9 | 15.4 | 13.9 | 47.9 | - | 50.3 |
| **0.10** | 1.6 | 2.3 | 0.4 | 398.9 | 428.9 | 294.9 | 83.3 | 157.2 | 68.4 | 48.0 | 17.8 | 10.4 | 11.7 | 38.0 | - | 42.2 |
| **0.00** | 1.5 | 2.4 | 0.4 | 371.1 | 414.8 | 278.0 | 77.7 | 133.0 | 58.8 | 40.7 | 10.1 | 6.6 | 9.9 | 26.0 | - | 32.0 |
| **-0.10** | 1.4 | 2.5 | 0.4 | 344.3 | 388.9 | 267.6 | 75.6 | 105.2 | 50.2 | 34.5 | 5.6 | 4.0 | 7.6 | 15.0 | - | 19.9 |
| **-0.20** | 1.4 | 2.5 | 0.4 | 300.3 | 347.8 | 238.4 | 70.6 | 68.9 | 43.4 | 28.1 | 2.9 | 2.4 | 5.6 | 7.5 | - | 10.7 |
| **-0.30** | 1.4 | 2.6 | 0.4 | 257.9 | 278.2 | 213.8 | 67.6 | 39.4 | 35.5 | 22.6 | 1.7 | 1.6 | 3.8 | 4.0 | - | 5.5 |
| **-0.40** | 1.4 | 2.5 | 0.5 | 208.1 | 214.9 | 176.0 | 62.2 | 20.5 | 27.8 | 18.2 | 1.2 | 1.1 | 2.5 | 2.3 | - | 2.9 |
| **-0.50** | 1.4 | 2.4 | 0.5 | 164.0 | 153.6 | 142.0 | 58.5 | 11.6 | 20.1 | 15.4 | 0.9 | 0.8 | 1.7 | 1.5 | - | 1.7 |
| **-0.60** | 1.5 | 2.2 | 0.5 | 112.3 | 108.5 | 105.8 | 52.6 | 7.0 | 13.4 | 13.4 | 0.8 | 0.7 | 1.1 | 1.2 | - | 1.2 |
| **-0.70** | 1.4 | 2.0 | 0.6 | 66.7 | 70.4 | 82.1 | 48.2 | 4.8 | 9.3 | 11.4 | 0.7 | 0.7 | 0.9 | 1.0 | - | 1.0 |
| **-0.76** | 1.4 | 1.9 | 0.6 | 35.7 | 45.5 | 64.7 | 43.6 | 4.8 | 9.3 | 11.2 | 0.7 | 0.7 | 0.9 | 1.0 | - | 1.0 |

*Table 89. The 2022 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 415.9 | 192.5 | 14.6 | 25.8 | 20.5 | 58.7 | 57.4 | 62.4 | 44.0 | 44.8 | - | - | - |
| **0.70** | 400.3 | 168.1 | 14.6 | 25.8 | 20.5 | 60.5 | 58.2 | 63.5 | 45.0 | 45.5 | - | - | - |
| **0.60** | 373.8 | 135.7 | 15.0 | 26.4 | 20.6 | 61.9 | 59.5 | 65.9 | 45.8 | 47.3 | - | - | - |
| **0.50** | 343.0 | 117.5 | 15.4 | 27.2 | 21.3 | 63.7 | 61.1 | 68.0 | 47.4 | 48.2 | - | - | - |
| **0.40** | 289.9 | 99.6 | 15.7 | 27.8 | 21.3 | 65.4 | 62.4 | 70.4 | 48.2 | 49.9 | - | - | - |
| **0.30** | 228.5 | 89.9 | 16.0 | 28.5 | 21.9 | 67.0 | 64.1 | 72.4 | 49.8 | 50.7 | - | - | - |
| **0.20** | 158.2 | 79.2 | 16.3 | 29.1 | 21.7 | 68.8 | 65.3 | 74.8 | 50.5 | 52.5 | - | - | - |
| **0.10** | 104.7 | 70.2 | 16.5 | 29.9 | 22.2 | 70.6 | 66.8 | 76.5 | 52.2 | 53.1 | - | - | - |
| **0.00** | 67.4 | 58.7 | 16.7 | 30.5 | 21.9 | 72.5 | 67.7 | 78.8 | 52.6 | 54.9 | - | - | - |
| **-0.10** | 43.1 | 48.1 | 16.7 | 31.2 | 22.2 | 74.2 | 69.1 | 80.3 | 54.0 | 55.5 | - | - | - |
| **-0.20** | 27.2 | 37.7 | 16.6 | 31.6 | 21.6 | 76.2 | 69.8 | 82.3 | 54.5 | 57.1 | - | - | - |
| **-0.30** | 18.1 | 28.7 | 16.2 | 32.2 | 21.6 | 78.2 | 71.2 | 83.6 | 55.9 | 57.6 | - | - | - |
| **-0.40** | 12.4 | 21.1 | 15.6 | 32.4 | 20.6 | 80.2 | 71.7 | 85.6 | 56.2 | 59.3 | - | - | - |
| **-0.50** | 9.6 | 16.2 | 14.8 | 32.6 | 20.0 | 82.1 | 72.8 | 86.6 | 57.5 | 59.5 | - | - | - |
| **-0.60** | 7.6 | 11.6 | 13.3 | 32.0 | 17.9 | 84.1 | 73.3 | 88.2 | 57.8 | 61.0 | - | - | - |
| **-0.70** | 6.6 | 8.9 | 11.1 | 31.2 | 15.9 | 86.0 | 74.7 | 89.3 | 58.9 | 61.2 | - | - | - |
| **-0.76** | 6.0 | 6.8 | 7.7 | 29.1 | 12.6 | 88.2 | 75.0 | 89.9 | 58.9 | 61.8 | - | - | - |

*Table 90. The 2022 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.5 | 1.9 | 0.7 | 354.3 | 347.9 | 278.2 | 111.2 | 189.6 | 133.1 | 96.1 | 54.1 | 45.0 | 32.3 | 61.2 | - | 60.3 |
| **0.70** | 1.5 | 1.9 | 0.6 | 362.4 | 355.1 | 280.2 | 111.5 | 193.9 | 134.5 | 97.1 | 54.1 | 44.3 | 32.0 | 62.0 | - | 61.4 |
| **0.60** | 1.6 | 1.9 | 0.5 | 369.0 | 363.5 | 284.4 | 112.7 | 196.5 | 132.6 | 96.6 | 54.9 | 45.0 | 31.3 | 62.9 | - | 61.9 |
| **0.50** | 1.7 | 1.8 | 0.5 | 377.0 | 370.5 | 288.1 | 110.9 | 201.0 | 132.3 | 96.7 | 54.2 | 43.4 | 30.2 | 63.5 | - | 62.6 |
| **0.40** | 1.9 | 1.8 | 0.5 | 385.0 | 379.2 | 291.8 | 111.7 | 202.6 | 129.5 | 94.7 | 53.8 | 42.9 | 28.2 | 63.6 | - | 62.4 |
| **0.30** | 2.0 | 1.8 | 0.4 | 392.8 | 386.3 | 294.5 | 110.1 | 205.6 | 127.6 | 92.8 | 51.3 | 39.0 | 25.7 | 63.0 | - | 62.2 |
| **0.20** | 2.2 | 1.8 | 0.4 | 399.0 | 394.7 | 298.3 | 109.9 | 205.4 | 122.7 | 88.4 | 48.3 | 35.3 | 22.6 | 61.5 | - | 60.4 |
| **0.10** | 2.2 | 1.8 | 0.4 | 405.9 | 401.4 | 300.1 | 107.3 | 206.6 | 118.7 | 84.5 | 43.2 | 28.7 | 19.5 | 58.9 | - | 58.7 |
| **0.00** | 2.2 | 1.8 | 0.4 | 411.9 | 409.3 | 303.0 | 106.9 | 204.3 | 111.6 | 77.5 | 36.2 | 22.0 | 16.3 | 54.7 | - | 55.2 |
| **-0.10** | 2.1 | 1.9 | 0.4 | 417.1 | 416.7 | 304.6 | 103.6 | 202.8 | 105.3 | 71.7 | 26.9 | 15.4 | 13.9 | 47.9 | - | 50.3 |
| **-0.20** | 1.9 | 2.0 | 0.4 | 419.9 | 421.9 | 306.3 | 102.8 | 195.1 | 94.2 | 63.8 | 17.8 | 10.4 | 11.7 | 38.0 | - | 42.2 |
| **-0.30** | 1.7 | 2.1 | 0.4 | 421.3 | 426.9 | 305.2 | 99.4 | 186.7 | 83.4 | 57.0 | 10.1 | 6.6 | 9.9 | 26.0 | - | 32.0 |
| **-0.40** | 1.6 | 2.2 | 0.4 | 420.1 | 431.6 | 306.6 | 97.2 | 172.6 | 70.9 | 48.7 | 5.6 | 4.0 | 7.6 | 15.0 | - | 19.9 |
| **-0.50** | 1.5 | 2.3 | 0.4 | 417.3 | 434.7 | 303.5 | 93.2 | 157.1 | 62.2 | 42.2 | 2.9 | 2.4 | 5.6 | 7.5 | - | 10.7 |
| **-0.60** | 1.5 | 2.4 | 0.5 | 411.7 | 434.8 | 302.8 | 90.4 | 133.0 | 54.6 | 35.5 | 1.7 | 1.6 | 3.8 | 4.0 | - | 5.5 |
| **-0.70** | 1.4 | 2.4 | 0.5 | 398.7 | 428.6 | 295.8 | 85.7 | 105.1 | 48.6 | 30.1 | 1.2 | 1.1 | 2.5 | 2.3 | - | 2.9 |
| **-0.76** | 1.4 | 2.5 | 0.5 | 398.7 | 428.6 | 294.7 | 82.2 | 105.1 | 48.6 | 30.1 | 1.2 | 1.1 | 2.5 | 2.3 | - | 2.9 |

*Table 91. The 2022 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 415.9 | 192.5 | 13.9 | 24.5 | 19.7 | 53.5 | 48.2 | 51.1 | 37.7 | 37.6 | - | - | - |
| **0.70** | 400.3 | 168.1 | 14.3 | 24.5 | 19.7 | 53.5 | 49.1 | 52.2 | 38.9 | 39.0 | - | - | - |
| **0.60** | 373.8 | 135.7 | 14.6 | 25.1 | 19.9 | 55.3 | 51.1 | 54.3 | 40.2 | 40.4 | - | - | - |
| **0.50** | 343.0 | 117.5 | 15.0 | 25.8 | 20.5 | 57.1 | 52.9 | 56.7 | 41.5 | 41.9 | - | - | - |
| **0.40** | 289.9 | 99.6 | 15.4 | 26.4 | 20.6 | 58.7 | 54.9 | 58.7 | 42.7 | 43.3 | - | - | - |
| **0.30** | 228.5 | 89.9 | 15.7 | 27.2 | 21.3 | 60.4 | 56.4 | 61.4 | 44.0 | 44.8 | - | - | - |
| **0.20** | 158.2 | 79.2 | 16.0 | 27.8 | 21.3 | 61.9 | 58.1 | 63.4 | 45.3 | 46.1 | - | - | - |
| **0.10** | 104.7 | 70.2 | 16.3 | 28.5 | 21.9 | 63.6 | 59.4 | 65.8 | 46.4 | 47.6 | - | - | - |
| **0.00** | 67.4 | 58.7 | 16.5 | 29.1 | 21.7 | 65.3 | 61.1 | 67.9 | 47.7 | 48.8 | - | - | - |
| **-0.10** | 43.1 | 48.1 | 16.7 | 29.9 | 22.2 | 67.0 | 62.4 | 70.3 | 48.8 | 50.2 | - | - | - |
| **-0.20** | 27.2 | 37.7 | 16.7 | 30.5 | 21.9 | 68.7 | 64.1 | 72.3 | 50.0 | 51.5 | - | - | - |
| **-0.30** | 18.1 | 28.7 | 16.6 | 31.2 | 22.2 | 70.5 | 65.2 | 74.7 | 51.1 | 52.6 | - | - | - |
| **-0.40** | 12.4 | 21.1 | 16.2 | 31.6 | 21.6 | 72.5 | 66.7 | 76.4 | 52.3 | 53.7 | - | - | - |
| **-0.50** | 9.6 | 16.2 | 15.6 | 32.2 | 21.6 | 74.2 | 67.7 | 78.7 | 53.2 | 55.0 | - | - | - |
| **-0.60** | 7.6 | 11.6 | 14.8 | 32.4 | 20.6 | 76.2 | 69.1 | 80.2 | 54.1 | 56.1 | - | - | - |
| **-0.70** | 6.6 | 8.9 | 13.3 | 32.6 | 20.0 | 78.2 | 69.7 | 82.2 | 55.0 | 57.2 | - | - | - |
| **-0.76** | 6.0 | 6.8 | 11.1 | 32.0 | 17.9 | 80.1 | 71.1 | 83.5 | 55.1 | 57.2 | - | - | - |

*Table 92. The 2023 Ford F-150 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.5 | 3.6 | 0.7 | 12.8 | 12.4 | 10.0 | 3.6 | 5.8 | 3.5 | 2.3 | 3.1 | 1.6 | 1.4 | 4.1 | - | 5.0 |
| **0.70** | 2.4 | 3.6 | 0.7 | 12.8 | 12.5 | 10.5 | 3.6 | 5.8 | 3.6 | 2.3 | 3.1 | 1.6 | 1.4 | 4.1 | - | 5.0 |
| **0.60** | 2.3 | 3.6 | 0.7 | 13.5 | 12.7 | 10.9 | 3.7 | 5.8 | 3.6 | 2.3 | 2.6 | 1.5 | 1.2 | 3.3 | - | 3.9 |
| **0.50** | 2.2 | 3.4 | 0.7 | 14.1 | 13.2 | 11.3 | 3.7 | 5.8 | 3.7 | 2.3 | 2.3 | 1.5 | 1.1 | 2.8 | - | 3.1 |
| **0.40** | 2.0 | 3.3 | 0.7 | 14.4 | 13.9 | 11.3 | 3.9 | 5.8 | 3.7 | 2.3 | 2.0 | 1.4 | 1.1 | 2.5 | - | 2.7 |
| **0.30** | 1.9 | 3.3 | 0.8 | 14.7 | 14.2 | 11.4 | 4.0 | 5.8 | 3.8 | 2.3 | 1.9 | 1.3 | 1.0 | 2.3 | - | 2.4 |
| **0.20** | 1.7 | 3.2 | 0.8 | 14.9 | 14.3 | 11.5 | 4.0 | 5.9 | 3.9 | 2.4 | 1.8 | 1.3 | 1.0 | 2.1 | - | 2.3 |
| **0.10** | 1.6 | 3.1 | 0.8 | 14.9 | 14.4 | 11.6 | 4.0 | 6.0 | 4.0 | 2.4 | 1.7 | 1.3 | 1.0 | 2.0 | - | 2.1 |
| **0.00** | - | - | 0.8 | 15.1 | 14.5 | 11.6 | 3.9 | 6.2 | 4.0 | 2.4 | 1.7 | 1.2 | 0.9 | 2.0 | - | 2.0 |
| **-0.10** | - | - | 0.8 | 15.1 | 14.5 | 11.5 | 3.8 | 6.2 | 4.0 | 2.4 | 1.7 | 1.2 | 0.9 | 1.9 | - | 2.0 |
| **-0.20** | - | - | 0.8 | 15.0 | 14.1 | 11.2 | 3.8 | 6.1 | 4.1 | 2.5 | 1.6 | 1.2 | 0.9 | 1.9 | - | 1.9 |
| **-0.30** | - | - | 0.8 | 14.4 | 13.5 | 11.0 | 3.8 | 6.3 | 4.2 | 2.6 | 1.6 | 1.2 | 0.9 | 1.8 | - | 1.8 |
| **-0.40** | - | - | 0.9 | 13.8 | 12.8 | 10.8 | 3.9 | 6.5 | 4.3 | 2.7 | 1.5 | 1.2 | 0.9 | 1.8 | - | 1.8 |
| **-0.50** | - | - | 0.9 | 13.5 | 12.1 | 10.8 | 3.8 | 6.6 | 4.5 | 2.8 | 1.5 | 1.2 | 0.9 | 1.8 | - | 1.8 |
| **-0.60** | - | - | 1.0 | 13.4 | 11.7 | 10.7 | 3.6 | 6.8 | 4.7 | 2.8 | 1.5 | 1.2 | 0.9 | 1.8 | - | 1.8 |
| **-0.70** | - | - | 1.0 | 13.1 | 11.8 | 10.8 | 3.5 | 7.3 | 4.8 | 2.8 | 1.5 | 1.2 | 0.9 | 1.7 | - | 1.8 |
| **-0.76** | - | - | 1.0 | 12.8 | 12.0 | 10.4 | 3.5 | 7.3 | 4.8 | 2.8 | 1.5 | 1.2 | 0.9 | 1.7 | - | 1.8 |

*Table 93. The 2023 Ford F-150 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 541.7 | 175.3 | 17.7 | 33.7 | 22.0 | 73.4 | 55.5 | 59.1 | 27.8 | 26.6 | 223.8 | 66.0 | 72.2 |
| **0.70** | 529.4 | 139.7 | 18.9 | 33.7 | 22.0 | 81.8 | 56.0 | 59.5 | 28.1 | 26.9 | 233.1 | 66.0 | 72.2 |
| **0.60** | 512.6 | 122.7 | 19.7 | 34.5 | 20.8 | 89.4 | 58.0 | 62.0 | 29.1 | 26.8 | 243.5 | 67.9 | 74.5 |
| **0.50** | 483.2 | 93.7 | 20.0 | 36.2 | 19.2 | 96.3 | 60.2 | 63.9 | 29.5 | 26.5 | 254.6 | 69.1 | 76.9 |
| **0.40** | 447.2 | 72.5 | 19.9 | 37.1 | 17.0 | 102.7 | 62.0 | 68.2 | 30.4 | 26.9 | 261.4 | 71.9 | 78.9 |
| **0.30** | 387.8 | 45.3 | 19.4 | 37.4 | 15.2 | 107.0 | 64.0 | 70.8 | 30.9 | 27.3 | 267.0 | 72.9 | 79.4 |
| **0.20** | 333.1 | 30.6 | 18.5 | 36.4 | 12.7 | 111.2 | 64.8 | 73.9 | 31.6 | 27.8 | 281.5 | 73.9 | 81.0 |
| **0.10** | 267.4 | 20.3 | 17.4 | 35.4 | 10.7 | 114.3 | 66.5 | 75.6 | 32.5 | 28.0 | 294.3 | 75.1 | 81.0 |
| **0.00** | 171.8 | 15.3 | 16.0 | 33.5 | 7.9 | 115.1 | 66.7 | 78.6 | 33.2 | 28.4 | 313.1 | 75.9 | 80.9 |
| **-0.10** | 95.4 | 12.3 | 14.7 | 31.1 | 5.2 | 114.5 | 67.0 | 79.9 | 33.7 | 28.8 | 333.9 | 77.3 | 81.4 |
| **-0.20** | 55.5 | 10.5 | 12.5 | 26.4 | 3.2 | 111.6 | 66.1 | 82.0 | 33.2 | 29.5 | 360.3 | 79.5 | 81.6 |
| **-0.30** | 36.6 | 9.0 | 8.4 | 21.5 | 2.3 | 106.9 | 64.2 | 82.9 | 31.9 | 30.0 | 387.4 | 80.8 | 80.8 |
| **-0.40** | 25.6 | 8.2 | 4.5 | 16.8 | 1.5 | 100.3 | 59.6 | 83.9 | 29.0 | 30.7 | 419.9 | 83.9 | 79.8 |
| **-0.50** | 19.4 | 7.6 | 2.7 | 11.6 | 1.1 | 92.9 | 54.5 | 83.7 | 25.6 | 31.2 | 444.2 | 86.5 | 80.0 |
| **-0.60** | 15.7 | 7.1 | 1.7 | 6.2 | 0.8 | 84.8 | 49.6 | 82.6 | 21.5 | 32.2 | 473.6 | 88.4 | 78.7 |
| **-0.70** | 13.4 | 6.8 | 1.1 | 3.8 | 0.7 | 71.3 | 37.7 | 79.7 | 16.7 | 32.8 | 490.3 | 87.7 | 78.4 |
| **-0.76** | 11.7 | 6.5 | 1.1 | 2.5 | 0.6 | 46.4 | 26.7 | 77.4 | 11.7 | 33.2 | 496.5 | 86.4 | 78.5 |

*Table 94. The 2023 Ford F-150 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 3.0 | 3.7 | 0.8 | 24.3 | 24.1 | 39.4 | 13.8 | 69.1 | 9.0 | 6.8 | 54.0 | 15.0 | 16.9 | 88.0 | - | 97.2 |
| **0.70** | 3.0 | 3.8 | 0.8 | 24.3 | 23.5 | 35.4 | 13.2 | 69.1 | 9.0 | 6.2 | 54.0 | 15.0 | 16.9 | 88.0 | - | 97.2 |
| **0.60** | 3.0 | 3.8 | 0.7 | 19.9 | 19.4 | 29.2 | 12.1 | 40.6 | 7.3 | 5.3 | 48.5 | 9.8 | 9.7 | 71.8 | - | 89.5 |
| **0.50** | 2.9 | 3.9 | 0.7 | 17.1 | 17.0 | 24.1 | 11.1 | 26.4 | 6.1 | 4.5 | 38.5 | 6.3 | 6.0 | 56.4 | - | 78.6 |
| **0.40** | 2.9 | 4.0 | 0.7 | 15.3 | 15.5 | 20.0 | 10.1 | 17.7 | 5.4 | 3.9 | 24.0 | 4.4 | 4.0 | 38.4 | - | 54.9 |
| **0.30** | 2.9 | 4.1 | 0.7 | 14.0 | 14.0 | 16.5 | 9.4 | 13.0 | 4.9 | 3.5 | 13.5 | 3.1 | 2.9 | 21.1 | - | 29.3 |
| **0.20** | 2.8 | 4.1 | 0.7 | 13.2 | 13.1 | 14.3 | 8.5 | 10.5 | 4.6 | 3.2 | 8.1 | 2.5 | 2.2 | 12.8 | - | 17.3 |
| **0.10** | 2.8 | 4.0 | 0.7 | 12.4 | 12.4 | 12.9 | 7.6 | 9.0 | 4.4 | 3.1 | 5.5 | 2.0 | 1.8 | 8.3 | - | 10.9 |
| **0.00** | 2.8 | 3.8 | 0.7 | 11.9 | 12.1 | 11.8 | 6.7 | 7.9 | 4.2 | 2.9 | 3.9 | 1.8 | 1.5 | 5.5 | - | 7.1 |
| **-0.10** | 2.7 | 3.8 | 0.7 | 11.8 | 11.6 | 10.9 | 6.0 | 7.4 | 4.1 | 2.8 | 3.1 | 1.6 | 1.4 | 4.1 | - | 5.0 |
| **-0.20** | 2.6 | 3.7 | 0.7 | 11.6 | 11.3 | 10.3 | 5.2 | 7.0 | 4.0 | 2.6 | 2.6 | 1.5 | 1.2 | 3.3 | - | 3.9 |
| **-0.30** | 2.6 | 3.7 | 0.7 | 11.3 | 10.9 | 10.0 | 4.6 | 6.6 | 3.9 | 2.6 | 2.3 | 1.5 | 1.1 | 2.8 | - | 3.1 |
| **-0.40** | 2.5 | 3.7 | 0.8 | 10.9 | 10.9 | 9.6 | 4.2 | 6.4 | 3.8 | 2.5 | 2.0 | 1.4 | 1.1 | 2.5 | - | 2.7 |
| **-0.50** | 2.5 | 3.7 | 0.8 | 10.8 | 10.9 | 9.2 | 4.0 | 6.3 | 3.8 | 2.4 | 1.9 | 1.3 | 1.0 | 2.3 | - | 2.4 |
| **-0.60** | 2.3 | 3.6 | 0.8 | 10.8 | 10.9 | 9.1 | 3.7 | 6.2 | 3.7 | 2.4 | 1.8 | 1.3 | 1.0 | 2.1 | - | 2.3 |
| **-0.70** | 2.2 | 3.5 | 0.8 | 10.8 | 10.9 | 9.1 | 3.6 | 6.0 | 3.7 | 2.4 | 1.7 | 1.3 | 1.0 | 2.0 | - | 2.1 |
| **-0.76** | 2.2 | 3.4 | 0.8 | 10.8 | 10.8 | 9.0 | 3.5 | 5.8 | 3.6 | 2.3 | 1.7 | 1.2 | 0.9 | 2.0 | - | 2.0 |

*Table 95. The 2023 Ford F-150 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 541.7 | 175.3 | 14.6 | 25.4 | 23.6 | 43.1 | 32.9 | 40.2 | 20.3 | 23.7 | 108.0 | - | - |
| **0.70** | 529.4 | 139.7 | 15.7 | 27.5 | 24.0 | 43.1 | 34.2 | 40.6 | 20.8 | 24.2 | 110.0 | 34.2 | 34.8 |
| **0.60** | 512.6 | 122.7 | 16.7 | 29.7 | 23.9 | 44.8 | 35.3 | 42.2 | 21.5 | 25.2 | 113.7 | 34.6 | 36.0 |
| **0.50** | 483.2 | 93.7 | 17.7 | 31.3 | 23.6 | 47.1 | 36.7 | 43.7 | 22.3 | 25.8 | 116.5 | 35.7 | 37.1 |
| **0.40** | 447.2 | 72.5 | 18.9 | 32.8 | 22.8 | 50.7 | 37.7 | 45.7 | 22.5 | 26.4 | 120.0 | 37.4 | 37.9 |
| **0.30** | 387.8 | 45.3 | 19.7 | 33.7 | 22.0 | 55.5 | 39.4 | 46.8 | 22.9 | 26.7 | 121.9 | 38.8 | 38.8 |
| **0.20** | 333.1 | 30.6 | 20.0 | 34.5 | 20.8 | 61.1 | 40.5 | 48.3 | 23.6 | 27.0 | 124.9 | 39.9 | 40.2 |
| **0.10** | 267.4 | 20.3 | 19.9 | 36.2 | 19.2 | 66.7 | 43.5 | 48.9 | 24.0 | 26.7 | 128.0 | 41.6 | 41.9 |
| **0.00** | 171.8 | 15.3 | 19.4 | 37.1 | 17.0 | 73.3 | 45.7 | 50.4 | 24.7 | 26.9 | 133.0 | 43.4 | 43.4 |
| **-0.10** | 95.4 | 12.3 | 18.5 | 37.4 | 15.2 | 81.7 | 49.6 | 53.1 | 25.6 | 27.2 | 140.7 | 45.2 | 45.2 |
| **-0.20** | 55.5 | 10.5 | 17.4 | 36.4 | 12.7 | 89.3 | 51.6 | 56.1 | 26.4 | 27.0 | 145.2 | 47.1 | 47.4 |
| **-0.30** | 36.6 | 9.0 | 16.0 | 35.4 | 10.7 | 96.3 | 55.4 | 59.0 | 27.7 | 26.6 | 149.3 | 49.4 | 49.1 |
| **-0.40** | 25.6 | 8.2 | 14.7 | 33.5 | 7.9 | 102.6 | 57.2 | 62.0 | 28.7 | 26.9 | 154.4 | 51.1 | 51.6 |
| **-0.50** | 19.4 | 7.6 | 12.5 | 31.1 | 5.2 | 106.9 | 59.8 | 63.3 | 29.5 | 26.6 | 162.7 | 52.6 | 53.9 |
| **-0.60** | 15.7 | 7.1 | 8.4 | 26.4 | 3.2 | 111.2 | 61.0 | 68.0 | 30.1 | 26.8 | 168.6 | 53.4 | 56.2 |
| **-0.70** | 13.4 | 6.8 | 4.5 | 21.5 | 2.3 | 114.3 | 63.4 | 70.1 | 31.1 | 26.9 | 178.8 | 55.0 | 58.1 |
| **-0.76** | 11.7 | 6.5 | 4.5 | 16.8 | 1.5 | 115.1 | 63.9 | 70.7 | 30.9 | 27.2 | 181.4 | 57.5 | 60.4 |

*Table 96. The 2023 Ford F-150 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.3 | 3.2 | 0.9 | 534.9 | 571.8 | 281.7 | 69.7 | 318.8 | 172.5 | 63.9 | 87.4 | 66.2 | 42.2 | 115.3 | - | 112.5 |
| **0.70** | 2.3 | 3.2 | 0.9 | 552.9 | 580.3 | 303.1 | 69.5 | 329.2 | 170.6 | 67.0 | 87.4 | 66.2 | 42.2 | 115.3 | - | 112.5 |
| **0.60** | 2.4 | 3.3 | 0.8 | 561.8 | 579.4 | 312.4 | 68.8 | 340.8 | 165.3 | 68.1 | 85.4 | 61.6 | 41.3 | 116.2 | - | 116.3 |
| **0.50** | 2.4 | 3.3 | 0.8 | 567.5 | 577.4 | 329.3 | 68.4 | 349.2 | 155.1 | 70.4 | 83.4 | 57.2 | 40.0 | 117.0 | - | 117.0 |
| **0.40** | 2.4 | 3.4 | 0.8 | 565.1 | 569.6 | 336.0 | 67.4 | 346.5 | 140.6 | 69.0 | 77.1 | 50.9 | 37.6 | 115.7 | - | 116.9 |
| **0.30** | 2.5 | 3.3 | 0.8 | 551.9 | 559.9 | 348.2 | 67.2 | 340.4 | 128.5 | 65.6 | 73.3 | 46.1 | 34.9 | 112.9 | - | 114.2 |
| **0.20** | 2.6 | 3.3 | 0.8 | 525.8 | 548.3 | 352.3 | 66.9 | 332.4 | 110.8 | 58.9 | 66.2 | 38.0 | 32.3 | 107.5 | - | 110.3 |
| **0.10** | 2.6 | 3.4 | 0.7 | 503.2 | 526.8 | 362.4 | 67.3 | 316.5 | 93.3 | 52.1 | 60.6 | 25.7 | 27.1 | 100.8 | - | 103.9 |
| **0.00** | 2.7 | 3.4 | 0.7 | 482.5 | 504.5 | 365.3 | 67.3 | 297.9 | 81.1 | 43.1 | 54.0 | 15.0 | 16.9 | 88.0 | - | 97.2 |
| **-0.10** | 2.7 | 3.5 | 0.7 | 455.0 | 477.4 | 371.7 | 68.3 | 265.2 | 61.4 | 33.4 | 48.5 | 9.8 | 9.7 | 71.8 | - | 89.5 |
| **-0.20** | 2.8 | 3.6 | 0.7 | 422.8 | 442.9 | 369.5 | 69.1 | 239.0 | 39.6 | 21.2 | 38.5 | 6.3 | 6.0 | 56.4 | - | 78.7 |
| **-0.30** | 3.0 | 3.8 | 0.7 | 401.9 | 381.4 | 369.2 | 66.9 | 213.8 | 25.6 | 14.0 | 24.0 | 4.4 | 4.0 | 38.4 | - | 54.9 |
| **-0.40** | 3.0 | 3.8 | 0.7 | 361.4 | 325.5 | 358.0 | 61.6 | 185.1 | 16.3 | 10.6 | 13.5 | 3.1 | 2.9 | 21.1 | - | 29.3 |
| **-0.50** | 3.0 | 3.8 | 0.7 | 335.3 | 277.3 | 350.4 | 52.4 | 127.1 | 11.5 | 8.4 | 8.1 | 2.5 | 2.2 | 12.8 | - | 17.3 |
| **-0.60** | 2.9 | 3.9 | 0.7 | 302.7 | 245.0 | 326.8 | 39.1 | 69.1 | 9.0 | 6.8 | 5.5 | 2.0 | 1.8 | 8.3 | - | 10.9 |
| **-0.70** | 2.9 | 4.0 | 0.7 | 272.8 | 211.7 | 293.2 | 31.1 | 40.6 | 7.3 | 5.7 | 3.9 | 1.8 | 1.5 | 5.5 | - | 7.1 |
| **-0.76** | 2.9 | 4.0 | 0.7 | 195.1 | 156.4 | 283.1 | 29.4 | 40.6 | 7.3 | 5.7 | 3.1 | 1.6 | 1.4 | 4.1 | - | 5.0 |

*Table 97. The 2023 Ford F-150 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 541.7 | 175.3 | 10.9 | 19.2 | 19.7 | 36.0 | 23.9 | 28.8 | 14.6 | 16.7 | - | - | - |
| **0.70** | 529.4 | 139.7 | 12.1 | 19.2 | 20.5 | 36.6 | 25.0 | 29.0 | 14.9 | 17.2 | - | - | - |
| **0.60** | 512.6 | 122.7 | 13.5 | 21.0 | 21.5 | 37.9 | 26.1 | 30.5 | 15.5 | 17.9 | - | - | - |
| **0.50** | 483.2 | 93.7 | 14.6 | 23.1 | 22.9 | 39.5 | 26.8 | 32.8 | 16.1 | 19.0 | - | - | - |
| **0.40** | 447.2 | 72.5 | 15.7 | 25.4 | 23.5 | 41.7 | 28.1 | 34.1 | 16.8 | 19.7 | - | - | - |
| **0.30** | 387.8 | 45.3 | 16.7 | 27.5 | 24.0 | 41.7 | 28.6 | 35.1 | 17.1 | 20.6 | - | - | - |
| **0.20** | 333.1 | 30.6 | 17.7 | 29.7 | 23.9 | 42.0 | 29.6 | 36.3 | 18.0 | 21.4 | - | - | - |
| **0.10** | 267.4 | 20.3 | 18.9 | 31.2 | 23.6 | 43.1 | 29.8 | 37.9 | 18.4 | 22.4 | - | - | - |
| **0.00** | 171.8 | 15.3 | 19.7 | 32.8 | 22.8 | 44.7 | 31.2 | 38.7 | 19.3 | 22.6 | - | - | - |
| **-0.10** | 95.4 | 12.3 | 20.0 | 33.7 | 22.0 | 47.0 | 32.2 | 39.9 | 19.8 | 23.5 | - | - | - |
| **-0.20** | 55.5 | 10.5 | 19.9 | 34.5 | 20.8 | 50.7 | 34.2 | 40.5 | 20.8 | 24.2 | - | - | - |
| **-0.30** | 36.6 | 9.0 | 19.4 | 36.2 | 19.2 | 55.4 | 35.3 | 42.1 | 21.5 | 25.2 | - | - | - |
| **-0.40** | 25.6 | 8.2 | 18.5 | 37.0 | 17.0 | 61.0 | 36.7 | 43.7 | 22.3 | 25.7 | - | - | - |
| **-0.50** | 19.4 | 7.6 | 17.4 | 37.4 | 15.2 | 66.6 | 37.7 | 45.6 | 22.4 | 26.4 | - | - | - |
| **-0.60** | 15.7 | 7.1 | 16.0 | 36.4 | 12.7 | 73.3 | 39.3 | 46.7 | 22.8 | 26.7 | - | - | - |
| **-0.70** | 13.4 | 6.8 | 14.7 | 35.4 | 10.7 | 81.7 | 40.4 | 48.2 | 23.5 | 26.9 | - | - | - |
| **-0.76** | 11.7 | 6.5 | 12.5 | 33.5 | 7.9 | 81.7 | 41.0 | 48.3 | 23.6 | 26.7 | - | - | - |

*Table 98. The 2023 Ford F-150 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.3 | 3.3 | 1.0 | 338.7 | 350.7 | 196.8 | 65.1 | 212.8 | 154.7 | 54.5 | 85.7 | 72.8 | 41.4 | 98.1 | - | 89.3 |
| **0.70** | 2.3 | 3.3 | 1.0 | 347.0 | 362.7 | 196.8 | 66.0 | 225.9 | 160.1 | 55.6 | 87.6 | 71.2 | 41.6 | 103.5 | - | 96.6 |
| **0.60** | 2.2 | 3.3 | 1.0 | 359.0 | 380.8 | 204.8 | 67.4 | 243.0 | 169.9 | 57.5 | 88.6 | 70.4 | 42.0 | 108.2 | - | 101.8 |
| **0.50** | 2.2 | 3.3 | 0.9 | 376.0 | 402.0 | 209.7 | 68.3 | 257.6 | 172.7 | 58.7 | 87.6 | 68.3 | 41.9 | 112.2 | - | 107.0 |
| **0.40** | 2.3 | 3.2 | 0.9 | 398.9 | 427.9 | 213.6 | 68.2 | 275.3 | 176.1 | 60.2 | 87.4 | 66.1 | 42.2 | 115.3 | - | 112.5 |
| **0.30** | 2.3 | 3.2 | 0.8 | 416.7 | 452.3 | 217.6 | 68.7 | 292.5 | 174.0 | 61.5 | 85.4 | 61.6 | 41.3 | 116.1 | - | 116.3 |
| **0.20** | 2.3 | 3.2 | 0.8 | 445.2 | 478.5 | 224.6 | 68.6 | 306.2 | 174.6 | 63.1 | 83.4 | 57.2 | 40.0 | 117.0 | - | 117.0 |
| **0.10** | 2.3 | 3.2 | 0.8 | 470.2 | 505.5 | 237.5 | 69.6 | 318.7 | 172.4 | 63.8 | 77.1 | 50.9 | 37.6 | 115.7 | - | 116.9 |
| **0.00** | 2.4 | 3.3 | 0.8 | 497.4 | 534.0 | 250.2 | 70.1 | 329.1 | 170.6 | 67.0 | 73.3 | 46.1 | 34.9 | 112.9 | - | 114.2 |
| **-0.10** | 2.4 | 3.3 | 0.8 | 516.5 | 556.6 | 264.6 | 69.7 | 340.6 | 165.2 | 68.1 | 66.2 | 37.9 | 32.3 | 107.5 | - | 110.3 |
| **-0.20** | 2.4 | 3.4 | 0.7 | 534.5 | 571.4 | 276.4 | 69.4 | 349.0 | 155.0 | 70.4 | 60.6 | 25.7 | 27.1 | 100.8 | - | 103.9 |
| **-0.30** | 2.5 | 3.3 | 0.7 | 552.4 | 579.8 | 281.4 | 69.6 | 346.3 | 140.6 | 69.0 | 54.0 | 15.0 | 16.9 | 88.0 | - | 97.2 |
| **-0.40** | 2.6 | 3.3 | 0.7 | 561.4 | 578.9 | 303.3 | 69.2 | 340.3 | 128.4 | 65.6 | 48.5 | 9.8 | 9.7 | 71.8 | - | 89.5 |
| **-0.50** | 2.6 | 3.4 | 0.7 | 567.1 | 577.0 | 314.0 | 68.5 | 332.3 | 110.8 | 58.9 | 38.5 | 6.3 | 6.0 | 56.4 | - | 78.6 |
| **-0.60** | 2.7 | 3.4 | 0.7 | 564.6 | 569.1 | 329.9 | 67.8 | 316.4 | 93.2 | 52.1 | 24.0 | 4.4 | 4.0 | 38.4 | - | 54.9 |
| **-0.70** | 2.8 | 3.5 | 0.7 | 551.5 | 559.4 | 336.3 | 66.6 | 297.8 | 81.0 | 43.1 | 13.5 | 3.1 | 2.9 | 21.1 | - | 29.3 |
| **-0.76** | 2.8 | 3.7 | 0.7 | 551.5 | 559.4 | 348.2 | 66.1 | 297.8 | 81.0 | 42.4 | 13.5 | 3.1 | 2.9 | 21.1 | - | 29.3 |

*Table 99. The 2023 Ford F-150 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 541.7 | 175.3 | 10.0 | 16.8 | 18.3 | 34.3 | 20.3 | 25.0 | 12.2 | 13.7 | - | - | - |
| **0.70** | 529.4 | 139.7 | 10.9 | 16.8 | 18.3 | 34.3 | 20.5 | 25.3 | 12.3 | 14.0 | - | - | - |
| **0.60** | 512.6 | 122.7 | 12.1 | 18.0 | 19.2 | 34.7 | 21.1 | 26.2 | 12.8 | 14.6 | - | - | - |
| **0.50** | 483.2 | 93.7 | 13.5 | 19.2 | 20.5 | 35.4 | 22.0 | 27.2 | 13.4 | 15.3 | - | - | - |
| **0.40** | 447.2 | 72.5 | 14.6 | 21.0 | 21.5 | 36.0 | 22.5 | 28.2 | 14.0 | 16.0 | - | - | - |
| **0.30** | 387.8 | 45.3 | 15.7 | 23.1 | 22.9 | 36.6 | 23.8 | 28.8 | 14.6 | 16.7 | - | - | - |
| **0.20** | 333.1 | 30.6 | 16.7 | 25.4 | 23.5 | 37.8 | 25.3 | 29.5 | 15.2 | 17.5 | - | - | - |
| **0.10** | 267.4 | 20.3 | 17.7 | 27.5 | 24.0 | 39.5 | 26.4 | 31.2 | 15.8 | 18.5 | - | - | - |
| **0.00** | 171.8 | 15.3 | 18.9 | 29.7 | 23.9 | 41.6 | 27.4 | 33.2 | 16.3 | 19.3 | - | - | - |
| **-0.10** | 95.4 | 12.3 | 19.7 | 31.2 | 23.6 | 41.7 | 28.4 | 34.6 | 16.9 | 20.1 | - | - | - |
| **-0.20** | 55.5 | 10.5 | 20.0 | 32.8 | 22.8 | 42.0 | 28.8 | 36.0 | 17.6 | 20.8 | - | - | - |
| **-0.30** | 36.6 | 9.0 | 19.9 | 33.7 | 22.0 | 43.1 | 29.6 | 36.7 | 18.3 | 21.8 | - | - | - |
| **-0.40** | 25.6 | 8.2 | 19.4 | 34.5 | 20.8 | 44.7 | 29.9 | 38.3 | 18.8 | 22.5 | - | - | - |
| **-0.50** | 19.4 | 7.6 | 18.5 | 36.2 | 19.2 | 47.0 | 31.6 | 39.3 | 19.5 | 22.8 | - | - | - |
| **-0.60** | 15.7 | 7.1 | 17.4 | 37.0 | 17.0 | 50.6 | 32.9 | 40.1 | 20.3 | 23.6 | - | - | - |
| **-0.70** | 13.4 | 6.8 | 16.0 | 37.4 | 15.2 | 55.4 | 34.9 | 41.1 | 21.0 | 24.5 | - | - | - |
| **-0.76** | 11.7 | 6.5 | 16.0 | 36.4 | 12.7 | 61.0 | 35.3 | 42.1 | 21.8 | 25.4 | - | - | - |

*Table 100. The 2019 Ford Fusion Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 3.3 | 1.7 | 1.2 | 1.3 | 2.3 | 1.9 | 1.7 | 2.7 | 1.9 | 1.5 |
| **0.70** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 3.3 | 1.7 | 1.2 | 1.3 | 2.3 | 1.9 | 1.7 | 2.7 | 1.9 | 1.5 |
| **0.60** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 3.3 | 1.6 | 1.1 | 1.0 | 1.5 | 1.2 | 1.2 | 1.9 | 1.3 | 1.1 |
| **0.50** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 3.2 | 1.5 | 1.1 | 0.8 | 1.1 | 0.9 | 0.8 | 1.3 | 0.9 | 0.7 |
| **0.40** | 0.7 | 0.9 | 0.4 | 3.2 | 2.8 | 1.9 | 3.2 | 1.5 | 1.1 | 0.7 | 0.8 | 0.7 | 0.5 | 0.9 | 0.7 | 0.6 |
| **0.30** | 0.7 | 0.9 | 0.4 | 3.1 | 2.7 | 1.9 | 3.2 | 1.5 | 1.1 | 0.6 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5 |
| **0.20** | 0.7 | 0.8 | 0.4 | 3.1 | 2.7 | 1.9 | 3.2 | 1.4 | 1.1 | 0.6 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **0.10** | 0.7 | 0.8 | 0.4 | 3.1 | 2.7 | 1.9 | 3.2 | 1.4 | 1.1 | 0.6 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **0.00** | 0.7 | 0.8 | 0.4 | 3.0 | 2.7 | 1.9 | 3.1 | 1.4 | 1.1 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.10** | 0.6 | 0.8 | 0.4 | 3.0 | 2.6 | 1.9 | 3.1 | 1.4 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.20** | 0.7 | 0.8 | 0.3 | 3.0 | 2.6 | 1.8 | 3.0 | 1.4 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.30** | 0.6 | 0.8 | 0.3 | 2.9 | 2.6 | 1.8 | 3.0 | 1.4 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.40** | 0.6 | 0.8 | 0.3 | 2.9 | 2.6 | 1.8 | 3.0 | 1.3 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.50** | 0.6 | 0.8 | 0.3 | 2.9 | 2.5 | 1.8 | 2.9 | 1.3 | 1.0 | 0.6 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.60** | - | - | 0.3 | 2.8 | 2.5 | 1.8 | 2.9 | 1.3 | 1.0 | 0.5 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |
| **-0.70** | - | - | 0.3 | 2.8 | 2.5 | 1.8 | 2.9 | 1.3 | 1.0 | 0.6 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |
| **-0.76** | - | - | 0.3 | 2.8 | 2.4 | 1.8 | 2.8 | 1.3 | 1.0 | 0.5 | 0.4 | 0.3 | 0.2 | 0.4 | 0.4 | 0.3 |

*Table 101. The 2019 Ford Fusion Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 182.3 | 76.0 | 13.9 | 28.8 | 13.7 | 69.2 | 18.5 | 23.3 | 7.9 | 9.6 | 185.5 | 15.8 | 17.9 |
| **0.70** | 175.0 | 73.5 | 13.5 | 28.8 | 13.7 | 70.5 | 18.5 | 23.3 | 7.9 | 9.6 | 193.1 | 16.0 | 18.0 |
| **0.60** | 158.3 | 68.0 | 13.4 | 28.6 | 13.2 | 72.3 | 18.7 | 24.8 | 8.1 | 10.0 | 199.2 | 16.1 | 18.1 |
| **0.50** | 143.7 | 62.4 | 12.7 | 28.7 | 13.3 | 73.0 | 19.7 | 25.3 | 8.5 | 10.2 | 206.3 | 16.1 | 18.4 |
| **0.40** | 120.9 | 52.8 | 12.1 | 28.0 | 12.6 | 74.0 | 19.9 | 26.9 | 8.7 | 10.5 | 215.4 | 16.2 | 18.5 |
| **0.30** | 99.6 | 41.7 | 11.0 | 27.3 | 12.5 | 74.0 | 21.0 | 27.1 | 9.2 | 10.5 | 221.7 | 16.2 | 18.6 |
| **0.20** | 76.8 | 31.3 | 10.1 | 25.9 | 11.7 | 74.2 | 21.1 | 28.7 | 9.5 | 10.9 | 232.1 | 16.4 | 19.1 |
| **0.10** | 60.8 | 25.0 | 8.7 | 24.3 | 11.4 | 72.8 | 22.5 | 28.6 | 9.9 | 10.9 | 238.7 | 16.3 | 19.5 |
| **0.00** | 47.3 | 20.8 | 7.4 | 21.9 | 10.3 | 71.4 | 22.5 | 29.6 | 10.1 | 11.2 | 248.8 | 16.3 | 20.2 |
| **-0.10** | 34.8 | 17.8 | 5.6 | 19.5 | 9.5 | 68.6 | 23.7 | 29.5 | 10.6 | 11.2 | 256.5 | 16.5 | 20.7 |
| **-0.20** | 24.8 | 15.9 | 4.1 | 16.2 | 8.0 | 65.2 | 23.7 | 30.4 | 10.8 | 11.4 | 268.0 | 16.6 | 21.7 |
| **-0.30** | 17.4 | 14.0 | 2.8 | 12.7 | 6.6 | 60.4 | 24.8 | 29.9 | 11.2 | 11.4 | 275.8 | 17.1 | 22.3 |
| **-0.40** | 12.7 | 12.5 | 1.9 | 9.2 | 5.1 | 55.0 | 24.6 | 30.3 | 11.3 | 11.6 | 289.6 | 17.3 | 23.5 |
| **-0.50** | 10.0 | 10.2 | 1.3 | 6.4 | 3.8 | 48.2 | 25.4 | 29.5 | 11.5 | 11.6 | 296.1 | 17.8 | 24.2 |
| **-0.60** | 8.1 | 8.1 | 0.9 | 4.4 | 2.6 | 40.8 | 24.9 | 29.9 | 11.5 | 11.8 | 310.5 | 18.2 | 25.5 |
| **-0.70** | 7.0 | 6.2 | 0.7 | 3.0 | 1.7 | 32.0 | 24.9 | 28.7 | 11.7 | 11.7 | 316.0 | 19.0 | 26.3 |
| **-0.76** | 6.4 | 4.8 | 0.7 | 2.1 | 1.2 | 32.0 | 23.7 | 28.2 | 11.5 | 12.0 | 316.0 | 19.1 | 26.4 |

*Table 102. The 2019 Ford Fusion Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.8 | 1.0 | 0.4 | 17.5 | 20.6 | 13.6 | 17.3 | 27.5 | 14.5 | 8.0 | 9.9 | 7.8 | 5.2 | 12.2 | 9.1 | 7.6 |
| **0.70** | 0.8 | 1.0 | 0.4 | 17.5 | 20.6 | 13.6 | 17.3 | 20.7 | 11.5 | 7.1 | 9.9 | 7.8 | 5.2 | 12.2 | 9.1 | 7.6 |
| **0.60** | 0.8 | 1.0 | 0.4 | 12.1 | 13.9 | 11.4 | 12.0 | 14.9 | 9.3 | 6.1 | 8.1 | 6.4 | 4.5 | 10.3 | 7.9 | 6.5 |
| **0.50** | 0.8 | 1.0 | 0.4 | 8.5 | 9.5 | 9.2 | 8.4 | 10.1 | 7.3 | 5.0 | 6.6 | 5.3 | 3.8 | 7.9 | 5.9 | 5.0 |
| **0.40** | 0.8 | 1.0 | 0.4 | 6.1 | 6.6 | 6.9 | 6.2 | 6.9 | 5.1 | 4.3 | 4.7 | 3.9 | 3.0 | 5.8 | 4.2 | 3.5 |
| **0.30** | 0.8 | 1.0 | 0.4 | 4.9 | 5.0 | 5.4 | 5.0 | 4.7 | 3.5 | 3.8 | 3.3 | 2.8 | 2.4 | 4.0 | 2.9 | 2.3 |
| **0.20** | 0.8 | 1.0 | 0.4 | 4.2 | 4.2 | 3.8 | 4.3 | 3.3 | 2.4 | 3.2 | 2.3 | 1.9 | 1.7 | 2.7 | 1.9 | 1.5 |
| **0.10** | 0.8 | 0.9 | 0.4 | 3.8 | 3.6 | 3.2 | 3.9 | 2.6 | 1.9 | 2.8 | 1.5 | 1.2 | 1.2 | 1.9 | 1.3 | 1.1 |
| **0.00** | 0.8 | 1.0 | 0.4 | 3.7 | 3.4 | 2.5 | 3.7 | 2.1 | 1.5 | 2.2 | 1.1 | 0.9 | 0.8 | 1.3 | 0.9 | 0.7 |
| **-0.10** | 0.8 | 0.9 | 0.4 | 3.5 | 3.2 | 2.3 | 3.6 | 1.8 | 1.3 | 1.7 | 0.8 | 0.7 | 0.5 | 0.9 | 0.7 | 0.6 |
| **-0.20** | 0.7 | 0.9 | 0.4 | 3.4 | 3.1 | 2.1 | 3.5 | 1.7 | 1.2 | 1.3 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5 |
| **-0.30** | 0.8 | 0.9 | 0.4 | 3.4 | 3.0 | 2.0 | 3.5 | 1.6 | 1.1 | 1.0 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **-0.40** | 0.7 | 0.9 | 0.4 | 3.4 | 2.9 | 2.0 | 3.5 | 1.5 | 1.1 | 0.8 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.50** | 0.7 | 0.9 | 0.4 | 3.3 | 2.9 | 2.0 | 3.4 | 1.5 | 1.1 | 0.7 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.60** | 0.7 | 0.9 | 0.4 | 3.3 | 2.9 | 1.9 | 3.4 | 1.5 | 1.1 | 0.6 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |
| **-0.70** | 0.7 | 0.9 | 0.3 | 3.2 | 2.8 | 1.9 | 3.3 | 1.4 | 1.1 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.76** | 0.7 | 0.9 | 0.3 | 3.2 | 2.8 | 1.9 | 3.3 | 1.4 | 1.1 | 0.6 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 |

*Table 103. The 2019 Ford Fusion Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 182.3 | 76.0 | 13.6 | 25.5 | 13.1 | 48.7 | 12.2 | 15.0 | 5.7 | 7.0 | - | - | - |
| **0.70** | 175.0 | 73.5 | 13.6 | 25.5 | 13.1 | 50.1 | 12.8 | 14.9 | 5.8 | 7.0 | - | - | - |
| **0.60** | 158.3 | 68.0 | 13.9 | 26.1 | 13.0 | 52.5 | 12.9 | 15.7 | 5.9 | 7.1 | - | - | - |
| **0.50** | 143.7 | 62.4 | 13.8 | 27.0 | 13.5 | 54.1 | 13.5 | 16.1 | 6.0 | 7.3 | - | - | - |
| **0.40** | 120.9 | 52.8 | 13.9 | 27.4 | 13.4 | 56.7 | 13.6 | 16.2 | 6.2 | 7.3 | - | - | - |
| **0.30** | 99.6 | 41.7 | 13.5 | 28.1 | 13.8 | 58.5 | 14.2 | 17.1 | 6.3 | 7.4 | - | - | - |
| **0.20** | 76.8 | 31.3 | 13.4 | 28.3 | 13.5 | 61.0 | 14.4 | 17.2 | 6.4 | 7.7 | - | - | - |
| **0.10** | 60.8 | 25.0 | 12.7 | 28.8 | 13.7 | 62.6 | 14.7 | 18.3 | 6.5 | 7.8 | - | - | - |
| **0.00** | 47.3 | 20.8 | 12.1 | 28.6 | 13.2 | 65.2 | 15.4 | 18.5 | 6.6 | 8.0 | - | - | - |
| **-0.10** | 34.8 | 17.8 | 11.0 | 28.7 | 13.3 | 66.7 | 15.5 | 19.6 | 6.7 | 8.2 | - | - | - |
| **-0.20** | 24.8 | 15.9 | 10.1 | 28.0 | 12.6 | 69.1 | 16.4 | 19.9 | 6.8 | 8.5 | - | - | - |
| **-0.30** | 17.4 | 14.0 | 8.7 | 27.3 | 12.5 | 70.4 | 16.5 | 21.2 | 7.0 | 8.7 | - | | - |
| **-0.40** | 12.7 | 12.5 | 7.4 | 25.9 | 11.7 | 72.2 | 17.4 | 21.4 | 7.1 | 9.0 | - | - | - |
| **-0.50** | 10.0 | 10.2 | 5.6 | 24.3 | 11.4 | 72.9 | 17.4 | 22.8 | 7.4 | 9.2 | - | - | - |
| **-0.60** | 8.1 | 8.1 | 4.1 | 21.9 | 10.3 | 73.9 | 18.5 | 23.2 | 7.6 | 9.5 | - | - | - |
| **-0.70** | 7.0 | 6.2 | 2.8 | 19.5 | 9.5 | 73.9 | 18.6 | 24.7 | 7.9 | 9.7 | - | - | - |
| **-0.76** | 6.4 | 4.8 | 2.8 | 16.2 | 7.9 | 73.9 | 18.9 | 24.9 | 8.2 | 10.1 | - | - | - |

*Table 104. The 2019 Ford Fusion Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.9 | 1.1 | 0.5 | 111.2 | 130.5 | 45.4 | 105.9 | 58.4 | 26.9 | 9.6 | 13.8 | 10.9 | 6.5 | 17.8 | 12.9 | 10.4 |
| **0.70** | 0.9 | 1.1 | 0.5 | 111.2 | 130.5 | 45.4 | 105.9 | 56.6 | 25.8 | 9.4 | 13.8 | 10.9 | 6.5 | 17.8 | 12.9 | 10.4 |
| **0.60** | 0.9 | 1.1 | 0.5 | 111.2 | 128.9 | 43.9 | 103.2 | 55.3 | 26.1 | 9.7 | 12.8 | 10.0 | 6.2 | 16.9 | 12.5 | 10.2 |
| **0.50** | 0.9 | 1.0 | 0.4 | 106.7 | 127.1 | 44.0 | 100.0 | 52.1 | 24.7 | 9.5 | 12.3 | 9.7 | 6.1 | 15.5 | 11.4 | 9.2 |
| **0.40** | 0.9 | 1.1 | 0.4 | 104.4 | 122.1 | 42.5 | 96.5 | 49.3 | 24.2 | 9.6 | 11.0 | 8.6 | 5.6 | 14.1 | 10.5 | 8.6 |
| **0.30** | 0.9 | 1.0 | 0.4 | 98.8 | 116.7 | 41.9 | 91.3 | 44.7 | 22.3 | 9.3 | 9.9 | 7.8 | 5.2 | 12.2 | 9.1 | 7.6 |
| **0.20** | 0.9 | 1.0 | 0.4 | 94.0 | 108.1 | 39.9 | 85.4 | 40.3 | 20.7 | 9.1 | 8.1 | 6.4 | 4.5 | 10.3 | 7.9 | 6.5 |
| **0.10** | 0.9 | 1.0 | 0.4 | 85.7 | 99.1 | 38.2 | 78.7 | 33.9 | 17.5 | 8.6 | 6.6 | 5.3 | 3.8 | 7.9 | 5.9 | 5.0 |
| **0.00** | 0.9 | 1.0 | 0.4 | 77.5 | 87.2 | 35.3 | 71.1 | 27.5 | 14.5 | 8.0 | 4.7 | 3.9 | 3.0 | 5.8 | 4.2 | 3.5 |
| **-0.10** | 0.9 | 1.0 | 0.4 | 66.2 | 75.5 | 32.1 | 60.9 | 20.7 | 11.5 | 7.1 | 3.3 | 2.8 | 2.4 | 4.0 | 2.9 | 2.3 |
| **-0.20** | 0.8 | 1.0 | 0.4 | 53.0 | 60.5 | 26.5 | 49.1 | 14.9 | 9.3 | 6.1 | 2.3 | 1.9 | 1.7 | 2.7 | 1.9 | 1.5 |
| **-0.30** | 0.8 | 1.0 | 0.4 | 37.9 | 45.1 | 20.8 | 36.4 | 10.1 | 7.3 | 5.0 | 1.5 | 1.2 | 1.2 | 1.9 | 1.3 | 1.1 |
| **-0.40** | 0.8 | 1.0 | 0.4 | 25.7 | 30.9 | 16.5 | 25.5 | 6.9 | 5.1 | 4.3 | 1.1 | 0.9 | 0.8 | 1.3 | 0.9 | 0.7 |
| **-0.50** | 0.8 | 1.0 | 0.4 | 17.5 | 20.6 | 13.6 | 17.3 | 4.7 | 3.5 | 3.8 | 0.8 | 0.7 | 0.5 | 0.9 | 0.7 | 0.6 |
| **-0.60** | 0.8 | 1.0 | 0.4 | 12.1 | 13.9 | 11.4 | 12.0 | 3.3 | 2.4 | 3.2 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5 |
| **-0.70** | 0.8 | 1.0 | 0.4 | 8.5 | 9.5 | 9.2 | 8.4 | 2.6 | 1.9 | 2.8 | 0.5 | 0.4 | 0.3 | 0.6 | 0.5 | 0.4 |
| **-0.76** | 0.8 | 1.0 | 0.4 | 6.1 | 6.6 | 6.9 | 6.2 | 2.6 | 1.9 | 2.8 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 |

*Table 105. The 2019 Ford Fusion Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 182.3 | 76.0 | 12.5 | 21.0 | 11.4 | 33.3 | 9.2 | 11.1 | 5.0 | 6.0 | - | - | - |
| **0.70** | 175.0 | 73.5 | 12.5 | 21.0 | 11.4 | 34.5 | 9.4 | 11.2 | 5.0 | 6.1 | - | - | - |
| **0.60** | 158.3 | 68.0 | 13.0 | 22.0 | 12.0 | 36.4 | 9.5 | 11.7 | 5.0 | 6.2 | - | - | - |
| **0.50** | 143.7 | 62.4 | 13.2 | 22.7 | 11.9 | 37.7 | 9.8 | 11.8 | 5.1 | 6.2 | - | - | - |
| **0.40** | 120.9 | 52.8 | 13.6 | 23.8 | 12.5 | 39.6 | 9.9 | 12.3 | 5.1 | 6.3 | - | - | - |
| **0.30** | 99.6 | 41.7 | 13.6 | 24.5 | 12.5 | 41.0 | 10.3 | 12.3 | 5.3 | 6.3 | - | - | - |
| **0.20** | 76.8 | 31.3 | 13.9 | 25.5 | 13.1 | 43.0 | 10.4 | 12.9 | 5.3 | 6.4 | - | - | - |
| **0.10** | 60.8 | 25.0 | 13.8 | 26.1 | 13.0 | 44.4 | 10.9 | 13.0 | 5.4 | 6.5 | - | - | - |
| **0.00** | 47.3 | 20.8 | 13.9 | 27.0 | 13.5 | 46.6 | 10.9 | 13.5 | 5.4 | 6.6 | - | - | - |
| **-0.10** | 34.8 | 17.8 | 13.5 | 27.4 | 13.4 | 48.6 | 11.5 | 13.5 | 5.5 | 6.6 | - | - | - |
| **-0.20** | 24.8 | 15.9 | 13.4 | 28.1 | 13.8 | 50.1 | 11.5 | 14.2 | 5.6 | 6.7 | - | - | - |
| **-0.30** | 17.4 | 14.0 | 12.7 | 28.3 | 13.4 | 52.5 | 12.1 | 14.2 | 5.7 | 6.8 | - | - | - |
| **-0.40** | 12.7 | 12.5 | 12.1 | 28.8 | 13.7 | 54.1 | 12.2 | 14.9 | 5.8 | 7.0 | - | - | - |
| **-0.50** | 10.0 | 10.2 | 11.0 | 28.6 | 13.2 | 56.6 | 12.8 | 14.8 | 5.9 | 7.0 | - | - | - |
| **-0.60** | 8.1 | 8.1 | 10.1 | 28.7 | 13.3 | 58.4 | 12.9 | 15.6 | 6.0 | 7.2 | - | - | - |
| **-0.70** | 7.0 | 6.2 | 8.7 | 28.0 | 12.6 | 60.9 | 13.5 | 16.1 | 6.2 | 7.3 | - | - | - |
| **-0.76** | 6.4 | 4.8 | 7.4 | 27.2 | 12.5 | 60.9 | 13.6 | 16.2 | 6.2 | 7.3 | - | - | - |

*Table 106. The 2019 Ford Fusion Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.0 | 1.1 | 1.1 | 111.0 | 119.0 | 45.5 | 107.3 | 57.8 | 26.9 | 8.9 | 14.6 | 11.6 | 6.8 | 18.9 | 13.8 | 11.2 |
| **0.70** | 1.0 | 1.1 | 0.8 | 111.0 | 119.0 | 45.5 | 107.3 | 58.2 | 26.4 | 9.0 | 14.6 | 11.6 | 6.8 | 18.9 | 13.8 | 11.2 |
| **0.60** | 1.0 | 1.1 | 0.6 | 112.8 | 121.3 | 44.9 | 108.5 | 59.0 | 27.2 | 9.3 | 13.9 | 11.0 | 6.5 | 18.6 | 13.7 | 11.1 |
| **0.50** | 0.9 | 1.1 | 0.5 | 112.9 | 124.6 | 45.9 | 109.2 | 58.6 | 26.5 | 9.3 | 13.8 | 10.9 | 6.5 | 17.8 | 12.9 | 10.4 |
| **0.40** | 0.9 | 1.1 | 0.5 | 114.2 | 126.4 | 45.4 | 109.1 | 58.4 | 26.9 | 9.6 | 12.8 | 10.0 | 6.2 | 16.9 | 12.5 | 10.2 |
| **0.30** | 0.9 | 1.1 | 0.4 | 112.5 | 128.7 | 45.9 | 108.5 | 56.6 | 25.8 | 9.4 | 12.3 | 9.7 | 6.1 | 15.5 | 11.4 | 9.2 |
| **0.20** | 0.9 | 1.1 | 0.4 | 113.2 | 129.5 | 44.9 | 107.8 | 55.3 | 26.1 | 9.7 | 11.0 | 8.6 | 5.6 | 14.1 | 10.5 | 8.6 |
| **0.10** | 0.9 | 1.1 | 0.4 | 111.1 | 130.4 | 45.4 | 105.8 | 52.1 | 24.7 | 9.5 | 9.9 | 7.8 | 5.2 | 12.2 | 9.1 | 7.6 |
| **0.00** | 0.9 | 1.1 | 0.4 | 111.2 | 128.9 | 43.9 | 103.2 | 49.3 | 24.2 | 9.6 | 8.1 | 6.4 | 4.5 | 10.3 | 7.9 | 6.5 |
| **-0.10** | 0.9 | 1.0 | 0.4 | 106.7 | 127.1 | 43.9 | 100.0 | 44.7 | 22.3 | 9.3 | 6.6 | 5.3 | 3.8 | 7.9 | 5.9 | 5.0 |
| **-0.20** | 0.9 | 1.0 | 0.4 | 104.4 | 122.0 | 42.5 | 96.5 | 40.3 | 20.7 | 9.1 | 4.7 | 3.9 | 3.0 | 5.8 | 4.2 | 3.5 |
| **-0.30** | 0.9 | 1.0 | 0.4 | 98.8 | 116.7 | 41.9 | 91.3 | 33.9 | 17.4 | 8.6 | 3.3 | 2.8 | 2.4 | 4.0 | 2.9 | 2.3 |
| **-0.40** | 0.9 | 1.0 | 0.4 | 94.0 | 108.1 | 39.8 | 85.4 | 27.5 | 14.5 | 8.0 | 2.3 | 1.9 | 1.7 | 2.7 | 1.9 | 1.5 |
| **-0.50** | 0.9 | 1.0 | 0.4 | 85.7 | 99.1 | 38.2 | 78.7 | 20.7 | 11.5 | 7.1 | 1.5 | 1.2 | 1.2 | 1.9 | 1.3 | 1.1 |
| **-0.60** | 0.8 | 1.0 | 0.4 | 77.5 | 87.2 | 35.3 | 71.0 | 14.9 | 9.3 | 6.1 | 1.1 | 0.9 | 0.8 | 1.3 | 0.9 | 0.7 |
| **-0.70** | 0.8 | 1.0 | 0.4 | 66.2 | 75.5 | 32.1 | 60.8 | 10.1 | 7.3 | 5.0 | 0.8 | 0.7 | 0.5 | 0.9 | 0.7 | 0.6 |
| **-0.76** | 0.8 | 1.0 | 0.4 | 53.0 | 60.4 | 26.5 | 49.1 | 10.1 | 7.3 | 5.0 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5 |

*Table 107. The 2019 Ford Fusion Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 182.3 | 76.0 | 11.7 | 18.7 | 10.9 | 27.6 | - | - | - | - | - | - | - |
| **0.70** | 175.0 | 73.5 | 12.2 | 19.4 | 10.9 | 27.9 | - | - | - | - | - | - | - |
| **0.60** | 158.3 | 68.0 | 12.5 | 20.3 | 11.4 | 29.5 | - | - | - | - | - | - | - |
| **0.50** | 143.7 | 62.4 | 13.0 | 21.0 | 11.4 | 30.7 | - | - | - | - | - | - | - |
| **0.40** | 120.9 | 52.8 | 13.2 | 22.0 | 12.0 | 32.3 | 8.9 | 10.5 | 4.8 | 5.9 | - | - | - |
| **0.30** | 99.6 | 41.7 | 13.5 | 22.7 | 11.9 | 33.5 | 9.1 | 10.8 | 4.9 | 6.0 | - | - | - |
| **0.20** | 76.8 | 31.3 | 13.6 | 23.8 | 12.5 | 35.2 | 9.2 | 11.1 | 4.9 | 6.0 | - | - | - |
| **0.10** | 60.8 | 25.0 | 13.9 | 24.5 | 12.5 | 36.5 | 9.4 | 11.3 | 5.0 | 6.1 | - | - | - |
| **0.00** | 47.3 | 20.8 | 13.8 | 25.5 | 13.1 | 38.5 | 9.5 | 11.7 | 5.0 | 6.1 | - | - | - |
| **-0.10** | 34.8 | 17.8 | 13.9 | 26.1 | 13.0 | 39.8 | 9.8 | 11.8 | 5.1 | 6.2 | - | - | - |
| **-0.20** | 24.8 | 15.9 | 13.5 | 27.0 | 13.5 | 41.7 | 10.0 | 12.2 | 5.1 | 6.3 | - | - | - |
| **-0.30** | 17.4 | 14.0 | 13.4 | 27.4 | 13.4 | 43.1 | 10.3 | 12.3 | 5.3 | 6.3 | - | - | - |
| **-0.40** | 12.7 | 12.5 | 12.7 | 28.1 | 13.8 | 45.2 | 10.5 | 12.9 | 5.3 | 6.4 | - | - | - |
| **-0.50** | 10.0 | 10.2 | 12.1 | 28.3 | 13.4 | 47.0 | 10.9 | 13.0 | 5.4 | 6.5 | - | - | - |
| **-0.60** | 8.1 | 8.1 | 11.0 | 28.8 | 13.7 | 48.7 | 11.0 | 13.5 | 5.4 | 6.5 | - | - | - |
| **-0.70** | 7.0 | 6.2 | 10.1 | 28.6 | 13.2 | 50.7 | 11.4 | 13.5 | 5.5 | 6.6 | - | - | - |
| **-0.76** | 6.4 | 4.8 | 10.1 | 28.6 | 13.2 | 52.4 | 11.5 | 14.2 | 5.5 | 6.8 | - | - | - |

*Table 108. The 2022 Hyundai Tucson Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.2 | 1.5 | 0.6 | 4.0 | 4.1 | 3.5 | 1.6 | 2.2 | 1.7 | 1.3 | 4.8 | 2.9 | 3.1 | 9.9 | 9.9 | 9.6 |
| **0.70** | 1.2 | 1.6 | 0.6 | 4.0 | 4.0 | 3.4 | 1.5 | 2.2 | 1.7 | 1.3 | 4.8 | 2.9 | 3.1 | 9.9 | 9.9 | 9.6 |
| **0.60** | 1.2 | 1.5 | 0.6 | 3.9 | 3.9 | 3.3 | 1.5 | 2.0 | 1.7 | 1.3 | 2.8 | 1.8 | 1.4 | 5.0 | 4.9 | 4.9 |
| **0.50** | 1.2 | 1.6 | 0.6 | 3.8 | 3.7 | 3.2 | 1.4 | 1.9 | 1.7 | 1.3 | 1.7 | 1.2 | 0.8 | 2.7 | 2.6 | 2.6 |
| **0.40** | 1.2 | 1.5 | 0.6 | 3.8 | 3.6 | 3.1 | 1.4 | 1.8 | 1.7 | 1.3 | 1.1 | 0.9 | 0.6 | 1.6 | 1.6 | 1.6 |
| **0.30** | 1.2 | 1.6 | 0.6 | 3.7 | 3.6 | 3.0 | 1.4 | 1.8 | 1.7 | 1.2 | 0.8 | 0.7 | 0.5 | 1.1 | 1.1 | 1.0 |
| **0.20** | 1.2 | 1.5 | 0.6 | 3.6 | 3.5 | 3.0 | 1.4 | 1.7 | 1.7 | 1.2 | 0.6 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **0.10** | 1.3 | 1.6 | 0.6 | 3.5 | 3.3 | 3.0 | 1.3 | 1.6 | 1.7 | 1.2 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **0.00** | 1.3 | 1.4 | 0.6 | 3.5 | 3.3 | 3.0 | 1.3 | 1.6 | 1.6 | 1.2 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.10** | 1.3 | 1.4 | 0.6 | 3.5 | 3.4 | 3.1 | 1.3 | 1.5 | 1.6 | 1.2 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.20** | 1.2 | 1.2 | 0.7 | 3.5 | 3.5 | 3.3 | 1.3 | 1.5 | 1.6 | 1.2 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.30** | 1.2 | 1.2 | 0.7 | 3.5 | 3.6 | 3.4 | 1.3 | 1.5 | 1.5 | 1.2 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.40** | 1.1 | 1.1 | 0.7 | 3.6 | 3.7 | 3.5 | 1.3 | 1.5 | 1.5 | 1.2 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.50** | 1.0 | 1.0 | 0.6 | 3.7 | 3.8 | 3.6 | 1.3 | 1.5 | 1.5 | 1.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.60** | 0.9 | 1.0 | 0.6 | 3.7 | 3.8 | 3.5 | 1.3 | 1.4 | 1.4 | 1.2 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.70** | 0.9 | 0.9 | 0.6 | 3.7 | 3.6 | 3.3 | 1.2 | 1.4 | 1.4 | 1.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| **-0.76** | - | - | 0.6 | 3.5 | 3.5 | 3.2 | 1.2 | 1.4 | 1.4 | 1.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

*Table 109. The 2022 Hyundai Tucson Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 629.0 | 371.3 | 41.9 | 80.7 | 69.8 | 189.2 | 171.4 | 203.5 | 95.8 | 121.7 | 498.0 | 149.5 | 202.6 |
| **0.70** | 617.5 | 315.7 | 41.9 | 80.7 | 69.8 | 189.2 | 173.1 | 204.7 | 96.7 | 122.2 | 510.2 | 152.7 | 209.7 |
| **0.60** | 605.8 | 279.1 | 42.9 | 83.2 | 71.8 | 197.7 | 177.8 | 211.5 | 99.4 | 125.6 | 530.4 | 158.1 | 215.4 |
| **0.50** | 568.6 | 205.3 | 43.4 | 85.4 | 73.6 | 206.7 | 184.0 | 219.2 | 101.4 | 128.4 | 553.8 | 162.0 | 223.5 |
| **0.40** | 517.1 | 152.1 | 43.7 | 86.6 | 73.8 | 215.1 | 190.2 | 226.4 | 103.8 | 131.0 | 572.7 | 168.8 | 229.8 |
| **0.30** | 426.0 | 104.2 | 43.3 | 88.0 | 72.1 | 223.8 | 195.8 | 232.8 | 106.0 | 133.7 | 594.3 | 172.1 | 238.2 |
| **0.20** | 315.6 | 54.9 | 42.7 | 87.2 | 68.6 | 231.3 | 202.3 | 238.8 | 107.9 | 136.5 | 615.9 | 179.1 | 245.8 |
| **0.10** | 177.4 | 33.0 | 41.5 | 86.8 | 62.4 | 238.5 | 207.8 | 245.2 | 109.7 | 138.7 | 637.3 | 183.1 | 254.7 |
| **0.00** | 89.7 | 15.9 | 39.7 | 82.7 | 55.8 | 244.9 | 214.2 | 252.2 | 111.6 | 140.6 | 660.1 | 189.0 | 262.0 |
| **-0.10** | 47.7 | 10.5 | 36.4 | 77.5 | 47.1 | 250.8 | 219.1 | 258.7 | 112.8 | 143.7 | 686.7 | 193.0 | 271.2 |
| **-0.20** | 28.8 | 9.2 | 31.0 | 71.0 | 39.0 | 254.2 | 226.3 | 265.6 | 113.6 | 144.9 | 717.2 | 200.7 | 277.6 |
| **-0.30** | 19.1 | 8.4 | 22.8 | 60.8 | 31.3 | 255.9 | 230.4 | 271.8 | 114.0 | 146.9 | 749.1 | 205.6 | 286.7 |
| **-0.40** | 14.1 | 8.2 | 12.7 | 50.8 | 23.3 | 254.0 | 236.7 | 277.4 | 114.7 | 147.1 | 779.3 | 211.2 | 295.2 |
| **-0.50** | 12.2 | 7.9 | 6.4 | 37.0 | 15.2 | 250.4 | 238.7 | 281.5 | 113.9 | 148.3 | 817.0 | 216.7 | 305.5 |
| **-0.60** | 11.0 | 7.3 | 3.4 | 22.1 | 8.1 | 244.3 | 243.7 | 282.8 | 113.3 | 146.6 | 848.5 | 222.0 | 311.6 |
| **-0.70** | 10.7 | 6.9 | 2.1 | 11.9 | 4.1 | 231.8 | 243.5 | 283.2 | 111.1 | 144.7 | 884.0 | 227.3 | 320.6 |
| **-0.76** | 10.6 | 6.5 | 1.4 | 6.8 | 2.3 | 213.2 | 246.1 | 280.7 | 111.3 | 142.5 | 922.9 | 234.6 | 325.6 |

*Table 110. The 2022 Hyundai Tucson Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.1 | 2.3 | 0.7 | 68.8 | 81.9 | 58.3 | 20.2 | 53.0 | 36.6 | 42.2 | 17.5 | 13.3 | 13.8 | 31.1 | 30.5 | 29.4 |
| **0.70** | 2.1 | 2.3 | 0.7 | 68.8 | 81.9 | 58.3 | 20.2 | 53.0 | 36.6 | 42.2 | 17.5 | 13.3 | 13.8 | 31.1 | 30.5 | 29.4 |
| **0.60** | 2.1 | 2.2 | 0.7 | 37.5 | 42.2 | 29.9 | 11.4 | 39.2 | 25.6 | 29.4 | 15.1 | 10.3 | 10.7 | 28.6 | 27.9 | 26.6 |
| **0.50** | 2.0 | 2.1 | 0.7 | 21.1 | 22.2 | 16.0 | 6.8 | 22.4 | 14.7 | 15.6 | 11.7 | 7.6 | 8.7 | 24.3 | 23.8 | 22.6 |
| **0.40** | 1.9 | 2.1 | 0.7 | 13.4 | 13.2 | 9.7 | 4.3 | 12.0 | 7.0 | 7.4 | 8.3 | 4.9 | 5.5 | 18.0 | 17.5 | 16.5 |
| **0.30** | 1.7 | 1.9 | 0.7 | 9.0 | 8.6 | 6.2 | 2.8 | 6.9 | 3.8 | 3.7 | 4.8 | 2.9 | 3.1 | 9.9 | 9.9 | 9.6 |
| **0.20** | 1.6 | 1.9 | 0.6 | 6.8 | 6.6 | 4.8 | 2.1 | 4.4 | 2.6 | 2.2 | 2.8 | 1.8 | 1.4 | 5.0 | 4.9 | 4.9 |
| **0.10** | 1.5 | 1.7 | 0.6 | 5.7 | 5.6 | 4.1 | 1.8 | 3.2 | 2.1 | 1.6 | 1.7 | 1.2 | 0.8 | 2.7 | 2.6 | 2.6 |
| **0.00** | 1.4 | 1.7 | 0.6 | 5.0 | 5.1 | 4.0 | 1.7 | 2.4 | 1.8 | 1.3 | 1.1 | 0.9 | 0.6 | 1.6 | 1.6 | 1.6 |
| **-0.10** | 1.3 | 1.6 | 0.6 | 4.6 | 4.8 | 3.9 | 1.6 | 2.2 | 1.7 | 1.3 | 0.8 | 0.7 | 0.5 | 1.1 | 1.1 | 1.0 |
| **-0.20** | 1.3 | 1.6 | 0.6 | 4.4 | 4.7 | 3.8 | 1.6 | 2.0 | 1.7 | 1.3 | 0.6 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **-0.30** | 1.2 | 1.5 | 0.6 | 4.3 | 4.5 | 3.7 | 1.6 | 1.9 | 1.7 | 1.3 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.40** | 1.2 | 1.6 | 0.6 | 4.1 | 4.3 | 3.6 | 1.6 | 1.8 | 1.7 | 1.3 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.50** | 1.2 | 1.5 | 0.6 | 4.0 | 4.1 | 3.5 | 1.6 | 1.8 | 1.7 | 1.2 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.60** | 1.2 | 1.6 | 0.6 | 3.9 | 3.9 | 3.3 | 1.5 | 1.7 | 1.7 | 1.2 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.70** | 1.2 | 1.5 | 0.6 | 3.8 | 3.8 | 3.3 | 1.5 | 1.6 | 1.7 | 1.2 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.76** | 1.2 | 1.6 | 0.7 | 3.8 | 3.7 | 3.2 | 1.4 | 1.6 | 1.6 | 1.2 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |

*Table 111. The 2022 Hyundai Tucson Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 629.0 | 371.3 | 34.8 | 59.6 | 51.8 | 107.4 | 87.7 | 118.7 | 60.1 | 72.4 | - | - | - |
| **0.70** | 617.5 | 315.7 | 36.4 | 62.5 | 54.2 | 112.4 | 92.2 | 123.2 | 62.3 | 75.3 | - | - | - |
| **0.60** | 605.8 | 279.1 | 37.9 | 65.1 | 56.6 | 117.9 | 96.8 | 127.1 | 64.2 | 78.2 | - | - | - |
| **0.50** | 568.6 | 205.3 | 39.4 | 68.4 | 59.4 | 123.5 | 101.7 | 131.5 | 66.6 | 81.1 | - | - | - |
| **0.40** | 517.1 | 152.1 | 40.7 | 71.2 | 61.6 | 129.6 | 106.6 | 135.7 | 68.4 | 84.4 | - | - | - |
| **0.30** | 426.0 | 104.2 | 41.9 | 74.6 | 64.4 | 136.6 | 111.8 | 140.1 | 71.1 | 87.8 | - | - | - |
| **0.20** | 315.6 | 54.9 | 42.8 | 77.6 | 66.7 | 143.5 | 117.0 | 145.2 | 73.3 | 91.4 | - | - | - |
| **0.10** | 177.4 | 33.0 | 43.4 | 80.7 | 69.8 | 150.0 | 122.1 | 150.4 | 75.5 | 94.7 | - | - | - |
| **0.00** | 89.7 | 15.9 | 43.7 | 83.2 | 71.7 | 157.4 | 127.5 | 155.3 | 77.6 | 98.1 | - | - | - |
| **-0.10** | 47.7 | 10.5 | 43.3 | 85.4 | 73.6 | 164.9 | 133.0 | 160.9 | 80.0 | 101.4 | - | - | - |
| **-0.20** | 28.8 | 9.2 | 42.7 | 86.5 | 73.8 | 173.2 | 138.8 | 166.6 | 82.9 | 104.5 | - | - | - |
| **-0.30** | 19.1 | 8.4 | 41.5 | 87.9 | 72.0 | 180.7 | 144.3 | 172.9 | 85.3 | 107.5 | - | - | - |
| **-0.40** | 14.1 | 8.2 | 39.7 | 87.1 | 68.6 | 189.0 | 149.8 | 179.0 | 87.3 | 110.6 | - | - | - |
| **-0.50** | 12.2 | 7.9 | 36.3 | 86.7 | 62.4 | 197.4 | 155.3 | 185.0 | 89.8 | 113.5 | - | - | - |
| **-0.60** | 11.0 | 7.3 | 31.0 | 82.7 | 55.8 | 206.4 | 161.1 | 191.4 | 91.9 | 116.4 | - | - | - |
| **-0.70** | 10.7 | 6.9 | 22.8 | 77.5 | 47.0 | 214.8 | 166.4 | 197.4 | 94.5 | 119.1 | - | - | - |
| **-0.76** | 10.6 | 6.5 | 22.8 | 77.5 | 47.0 | 219.5 | 171.0 | 203.0 | 94.5 | 119.1 | - | - | - |

*Table 112. The 2022 Hyundai Tucson Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.1 | 2.1 | 0.8 | 275.2 | 264.3 | 224.0 | 125.4 | 108.1 | 95.3 | 69.7 | 27.6 | 23.6 | 21.6 | 34.3 | 33.6 | 32.4 |
| **0.70** | 2.1 | 2.1 | 0.7 | 278.6 | 270.5 | 228.6 | 127.0 | 108.1 | 95.3 | 69.7 | 25.2 | 21.6 | 19.6 | 34.0 | 33.2 | 32.1 |
| **0.60** | 2.1 | 2.1 | 0.7 | 282.2 | 273.0 | 228.1 | 126.8 | 99.4 | 88.6 | 69.6 | 22.7 | 19.0 | 18.1 | 33.5 | 32.9 | 31.8 |
| **0.50** | 2.1 | 2.3 | 0.7 | 278.4 | 275.0 | 229.6 | 127.3 | 92.1 | 79.5 | 70.0 | 20.6 | 16.7 | 15.3 | 32.6 | 31.9 | 30.7 |
| **0.40** | 2.0 | 2.4 | 0.7 | 273.3 | 272.3 | 226.7 | 125.2 | 86.6 | 71.5 | 69.1 | 17.5 | 13.3 | 13.8 | 31.1 | 30.5 | 29.4 |
| **0.30** | 2.0 | 2.5 | 0.7 | 259.7 | 269.5 | 223.6 | 121.5 | 79.2 | 63.4 | 67.2 | 15.1 | 10.3 | 10.7 | 28.6 | 27.9 | 26.6 |
| **0.20** | 2.0 | 2.6 | 0.7 | 236.1 | 261.9 | 214.5 | 110.9 | 72.6 | 54.5 | 62.0 | 11.7 | 7.6 | 8.7 | 24.3 | 23.8 | 22.6 |
| **0.10** | 2.0 | 2.7 | 0.7 | 214.1 | 250.0 | 201.2 | 95.3 | 64.0 | 45.9 | 53.7 | 8.3 | 4.9 | 5.5 | 18.0 | 17.5 | 16.5 |
| **0.00** | 2.1 | 2.6 | 0.7 | 180.9 | 227.4 | 175.8 | 73.0 | 53.0 | 36.6 | 42.2 | 4.8 | 2.9 | 3.1 | 9.9 | 9.9 | 9.6 |
| **-0.10** | 2.1 | 2.4 | 0.7 | 148.1 | 191.8 | 143.4 | 53.6 | 39.2 | 25.6 | 29.4 | 2.8 | 1.8 | 1.4 | 5.0 | 4.9 | 4.9 |
| **-0.20** | 2.1 | 2.3 | 0.6 | 110.5 | 142.4 | 99.6 | 33.4 | 22.4 | 14.7 | 15.6 | 1.7 | 1.2 | 0.8 | 2.7 | 2.6 | 2.6 |
| **-0.30** | 2.1 | 2.2 | 0.6 | 68.9 | 81.9 | 58.3 | 20.2 | 12.0 | 7.0 | 7.4 | 1.1 | 0.9 | 0.6 | 1.6 | 1.6 | 1.6 |
| **-0.40** | 2.0 | 2.1 | 0.6 | 37.5 | 42.2 | 29.9 | 11.4 | 6.9 | 3.8 | 3.7 | 0.8 | 0.7 | 0.5 | 1.1 | 1.1 | 1.0 |
| **-0.50** | 1.9 | 2.1 | 0.6 | 21.2 | 22.2 | 16.0 | 6.8 | 4.4 | 2.6 | 2.2 | 0.6 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **-0.60** | 1.7 | 1.9 | 0.6 | 13.4 | 13.2 | 9.7 | 4.3 | 3.2 | 2.1 | 1.6 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.70** | 1.6 | 1.9 | 0.6 | 9.0 | 8.6 | 6.2 | 2.8 | 2.4 | 1.8 | 1.3 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.76** | 1.5 | 1.7 | 0.6 | 6.8 | 6.6 | 4.8 | 2.4 | 2.2 | 1.7 | 1.3 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |

*Table 113. The 2022 Hyundai Tucson Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 629.0 | 371.3 | 29.1 | 46.6 | 40.2 | 71.6 | - | - | - | - | - | - | - |
| **0.70** | 617.5 | 315.7 | 30.4 | 46.6 | 41.2 | 73.5 | - | - | - | - | - | - | - |
| **0.60** | 605.8 | 279.1 | 31.8 | 49.1 | 43.2 | 76.8 | - | - | - | - | - | - | - |
| **0.50** | 568.6 | 205.3 | 33.3 | 51.5 | 45.3 | 80.0 | - | - | - | - | - | - | - |
| **0.40** | 517.1 | 152.1 | 34.8 | 54.1 | 47.5 | 83.5 | - | - | - | - | - | - | - |
| **0.30** | 426.0 | 104.2 | 36.4 | 56.8 | 49.7 | 87.1 | - | - | - | - | - | - | - |
| **0.20** | 315.6 | 54.9 | 37.9 | 59.6 | 51.8 | 90.6 | - | - | - | - | - | - | - |
| **0.10** | 177.4 | 33.0 | 39.4 | 62.5 | 54.2 | 94.7 | - | - | - | - | - | - | - |
| **0.00** | 89.7 | 15.9 | 40.7 | 65.1 | 56.6 | 98.6 | 70.0 | 96.3 | - | - | - | - | - |
| **-0.10** | 47.7 | 10.5 | 41.8 | 68.3 | 59.3 | 103.0 | 72.5 | 100.7 | 52.4 | 62.3 | - | - | - |
| **-0.20** | 28.8 | 9.2 | 42.8 | 71.2 | 61.5 | 107.2 | 76.1 | 105.1 | 54.7 | 64.8 | - | - | - |
| **-0.30** | 19.1 | 8.4 | 43.4 | 74.6 | 64.4 | 112.2 | 79.8 | 109.9 | 56.3 | 67.2 | - | - | - |
| **-0.40** | 14.1 | 8.2 | 43.7 | 77.6 | 66.7 | 117.7 | 83.3 | 114.4 | 58.4 | 69.7 | - | - | - |
| **-0.50** | 12.2 | 7.9 | 43.3 | 80.6 | 69.7 | 123.3 | 87.5 | 118.4 | 60.0 | 72.2 | - | - | - |
| **-0.60** | 11.0 | 7.3 | 42.7 | 83.2 | 71.7 | 129.3 | 91.9 | 122.8 | 62.1 | 75.1 | - | - | - |
| **-0.70** | 10.7 | 6.9 | 41.5 | 85.3 | 73.6 | 136.4 | 96.5 | 126.8 | 64.0 | 78.0 | - | - | - |
| **-0.76** | 10.6 | 6.5 | 41.5 | 86.5 | 73.8 | 143.3 | 96.5 | 126.8 | 64.0 | 78.0 | - | - | - |

*Table 114. The 2022 Hyundai Tucson Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.1 | 2.2 | 1.0 | 230.7 | 225.5 | 194.8 | 115.3 | 115.0 | 97.1 | 64.8 | 30.2 | 27.7 | 25.2 | 33.7 | 32.9 | 31.8 |
| **0.70** | 2.1 | 2.2 | 1.0 | 241.3 | 234.6 | 201.8 | 117.3 | 117.0 | 99.8 | 65.9 | 29.1 | 26.0 | 24.0 | 34.2 | 33.3 | 32.1 |
| **0.60** | 2.2 | 2.1 | 0.8 | 250.9 | 242.9 | 208.4 | 120.2 | 116.9 | 100.9 | 67.6 | 27.6 | 23.6 | 21.6 | 34.3 | 33.6 | 32.4 |
| **0.50** | 2.1 | 2.1 | 0.8 | 260.5 | 251.1 | 214.1 | 121.4 | 113.3 | 100.0 | 68.1 | 25.2 | 21.6 | 19.6 | 34.0 | 33.2 | 32.1 |
| **0.40** | 2.1 | 2.1 | 0.7 | 267.7 | 258.0 | 220.1 | 124.2 | 108.1 | 95.3 | 69.7 | 22.7 | 19.0 | 18.1 | 33.5 | 32.9 | 31.8 |
| **0.30** | 2.1 | 2.1 | 0.7 | 275.2 | 264.3 | 223.9 | 125.4 | 99.4 | 88.5 | 69.5 | 20.6 | 16.7 | 15.3 | 32.6 | 31.9 | 30.7 |
| **0.20** | 2.1 | 2.1 | 0.7 | 278.5 | 270.4 | 228.5 | 127.0 | 92.0 | 79.5 | 70.0 | 17.5 | 13.3 | 13.8 | 31.1 | 30.5 | 29.4 |
| **0.10** | 2.1 | 2.3 | 0.7 | 282.2 | 273.0 | 228.0 | 126.7 | 86.6 | 71.5 | 69.1 | 15.1 | 10.3 | 10.7 | 28.6 | 27.9 | 26.6 |
| **0.00** | 2.1 | 2.4 | 0.7 | 278.3 | 274.9 | 229.6 | 127.3 | 79.2 | 63.4 | 67.2 | 11.7 | 7.6 | 8.7 | 24.3 | 23.8 | 22.6 |
| **-0.10** | 2.0 | 2.5 | 0.7 | 273.3 | 272.3 | 226.6 | 125.2 | 72.6 | 54.5 | 62.0 | 8.3 | 4.9 | 5.5 | 18.0 | 17.5 | 16.5 |
| **-0.20** | 2.0 | 2.6 | 0.7 | 259.6 | 269.4 | 223.5 | 121.5 | 64.0 | 45.9 | 53.7 | 4.8 | 2.9 | 3.1 | 9.9 | 9.9 | 9.6 |
| **-0.30** | 2.0 | 2.7 | 0.7 | 236.1 | 261.9 | 214.4 | 110.9 | 53.0 | 36.6 | 42.2 | 2.8 | 1.8 | 1.4 | 5.0 | 4.9 | 4.9 |
| **-0.40** | 2.1 | 2.6 | 0.7 | 214.1 | 249.9 | 201.2 | 95.3 | 39.2 | 25.6 | 29.4 | 1.7 | 1.2 | 0.8 | 2.7 | 2.6 | 2.6 |
| **-0.50** | 2.1 | 2.4 | 0.6 | 180.9 | 227.3 | 175.8 | 73.0 | 22.4 | 14.7 | 15.6 | 1.1 | 0.9 | 0.6 | 1.6 | 1.6 | 1.6 |
| **-0.60** | 2.1 | 2.3 | 0.6 | 148.0 | 191.8 | 143.4 | 53.5 | 12.0 | 7.0 | 7.4 | 0.8 | 0.7 | 0.5 | 1.1 | 1.1 | 1.0 |
| **-0.70** | 2.1 | 2.2 | 0.6 | 110.5 | 142.4 | 99.6 | 33.4 | 6.9 | 3.8 | 3.7 | 0.6 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **-0.76** | 2.1 | 2.2 | 0.6 | 110.5 | 142.4 | 99.6 | 33.4 | 6.9 | 3.8 | 3.7 | 0.6 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |

*Table 115. The 2022 Hyundai Tucson Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 629.0 | 371.3 | 26.4 | 39.6 | 35.9 | 57.2 | - | - | - | - | - | - | - |
| **0.70** | 617.5 | 315.7 | 27.7 | 39.6 | 35.9 | 57.2 | - | - | - | - | - | - | - |
| **0.60** | 605.8 | 279.1 | 29.1 | 41.9 | 37.7 | 60.7 | - | - | - | - | - | - | - |
| **0.50** | 568.6 | 205.3 | 30.4 | 44.0 | 39.3 | 63.5 | - | - | - | - | - | - | - |
| **0.40** | 517.1 | 152.1 | 31.8 | 46.6 | 41.2 | 67.0 | - | - | - | - | - | - | - |
| **0.30** | 426.0 | 104.2 | 33.3 | 49.0 | 43.2 | 70.1 | - | - | - | - | - | - | - |
| **0.20** | 315.6 | 54.9 | 34.8 | 51.5 | 45.3 | 73.4 | - | - | - | - | - | - | - |
| **0.10** | 177.4 | 33.0 | 36.4 | 54.1 | 47.4 | 76.7 | - | - | - | - | - | - | - |
| **0.00** | 89.7 | 15.9 | 37.9 | 56.8 | 49.7 | 79.9 | - | - | - | - | - | - | - |
| **-0.10** | 47.7 | 10.5 | 39.4 | 59.6 | 51.8 | 83.5 | - | - | - | - | - | - | - |
| **-0.20** | 28.8 | 9.2 | 40.7 | 62.5 | 54.2 | 87.0 | - | - | - | - | - | - | - |
| **-0.30** | 19.1 | 8.4 | 41.8 | 65.0 | 56.5 | 90.5 | - | - | - | - | - | - | - |
| **-0.40** | 14.1 | 8.2 | 42.8 | 68.3 | 59.3 | 94.6 | - | - | - | - | - | - | - |
| **-0.50** | 12.2 | 7.9 | 43.4 | 71.2 | 61.5 | 98.5 | - | - | - | - | - | - | - |
| **-0.60** | 11.0 | 7.3 | 43.7 | 74.5 | 64.4 | 102.9 | - | - | - | - | - | - | - |
| **-0.70** | 10.7 | 6.9 | 43.3 | 77.6 | 66.7 | 107.1 | 69.9 | 96.1 | 50.7 | 59.9 | - | - | - |
| **-0.76** | 10.6 | 6.5 | 43.3 | 80.6 | 69.7 | 112.1 | 72.4 | 100.5 | 52.3 | 62.2 | - | - | - |

*Table 116. The 2022 Subaru Outback Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 1.4 | 0.7 | 7.6 | 7.4 | 5.3 | 1.8 | 3.8 | 2.9 | 1.9 | 3.6 | 1.6 | 1.7 | 6.6 | - | 6.9 |
| **0.70** | 1.3 | 1.4 | 0.7 | 7.5 | 7.3 | 5.2 | 1.8 | 3.8 | 2.8 | 1.9 | 3.6 | 1.6 | 1.7 | 6.6 | - | 6.9 |
| **0.60** | 1.3 | 1.3 | 0.7 | 7.4 | 7.1 | 5.1 | 1.7 | 3.7 | 2.8 | 1.8 | 2.6 | 1.3 | 1.4 | 4.3 | - | 4.4 |
| **0.50** | 1.2 | 1.2 | 0.7 | 7.3 | 7.1 | 5.1 | 1.7 | 3.7 | 2.8 | 1.8 | 2.0 | 1.1 | 1.2 | 3.1 | - | 3.3 |
| **0.40** | 1.2 | 1.1 | 0.7 | 7.2 | 7.0 | 5.0 | 1.7 | 3.6 | 2.7 | 1.7 | 1.7 | 1.0 | 1.1 | 2.4 | - | 2.5 |
| **0.30** | 1.1 | 1.1 | 0.7 | 7.1 | 6.9 | 4.9 | 1.7 | 3.5 | 2.7 | 1.7 | 1.4 | 0.9 | 1.0 | 1.9 | - | 2.0 |
| **0.20** | 1.1 | 1.0 | 0.7 | 7.0 | 6.8 | 4.8 | 1.6 | 3.5 | 2.7 | 1.6 | 1.2 | 0.9 | 0.9 | 1.6 | - | 1.6 |
| **0.10** | 1.0 | 0.9 | 0.7 | 6.7 | 6.6 | 4.7 | 1.6 | 3.5 | 2.7 | 1.6 | 1.0 | 0.8 | 0.8 | 1.3 | - | 1.4 |
| **0.00** | 1.0 | 0.9 | 0.7 | 6.4 | 6.3 | 4.6 | 1.6 | 3.5 | 2.7 | 1.6 | 1.0 | 0.8 | 0.8 | 1.2 | - | 1.2 |
| **-0.10** | 0.9 | 0.8 | 0.7 | 6.3 | 6.1 | 4.5 | 1.5 | 3.4 | 2.7 | 1.7 | 1.0 | 0.8 | 0.7 | 1.1 | - | 1.1 |
| **-0.20** | 0.9 | 0.8 | 0.7 | 6.1 | 5.9 | 4.4 | 1.5 | 3.4 | 2.7 | 1.7 | 0.9 | 0.8 | 0.7 | 1.1 | - | 1.0 |
| **-0.30** | - | - | 0.6 | 5.9 | 5.8 | 4.3 | 1.4 | 3.3 | 2.7 | 1.7 | 0.9 | 0.8 | 0.7 | 1.0 | - | 1.0 |
| **-0.40** | - | - | 0.6 | 5.6 | 5.5 | 4.1 | 1.4 | 3.3 | 2.6 | 1.7 | 0.9 | 0.8 | 0.7 | 1.0 | - | 1.0 |
| **-0.50** | - | - | 0.6 | 5.3 | 5.3 | 4.0 | 1.3 | 3.2 | 2.6 | 1.6 | 0.9 | 0.8 | 0.7 | 1.0 | - | 0.9 |
| **-0.60** | - | - | 0.6 | 5.1 | 5.0 | 3.8 | 1.3 | 3.1 | 2.6 | 1.6 | 0.9 | 0.8 | 0.7 | 1.0 | - | 0.9 |
| **-0.70** | - | - | 0.6 | 4.9 | 4.8 | 3.6 | 1.2 | 3.1 | 2.6 | 1.6 | 0.9 | 0.8 | 0.7 | 0.9 | - | 0.9 |
| **-0.76** | - | - | 0.5 | 4.9 | 4.8 | 3.6 | 1.2 | 3.1 | 2.6 | 1.6 | 0.9 | 0.8 | 0.7 | 0.9 | - | 0.9 |

*Table 117. The Subaru Outback Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 492.3 | 200.1 | 21.3 | 33.9 | 26.0 | 90.0 | 60.8 | 65.7 | 40.9 | 39.6 | 266.9 | 82.4 | 80.0 |
| **0.70** | 491.2 | 174.4 | 21.3 | 36.5 | 25.9 | 90.0 | 60.8 | 65.7 | 40.9 | 39.6 | 269.1 | 84.8 | 82.1 |
| **0.60** | 487.5 | 149.7 | 23.2 | 39.0 | 24.8 | 95.8 | 60.8 | 66.0 | 40.9 | 39.4 | 280.4 | 87.4 | 83.9 |
| **0.50** | 449.9 | 122.0 | 25.3 | 42.4 | 23.0 | 101.7 | 60.7 | 67.5 | 40.6 | 39.5 | 289.7 | 90.0 | 85.7 |
| **0.40** | 406.1 | 101.9 | 27.5 | 45.5 | 20.3 | 109.3 | 60.6 | 67.8 | 40.7 | 39.2 | 302.2 | 92.2 | 87.7 |
| **0.30** | 350.4 | 85.5 | 29.0 | 49.4 | 17.9 | 117.6 | 60.7 | 69.3 | 40.1 | 39.3 | 313.1 | 95.0 | 90.2 |
| **0.20** | 280.9 | 68.3 | 29.9 | 51.6 | 15.7 | 129.2 | 61.0 | 70.0 | 39.5 | 38.6 | 326.2 | 97.8 | 91.8 |
| **0.10** | 172.2 | 52.6 | 30.0 | 53.8 | 13.7 | 139.1 | 61.0 | 72.4 | 38.7 | 38.6 | 340.0 | 100.0 | 94.0 |
| **0.00** | 96.2 | 36.6 | 29.1 | 53.2 | 11.1 | 151.1 | 61.9 | 73.4 | 38.2 | 38.0 | 354.3 | 102.1 | 94.6 |
| **-0.10** | 53.2 | 23.9 | 27.0 | 52.0 | 9.3 | 161.2 | 62.9 | 76.1 | 37.0 | 37.5 | 367.0 | 104.3 | 96.7 |
| **-0.20** | 34.3 | 16.3 | 22.5 | 48.1 | 6.5 | 170.3 | 63.3 | 76.8 | 35.7 | 36.5 | 383.8 | 105.4 | 96.6 |
| **-0.30** | 25.2 | 12.9 | 14.8 | 40.6 | 4.4 | 175.3 | 61.9 | 79.1 | 33.8 | 35.8 | 396.6 | 106.7 | 97.6 |
| **-0.40** | 20.0 | 11.1 | 7.4 | 26.8 | 2.7 | 176.2 | 60.5 | 78.8 | 32.6 | 34.1 | 409.6 | 107.0 | 97.6 |
| **-0.50** | 16.5 | 9.8 | 3.7 | 12.7 | 1.8 | 170.4 | 57.3 | 79.8 | 30.6 | 32.9 | 423.5 | 107.4 | 97.5 |
| **-0.60** | 14.0 | 8.8 | 2.1 | 6.4 | 1.2 | 157.9 | 54.2 | 76.6 | 29.2 | 30.7 | 440.5 | 107.5 | 97.1 |
| **-0.70** | 11.9 | 8.2 | 1.4 | 3.8 | 1.0 | 129.0 | 50.0 | 72.8 | 27.3 | 28.6 | 454.8 | 106.4 | 95.9 |
| **-0.76** | 10.6 | 7.6 | 1.0 | 2.6 | 0.8 | 83.8 | 43.5 | 63.7 | 25.5 | 26.1 | 469.7 | 105.2 | 94.8 |

*Table 118. The 2022 Subaru Outback Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.1 | 2.1 | 0.7 | 50.4 | 55.6 | 22.3 | 5.0 | 115.3 | 20.3 | 14.2 | 46.6 | 17.5 | 10.2 | 88.1 | - | 76.2 |
| **0.70** | 2.1 | 2.1 | 0.7 | 32.6 | 35.2 | 18.5 | 4.7 | 115.3 | 20.3 | 14.2 | 46.6 | 17.5 | 10.2 | 88.1 | - | 76.2 |
| **0.60** | 2.0 | 2.1 | 0.7 | 24.0 | 25.8 | 14.1 | 3.1 | 52.8 | 13.3 | 8.8 | 38.5 | 11.6 | 8.3 | 82.2 | - | 69.8 |
| **0.50** | 2.0 | 2.0 | 0.7 | 18.4 | 19.5 | 11.3 | 2.4 | 26.6 | 8.8 | 6.4 | 30.5 | 8.0 | 6.7 | 69.8 | - | 56.7 |
| **0.40** | 1.9 | 2.0 | 0.7 | 14.7 | 15.6 | 9.5 | 2.2 | 15.8 | 6.4 | 4.8 | 18.6 | 4.7 | 5.3 | 45.3 | - | 39.4 |
| **0.30** | 1.9 | 1.9 | 0.7 | 12.1 | 12.8 | 8.2 | 2.1 | 10.9 | 5.1 | 3.9 | 10.0 | 3.1 | 3.9 | 22.6 | - | 22.4 |
| **0.20** | 1.8 | 1.8 | 0.7 | 10.3 | 11.0 | 7.3 | 2.1 | 8.1 | 4.4 | 3.2 | 5.6 | 2.1 | 2.6 | 11.3 | - | 12.1 |
| **0.10** | 1.7 | 1.7 | 0.7 | 9.5 | 10.0 | 6.6 | 2.1 | 6.6 | 3.9 | 2.8 | 3.6 | 1.6 | 1.7 | 6.6 | - | 6.9 |
| **0.00** | 1.7 | 1.7 | 0.7 | 9.0 | 9.3 | 6.2 | 2.0 | 5.5 | 3.6 | 2.5 | 2.6 | 1.3 | 1.4 | 4.3 | - | 4.4 |
| **-0.10** | 1.6 | 1.6 | 0.7 | 8.6 | 8.9 | 6.0 | 2.0 | 4.7 | 3.3 | 2.3 | 2.0 | 1.1 | 1.2 | 3.1 | - | 3.3 |
| **-0.20** | 1.5 | 1.6 | 0.7 | 8.4 | 8.5 | 5.8 | 2.0 | 4.3 | 3.1 | 2.2 | 1.7 | 1.0 | 1.1 | 2.4 | - | 2.5 |
| **-0.30** | 1.5 | 1.5 | 0.7 | 8.2 | 8.3 | 5.6 | 1.9 | 4.1 | 3.0 | 2.1 | 1.4 | 0.9 | 1.0 | 1.9 | - | 2.0 |
| **-0.40** | 1.4 | 1.4 | 0.7 | 8.0 | 8.0 | 5.5 | 1.9 | 3.9 | 2.9 | 2.0 | 1.2 | 0.9 | 0.9 | 1.6 | - | 1.6 |
| **-0.50** | 1.3 | 1.4 | 0.7 | 7.8 | 7.8 | 5.4 | 2.0 | 3.8 | 2.9 | 1.9 | 1.0 | 0.8 | 0.8 | 1.3 | - | 1.4 |
| **-0.60** | 1.3 | 1.3 | 0.7 | 7.7 | 7.6 | 5.4 | 1.9 | 3.8 | 2.8 | 1.8 | 1.0 | 0.8 | 0.8 | 1.2 | - | 1.2 |
| **-0.70** | 1.2 | 1.2 | 0.7 | 7.7 | 7.5 | 5.3 | 1.9 | 3.7 | 2.8 | 1.8 | 1.0 | 0.8 | 0.7 | 1.1 | - | 1.1 |
| **-0.76** | 1.2 | 1.1 | 0.7 | 7.7 | 7.5 | 5.3 | 1.9 | 3.7 | 2.8 | 1.8 | 0.9 | 0.8 | 0.7 | 1.1 | - | 1.0 |

*Table 119. The 2022 Subaru Outback Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 492.3 | 200.1 | 15.9 | 25.7 | 21.7 | 55.2 | 52.1 | 50.1 | 34.2 | 33.1 | - | - | - |
| **0.70** | 491.2 | 174.4 | 16.9 | 26.9 | 22.7 | 55.2 | 53.3 | 51.4 | 34.7 | 33.5 | - | - | - |
| **0.60** | 487.5 | 149.7 | 18.1 | 28.2 | 23.8 | 58.0 | 54.2 | 53.5 | 35.3 | 34.1 | - | - | - |
| **0.50** | 449.9 | 122.0 | 19.5 | 29.9 | 24.8 | 61.2 | 55.5 | 55.2 | 36.2 | 35.0 | - | - | - |
| **0.40** | 406.1 | 101.9 | 21.3 | 32.1 | 25.9 | 64.5 | 56.7 | 57.2 | 37.3 | 35.9 | - | - | - |
| **0.30** | 350.4 | 85.5 | 23.2 | 33.9 | 26.0 | 68.3 | 58.2 | 58.7 | 38.2 | 37.0 | 122.0 | - | - |
| **0.20** | 280.9 | 68.3 | 25.3 | 36.5 | 25.9 | 72.2 | 59.3 | 60.7 | 38.9 | 37.7 | 126.6 | 48.8 | 49.2 |
| **0.10** | 172.2 | 52.6 | 27.4 | 39.0 | 24.8 | 76.4 | 60.4 | 61.7 | 39.8 | 38.6 | 130.7 | 50.9 | 50.4 |
| **0.00** | 96.2 | 36.6 | 29.0 | 42.4 | 23.0 | 80.8 | 61.0 | 63.2 | 40.4 | 39.1 | 136.5 | 52.3 | 52.6 |
| **-0.10** | 53.2 | 23.9 | 29.9 | 45.5 | 20.3 | 85.5 | 61.4 | 63.6 | 40.8 | 39.4 | 140.5 | 54.0 | 53.9 |
| **-0.20** | 34.3 | 16.3 | 30.0 | 49.4 | 17.9 | 89.9 | 61.3 | 64.5 | 41.0 | 39.4 | 146.2 | 55.5 | 55.4 |
| **-0.30** | 25.2 | 12.9 | 29.1 | 51.6 | 15.7 | 95.8 | 61.2 | 64.8 | 41.1 | 39.6 | 151.9 | 57.4 | 56.5 |
| **-0.40** | 20.0 | 11.1 | 27.0 | 53.8 | 13.7 | 101.6 | 60.7 | 65.6 | 41.0 | 39.7 | 157.4 | 58.7 | 58.6 |
| **-0.50** | 16.5 | 9.8 | 22.5 | 53.2 | 11.1 | 109.2 | 60.7 | 65.9 | 40.8 | 39.4 | 163.4 | 60.5 | 60.1 |
| **-0.60** | 14.0 | 8.8 | 14.8 | 52.0 | 9.3 | 117.5 | 60.7 | 67.4 | 40.6 | 39.5 | 171.1 | 61.7 | 61.9 |
| **-0.70** | 11.9 | 8.2 | 7.3 | 48.0 | 6.5 | 129.1 | 60.5 | 67.7 | 40.5 | 39.3 | 177.5 | 63.9 | 62.9 |
| **-0.76** | 10.6 | 7.6 | 3.7 | 40.6 | 4.4 | 139.0 | 60.5 | 67.7 | 40.6 | 39.1 | 182.8 | 65.1 | 64.9 |

*Table 120. The 2022 Subaru Outback Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.3 | 2.5 | 0.9 | 408.2 | 365.4 | 183.1 | 63.2 | 191.5 | 103.9 | 51.9 | 57.6 | 40.0 | 25.6 | 68.4 | - | 67.4 |
| **0.70** | 2.3 | 2.5 | 0.8 | 433.7 | 387.3 | 191.4 | 62.3 | 196.0 | 102.5 | 50.8 | 59.0 | 36.8 | 25.0 | 74.7 | - | 71.5 |
| **0.60** | 2.3 | 2.5 | 0.8 | 464.2 | 414.9 | 195.2 | 60.0 | 200.9 | 99.8 | 49.5 | 61.2 | 33.5 | 23.6 | 81.7 | - | 75.3 |
| **0.50** | 2.3 | 2.4 | 0.8 | 495.8 | 444.6 | 204.3 | 58.1 | 202.1 | 93.0 | 47.4 | 60.0 | 30.1 | 21.0 | 86.1 | - | 78.9 |
| **0.40** | 2.3 | 2.4 | 0.7 | 525.3 | 480.8 | 206.4 | 55.3 | 206.4 | 85.7 | 45.2 | 59.2 | 27.1 | 17.3 | 89.6 | - | 80.6 |
| **0.30** | 2.2 | 2.4 | 0.7 | 547.3 | 517.3 | 215.1 | 53.2 | 208.4 | 75.4 | 42.2 | 54.1 | 22.3 | 13.8 | 89.8 | - | 80.7 |
| **0.20** | 2.2 | 2.3 | 0.7 | 565.0 | 557.1 | 216.9 | 50.0 | 210.6 | 66.0 | 40.1 | 46.6 | 17.5 | 10.2 | 88.1 | - | 76.2 |
| **0.10** | 2.2 | 2.3 | 0.7 | 569.7 | 584.6 | 219.7 | 48.0 | 200.4 | 53.5 | 37.3 | 38.5 | 11.6 | 8.3 | 82.2 | - | 69.8 |
| **0.00** | 2.2 | 2.3 | 0.7 | 563.2 | 601.8 | 215.0 | 44.0 | 188.6 | 44.1 | 34.9 | 30.5 | 8.0 | 6.7 | 69.8 | - | 56.7 |
| **-0.10** | 2.1 | 2.2 | 0.7 | 538.6 | 612.3 | 206.5 | 41.3 | 172.5 | 36.8 | 31.0 | 18.6 | 4.7 | 5.3 | 45.3 | - | 39.4 |
| **-0.20** | 2.1 | 2.1 | 0.7 | 494.0 | 604.3 | 184.4 | 37.4 | 157.7 | 29.3 | 22.9 | 10.0 | 3.1 | 3.9 | 22.6 | - | 22.4 |
| **-0.30** | 2.1 | 2.1 | 0.7 | 434.6 | 565.7 | 166.8 | 33.6 | 115.3 | 20.3 | 14.2 | 5.6 | 2.1 | 2.6 | 11.3 | - | 12.1 |
| **-0.40** | 2.0 | 2.1 | 0.7 | 365.5 | 467.7 | 131.7 | 23.9 | 52.8 | 13.3 | 8.8 | 3.6 | 1.6 | 1.7 | 6.6 | - | 6.9 |
| **-0.50** | 2.0 | 2.0 | 0.7 | 277.6 | 292.0 | 97.7 | 16.2 | 26.6 | 8.8 | 6.4 | 2.6 | 1.3 | 1.4 | 4.3 | - | 4.4 |
| **-0.60** | 1.9 | 2.0 | 0.7 | 166.9 | 170.9 | 57.5 | 11.1 | 15.8 | 6.4 | 4.8 | 2.0 | 1.1 | 1.2 | 3.1 | - | 3.3 |
| **-0.70** | 1.9 | 1.9 | 0.7 | 90.8 | 99.2 | 33.6 | 7.8 | 10.9 | 5.1 | 3.9 | 1.7 | 1.0 | 1.1 | 2.4 | - | 2.5 |
| **-0.76** | 1.8 | 1.8 | 0.7 | 90.8 | 99.2 | 28.2 | 5.4 | 10.6 | 4.9 | 3.7 | 1.4 | 0.9 | 1.0 | 1.9 | - | 2.0 |

*Table 121. The 2022 Subaru Outback Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 492.3 | 200.1 | 13.3 | 21.7 | 17.9 | 36.4 | 39.0 | 37.7 | 25.9 | 24.0 | - | - | - |
| **0.70** | 491.2 | 174.4 | 14.1 | 22.6 | 18.7 | 38.5 | 40.4 | 38.9 | 26.1 | 24.3 | - | - | - |
| **0.60** | 487.5 | 149.7 | 14.8 | 23.6 | 19.8 | 40.4 | 41.9 | 39.8 | 26.9 | 25.2 | - | - | - |
| **0.50** | 449.9 | 122.0 | 15.9 | 24.5 | 20.7 | 42.9 | 43.2 | 41.4 | 27.7 | 25.9 | - | - | - |
| **0.40** | 406.1 | 101.9 | 16.9 | 25.6 | 21.7 | 45.0 | 44.4 | 42.3 | 28.6 | 26.6 | - | - | - |
| **0.30** | 350.4 | 85.5 | 18.1 | 26.9 | 22.7 | 47.3 | 46.0 | 43.8 | 29.5 | 27.4 | - | - | - |
| **0.20** | 280.9 | 68.3 | 19.5 | 28.2 | 23.8 | 49.7 | 47.2 | 44.5 | 30.2 | 28.3 | - | - | - |
| **0.10** | 172.2 | 52.6 | 21.3 | 29.9 | 24.8 | 52.3 | 48.6 | 46.1 | 31.3 | 29.3 | - | - | - |
| **0.00** | 96.2 | 36.6 | 23.2 | 32.1 | 25.9 | 55.1 | 50.0 | 47.3 | 32.2 | 30.4 | - | - | - |
| **-0.10** | 53.2 | 23.9 | 25.3 | 33.9 | 26.0 | 58.0 | 51.0 | 48.8 | 33.0 | 31.5 | - | - | - |
| **-0.20** | 34.3 | 16.3 | 27.4 | 36.5 | 25.9 | 61.1 | 52.0 | 50.1 | 33.7 | 32.5 | - | - | - |
| **-0.30** | 25.2 | 12.9 | 29.0 | 39.0 | 24.8 | 64.5 | 53.2 | 51.3 | 34.6 | 33.4 | - | - | - |
| **-0.40** | 20.0 | 11.1 | 29.9 | 42.4 | 23.0 | 68.2 | 54.1 | 53.4 | 35.3 | 34.1 | - | - | - |
| **-0.50** | 16.5 | 9.8 | 30.0 | 45.5 | 20.3 | 72.1 | 55.4 | 55.1 | 36.1 | 34.9 | - | - | - |
| **-0.60** | 14.0 | 8.8 | 29.1 | 49.3 | 17.9 | 76.3 | 56.6 | 57.1 | 37.2 | 35.9 | - | - | - |
| **-0.70** | 11.9 | 8.2 | 27.0 | 51.6 | 15.6 | 80.7 | 58.1 | 58.6 | 38.1 | 36.9 | - | - | - |
| **-0.76** | 10.6 | 7.6 | 22.5 | 51.6 | 15.6 | 85.4 | 58.1 | 58.6 | 38.8 | 37.6 | - | - | - |

*Table 122. The 2022 Subaru Outback Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 2.4 | 2.6 | 1.2 | 263.7 | 250.6 | 158.3 | 66.2 | 151.2 | 93.8 | 54.8 | 51.5 | 42.4 | 25.3 | 57.9 | - | 58.7 |
| **0.70** | 2.4 | 2.6 | 1.0 | 278.1 | 261.7 | 160.8 | 66.5 | 158.5 | 96.5 | 54.6 | 51.5 | 42.4 | 25.3 | 57.9 | - | 58.7 |
| **0.60** | 2.3 | 2.5 | 0.9 | 293.2 | 272.6 | 162.5 | 66.4 | 166.8 | 98.7 | 54.0 | 54.1 | 41.6 | 25.6 | 62.5 | - | 63.5 |
| **0.50** | 2.3 | 2.5 | 0.8 | 308.8 | 286.3 | 165.9 | 66.7 | 177.4 | 101.1 | 53.2 | 57.6 | 40.0 | 25.6 | 68.4 | - | 67.4 |
| **0.40** | 2.3 | 2.5 | 0.8 | 324.6 | 298.3 | 167.5 | 66.1 | 183.0 | 102.1 | 52.2 | 59.0 | 36.8 | 25.0 | 74.7 | - | 71.5 |
| **0.30** | 2.3 | 2.4 | 0.8 | 342.9 | 312.5 | 172.9 | 65.9 | 191.4 | 103.9 | 51.9 | 61.2 | 33.5 | 23.6 | 81.7 | - | 75.3 |
| **0.20** | 2.3 | 2.5 | 0.7 | 360.1 | 325.7 | 174.4 | 64.9 | 195.9 | 102.4 | 50.8 | 60.0 | 30.1 | 21.0 | 86.1 | - | 78.9 |
| **0.10** | 2.3 | 2.5 | 0.7 | 382.0 | 344.5 | 179.8 | 64.5 | 200.8 | 99.8 | 49.5 | 59.2 | 27.1 | 17.3 | 89.6 | - | 80.6 |
| **0.00** | 2.3 | 2.4 | 0.7 | 408.0 | 365.3 | 183.0 | 63.2 | 202.0 | 93.0 | 47.4 | 54.1 | 22.3 | 13.8 | 89.8 | - | 80.7 |
| **-0.10** | 2.3 | 2.4 | 0.7 | 433.5 | 387.2 | 191.3 | 62.2 | 206.3 | 85.7 | 45.1 | 46.6 | 17.5 | 10.2 | 88.1 | - | 76.2 |
| **-0.20** | 2.2 | 2.4 | 0.7 | 463.9 | 414.7 | 195.1 | 59.9 | 208.3 | 75.4 | 42.2 | 38.5 | 11.6 | 8.3 | 82.2 | - | 69.8 |
| **-0.30** | 2.2 | 2.3 | 0.7 | 495.5 | 444.4 | 204.3 | 58.0 | 210.6 | 66.0 | 40.1 | 30.5 | 8.0 | 6.7 | 69.8 | - | 56.7 |
| **-0.40** | 2.2 | 2.3 | 0.7 | 525.1 | 480.6 | 206.3 | 55.3 | 200.4 | 53.5 | 37.3 | 18.6 | 4.7 | 5.3 | 45.3 | - | 39.4 |
| **-0.50** | 2.2 | 2.3 | 0.7 | 547.0 | 517.0 | 215.0 | 53.2 | 188.6 | 44.0 | 34.9 | 10.0 | 3.1 | 3.9 | 22.6 | - | 22.4 |
| **-0.60** | 2.1 | 2.2 | 0.7 | 564.7 | 556.8 | 216.8 | 50.0 | 172.5 | 36.8 | 31.0 | 5.6 | 2.1 | 2.6 | 11.3 | - | 12.1 |
| **-0.70** | 2.1 | 2.1 | 0.7 | 569.4 | 584.3 | 219.6 | 48.0 | 157.7 | 29.3 | 22.9 | 3.6 | 1.6 | 1.7 | 6.6 | - | 6.9 |
| **-0.76** | 2.1 | 2.1 | 0.7 | 562.9 | 601.5 | 214.9 | 47.0 | 157.7 | 29.3 | 22.9 | 2.6 | 1.3 | 1.4 | 4.3 | - | 4.4 |

*Table 123. The 2022 Subaru Outback Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 492.3 | 200.1 | 12.6 | 19.8 | 16.4 | 31.7 | 31.7 | 30.8 | 21.0 | 20.6 | - | - | - |
| **0.70** | 491.2 | 174.4 | 13.0 | 20.8 | 17.0 | 31.7 | 33.1 | 32.2 | 21.4 | 20.7 | - | - | - |
| **0.60** | 487.5 | 149.7 | 13.7 | 21.7 | 17.9 | 33.0 | 34.5 | 33.8 | 22.4 | 21.4 | - | - | - |
| **0.50** | 449.9 | 122.0 | 14.5 | 22.6 | 18.7 | 34.7 | 36.0 | 35.2 | 23.2 | 22.1 | - | - | - |
| **0.40** | 406.1 | 101.9 | 15.4 | 23.6 | 19.8 | 36.4 | 37.5 | 36.5 | 24.2 | 22.9 | - | - | - |
| **0.30** | 350.4 | 85.5 | 16.4 | 24.5 | 20.7 | 38.5 | 38.9 | 37.6 | 25.2 | 23.6 | - | - | - |
| **0.20** | 280.9 | 68.3 | 17.4 | 25.6 | 21.7 | 40.4 | 40.4 | 38.9 | 26.1 | 24.3 | - | - | - |
| **0.10** | 172.2 | 52.6 | 18.7 | 26.8 | 22.7 | 42.8 | 41.8 | 39.7 | 26.9 | 25.1 | - | - | - |
| **0.00** | 96.2 | 36.6 | 20.3 | 28.2 | 23.8 | 45.0 | 43.1 | 41.3 | 27.7 | 25.8 | - | - | - |
| **-0.10** | 53.2 | 23.9 | 22.2 | 29.9 | 24.8 | 47.3 | 44.3 | 42.2 | 28.5 | 26.6 | - | - | - |
| **-0.20** | 34.3 | 16.3 | 24.3 | 32.1 | 25.9 | 49.7 | 45.9 | 43.8 | 29.4 | 27.4 | - | - | - |
| **-0.30** | 25.2 | 12.9 | 26.5 | 33.9 | 26.0 | 52.2 | 47.1 | 44.5 | 30.1 | 28.3 | - | - | - |
| **-0.40** | 20.0 | 11.1 | 28.3 | 36.5 | 25.9 | 55.1 | 48.6 | 46.1 | 31.2 | 29.3 | - | - | - |
| **-0.50** | 16.5 | 9.8 | 29.7 | 39.0 | 24.7 | 57.9 | 50.0 | 47.2 | 32.1 | 30.3 | - | - | - |
| **-0.60** | 14.0 | 8.8 | 30.1 | 42.4 | 23.0 | 61.1 | 50.9 | 48.7 | 32.9 | 31.5 | - | - | - |
| **-0.70** | 11.9 | 8.2 | 29.8 | 45.5 | 20.3 | 64.4 | 51.9 | 50.0 | 33.6 | 32.4 | - | - | - |
| **-0.76** | 10.6 | 7.6 | 29.1 | 45.5 | 20.3 | 68.2 | 52.6 | 50.6 | 34.6 | 33.4 | - | - | - |

*Table 124. The 2022 Tesla Model 3 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.2 | 1.2 | 0.5 | 4.1 | 5.1 | 4.6 | 2.5 | 2.9 | 1.6 | 1.3 | 9.2 | 5.7 | 3.6 | 18.6 | 16.7 | 16.0 |
| **0.70** | 1.2 | 1.2 | 0.5 | 4.1 | 5.1 | 4.6 | 2.5 | 2.5 | 1.5 | 1.2 | 5.0 | 3.4 | 2.3 | 9.3 | 9.4 | 9.4 |
| **0.60** | 1.1 | 1.2 | 0.5 | 3.8 | 5.0 | 4.7 | 2.4 | 2.2 | 1.4 | 1.1 | 2.7 | 2.0 | 1.4 | 4.4 | 4.8 | 4.9 |
| **0.50** | 1.1 | 1.1 | 0.5 | 3.8 | 5.0 | 4.7 | 2.3 | 2.1 | 1.4 | 1.1 | 1.6 | 1.2 | 0.9 | 2.5 | 2.6 | 2.6 |
| **0.40** | 1.1 | 1.1 | 0.5 | 3.6 | 4.9 | 4.6 | 2.2 | 1.9 | 1.3 | 1.0 | 1.2 | 0.9 | 0.7 | 1.6 | 1.7 | 1.7 |
| **0.30** | 1.1 | 1.1 | 0.5 | 3.6 | 4.8 | 4.4 | 2.2 | 1.8 | 1.3 | 1.0 | 0.9 | 0.7 | 0.5 | 1.2 | 1.2 | 1.3 |
| **0.20** | 1.0 | 1.1 | 0.5 | 3.4 | 4.7 | 4.3 | 2.1 | 1.8 | 1.3 | 1.0 | 0.8 | 0.6 | 0.5 | 0.9 | 1.0 | 1.0 |
| **0.10** | 1.0 | 1.1 | 0.5 | 3.4 | 4.6 | 4.2 | 2.1 | 1.7 | 1.3 | 0.9 | 0.7 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **0.00** | 1.0 | 1.0 | 0.5 | 3.3 | 4.4 | 4.0 | 2.1 | 1.7 | 1.3 | 0.9 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.10** | 1.0 | 1.0 | 0.5 | 3.3 | 4.2 | 3.9 | 2.0 | 1.6 | 1.2 | 0.9 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.20** | 1.0 | 1.0 | 0.4 | 3.3 | 4.0 | 3.7 | 2.0 | 1.6 | 1.2 | 0.9 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.30** | 1.0 | 1.0 | 0.4 | 3.1 | 3.8 | 3.4 | 1.9 | 1.5 | 1.2 | 0.9 | 0.5 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |
| **-0.40** | 1.0 | 1.0 | 0.4 | 3.1 | 3.6 | 3.1 | 1.9 | 1.5 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |
| **-0.50** | 1.0 | 0.9 | 0.4 | 3.0 | 3.3 | 2.9 | 1.8 | 1.5 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |
| **-0.60** | 1.0 | 0.9 | 0.4 | 3.0 | 3.2 | 2.7 | 1.8 | 1.4 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |
| **-0.70** | - | - | 0.4 | 2.9 | 2.9 | 2.5 | 1.7 | 1.4 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |
| **-0.76** | - | - | 0.4 | 2.8 | 2.7 | 2.3 | 1.7 | 1.4 | 1.2 | 0.9 | 0.4 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |

*Table 125. The 2022 Tesla Model 3 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 473.0 | 170.8 | 20.6 | 54.0 | 41.4 | 102.1 | 98.6 | 116.3 | 51.2 | 92.1 | 274.1 | 117.1 | 138.3 |
| **0.70** | 479.4 | 142.3 | 22.2 | 57.7 | 42.7 | 102.1 | 97.5 | 126.6 | 50.7 | 101.2 | 277.8 | 117.1 | 145.0 |
| **0.60** | 491.3 | 121.0 | 23.0 | 59.4 | 44.4 | 109.8 | 98.3 | 139.3 | 50.8 | 111.2 | 287.7 | 120.6 | 151.0 |
| **0.50** | 478.3 | 93.5 | 24.5 | 62.3 | 44.5 | 116.9 | 97.0 | 153.9 | 50.3 | 124.0 | 298.6 | 121.7 | 158.3 |
| **0.40** | 469.8 | 84.4 | 25.4 | 63.1 | 44.0 | 125.8 | 98.3 | 172.3 | 50.1 | 136.8 | 309.3 | 123.8 | 163.4 |
| **0.30** | 433.6 | 75.1 | 26.2 | 65.8 | 41.4 | 134.4 | 97.3 | 197.0 | 49.8 | 157.3 | 320.0 | 124.7 | 170.2 |
| **0.20** | 395.9 | 62.0 | 26.2 | 66.5 | 39.4 | 141.6 | 97.8 | 225.2 | 49.6 | 178.8 | 329.7 | 125.2 | 175.2 |
| **0.10** | 279.3 | 43.7 | 25.8 | 67.9 | 35.2 | 147.4 | 95.9 | 258.4 | 49.0 | 207.1 | 342.4 | 128.4 | 181.4 |
| **0.00** | 126.9 | 28.3 | 24.6 | 66.2 | 31.9 | 153.4 | 96.9 | 286.5 | 48.4 | 228.4 | 357.8 | 128.7 | 189.0 |
| **-0.10** | 67.5 | 18.3 | 23.2 | 63.7 | 25.8 | 156.6 | 94.6 | 308.6 | 47.7 | 250.0 | 375.6 | 132.0 | 196.6 |
| **-0.20** | 40.5 | 12.6 | 20.9 | 58.5 | 20.7 | 159.3 | 95.0 | 317.2 | 47.2 | 257.4 | 396.3 | 133.0 | 208.1 |
| **-0.30** | 27.8 | 9.6 | 16.4 | 53.9 | 14.4 | 159.7 | 93.8 | 317.3 | 45.8 | 259.8 | 417.8 | 136.4 | 220.4 |
| **-0.40** | 20.1 | 8.0 | 8.4 | 46.9 | 10.4 | 159.9 | 92.7 | 307.6 | 44.1 | 253.0 | 437.9 | 137.0 | 235.7 |
| **-0.50** | 15.8 | 6.9 | 4.1 | 35.2 | 6.3 | 157.2 | 88.0 | 295.7 | 42.0 | 245.0 | 460.9 | 140.2 | 251.4 |
| **-0.60** | 12.6 | 6.2 | 2.2 | 16.6 | 4.0 | 152.3 | 84.6 | 279.4 | 39.8 | 230.9 | 482.2 | 139.9 | 273.5 |
| **-0.70** | 10.7 | 5.7 | 1.5 | 7.7 | 2.5 | 141.0 | 78.5 | 260.8 | 37.1 | 216.7 | 501.6 | 141.0 | 296.5 |
| **-0.76** | 9.1 | 5.3 | 1.5 | 7.7 | 2.5 | 129.5 | 78.5 | 260.8 | 36.6 | 215.6 | 516.4 | 141.0 | 296.5 |

*Table 126. The 2022 Tesla Model 3 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 1.8 | 0.6 | 150.7 | 111.8 | 62.0 | 47.4 | 101.7 | 24.0 | 18.1 | 28.1 | 22.0 | 9.8 | 30.0 | 26.3 | 27.5 |
| **0.70** | 1.4 | 1.8 | 0.5 | 87.4 | 70.8 | 37.8 | 28.3 | 90.7 | 17.7 | 13.4 | 28.1 | 22.0 | 9.8 | 30.0 | 26.3 | 27.5 |
| **0.60** | 1.4 | 1.6 | 0.5 | 45.2 | 40.5 | 22.3 | 15.4 | 63.7 | 11.2 | 8.1 | 24.4 | 18.3 | 8.5 | 28.5 | 25.3 | 26.0 |
| **0.50** | 1.4 | 1.5 | 0.5 | 24.0 | 21.4 | 13.7 | 8.8 | 29.0 | 7.6 | 5.2 | 20.0 | 13.6 | 6.9 | 26.8 | 23.6 | 23.7 |
| **0.40** | 1.4 | 1.5 | 0.5 | 15.4 | 13.4 | 9.7 | 6.0 | 14.5 | 5.1 | 3.6 | 15.2 | 9.5 | 5.4 | 24.2 | 21.2 | 20.8 |
| **0.30** | 1.4 | 1.4 | 0.5 | 11.3 | 10.0 | 7.7 | 4.6 | 8.4 | 3.5 | 2.5 | 9.2 | 5.7 | 3.6 | 18.6 | 16.7 | 16.0 |
| **0.20** | 1.4 | 1.4 | 0.5 | 8.8 | 7.9 | 6.4 | 3.8 | 5.7 | 2.6 | 2.0 | 5.0 | 3.4 | 2.3 | 9.3 | 9.4 | 9.4 |
| **0.10** | 1.4 | 1.4 | 0.5 | 7.3 | 6.7 | 5.7 | 3.3 | 4.2 | 2.1 | 1.6 | 2.7 | 2.0 | 1.4 | 4.4 | 4.8 | 4.9 |
| **0.00** | 1.3 | 1.3 | 0.5 | 6.1 | 5.8 | 5.2 | 3.0 | 3.4 | 1.8 | 1.5 | 1.6 | 1.2 | 0.9 | 2.5 | 2.6 | 2.6 |
| **-0.10** | 1.3 | 1.3 | 0.5 | 5.3 | 5.3 | 4.8 | 2.8 | 2.9 | 1.6 | 1.3 | 1.2 | 0.9 | 0.7 | 1.6 | 1.7 | 1.7 |
| **-0.20** | 1.2 | 1.3 | 0.5 | 4.9 | 5.0 | 4.6 | 2.7 | 2.5 | 1.5 | 1.2 | 0.9 | 0.7 | 0.5 | 1.2 | 1.2 | 1.3 |
| **-0.30** | 1.2 | 1.2 | 0.5 | 4.5 | 5.0 | 4.5 | 2.7 | 2.2 | 1.4 | 1.1 | 0.8 | 0.6 | 0.5 | 0.9 | 1.0 | 1.0 |
| **-0.40** | 1.2 | 1.2 | 0.5 | 4.3 | 4.9 | 4.5 | 2.7 | 2.1 | 1.4 | 1.1 | 0.7 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |
| **-0.50** | 1.2 | 1.2 | 0.5 | 4.0 | 4.9 | 4.5 | 2.6 | 1.9 | 1.3 | 1.0 | 0.6 | 0.5 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.60** | 1.1 | 1.1 | 0.5 | 4.1 | 5.1 | 4.6 | 2.5 | 1.8 | 1.3 | 1.0 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.70** | 1.1 | 1.1 | 0.4 | 3.8 | 5.1 | 4.7 | 2.5 | 1.8 | 1.3 | 1.0 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.76** | 1.1 | 1.1 | 0.4 | 3.8 | 5.0 | 4.7 | 2.4 | 1.8 | 1.3 | 1.0 | 0.5 | 0.4 | 0.3 | 0.6 | 0.6 | 0.6 |

*Table 127. The 2022 Tesla Model 3 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 473.0 | 170.8 | 17.1 | 34.1 | 30.3 | 57.4 | 76.4 | 65.0 | 44.0 | 48.1 | - | - | - |
| **0.70** | 479.4 | 142.3 | 17.1 | 36.4 | 31.5 | 60.0 | 77.8 | 65.6 | 44.3 | 48.4 | - | - | - |
| **0.60** | 491.3 | 121.0 | 18.4 | 39.0 | 33.2 | 63.3 | 80.7 | 68.2 | 45.1 | 50.6 | - | - | - |
| **0.50** | 478.3 | 93.5 | 19.0 | 42.6 | 34.8 | 66.8 | 83.2 | 70.8 | 46.2 | 52.7 | - | - | - |
| **0.40** | 469.8 | 84.4 | 20.1 | 45.9 | 37.0 | 70.4 | 85.4 | 73.3 | 46.4 | 54.4 | - | - | - |
| **0.30** | 433.6 | 75.1 | 20.6 | 50.7 | 38.9 | 73.7 | 87.5 | 75.8 | 47.2 | 56.9 | - | - | - |
| **0.20** | 395.9 | 62.0 | 22.2 | 54.0 | 41.3 | 77.6 | 89.0 | 77.6 | 47.6 | 58.5 | - | - | - |
| **0.10** | 279.3 | 43.7 | 23.0 | 57.7 | 42.6 | 81.1 | 90.6 | 79.7 | 47.7 | 60.1 | - | - | - |
| **0.00** | 126.9 | 28.3 | 24.5 | 59.4 | 44.3 | 85.3 | 91.9 | 82.2 | 48.3 | 62.1 | - | - | - |
| **-0.10** | 67.5 | 18.3 | 25.4 | 62.3 | 44.5 | 90.5 | 92.6 | 84.8 | 48.7 | 64.1 | - | - | - |
| **-0.20** | 40.5 | 12.6 | 26.2 | 63.1 | 44.0 | 95.9 | 94.4 | 87.1 | 49.5 | 66.6 | - | - | - |
| **-0.30** | 27.8 | 9.6 | 26.1 | 65.8 | 41.4 | 102.0 | 95.0 | 90.6 | 49.7 | 70.0 | - | - | - |
| **-0.40** | 20.1 | 8.0 | 25.7 | 66.5 | 39.4 | 109.7 | 96.6 | 94.3 | 50.4 | 74.2 | - | - | - |
| **-0.50** | 15.8 | 6.9 | 24.6 | 67.9 | 35.2 | 116.8 | 96.9 | 100.2 | 50.6 | 78.9 | - | - | - |
| **-0.60** | 12.6 | 6.2 | 23.2 | 66.2 | 31.9 | 125.7 | 97.8 | 107.5 | 50.5 | 84.9 | - | - | - |
| **-0.70** | 10.7 | 5.7 | 20.9 | 63.7 | 25.7 | 134.2 | 97.3 | 116.5 | 50.7 | 92.2 | - | - | - |
| **-0.76** | 9.1 | 5.3 | 16.4 | 63.7 | 25.7 | 134.2 | 97.4 | 126.4 | 50.3 | 101.0 | - | - | - |

*Table 128. The 2022 Tesla Model 3 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 3.0 | 0.8 | 281.0 | 169.8 | 256.3 | 244.5 | 117.3 | 77.9 | 35.6 | 32.2 | 29.3 | 17.0 | 28.8 | 25.4 | 28.5 |
| **0.70** | 1.4 | 3.0 | 0.7 | 291.0 | 179.0 | 254.6 | 244.0 | 121.7 | 75.3 | 35.1 | 32.7 | 28.7 | 16.6 | 29.9 | 26.7 | 29.5 |
| **0.60** | 1.4 | 2.9 | 0.6 | 298.5 | 178.3 | 251.3 | 244.5 | 124.6 | 69.5 | 33.3 | 32.1 | 28.0 | 14.9 | 30.8 | 27.7 | 30.1 |
| **0.50** | 1.4 | 2.8 | 0.6 | 301.0 | 184.1 | 239.5 | 237.6 | 127.6 | 64.9 | 32.1 | 30.9 | 26.3 | 13.0 | 30.7 | 27.5 | 29.4 |
| **0.40** | 1.4 | 2.7 | 0.6 | 303.4 | 180.5 | 228.5 | 227.7 | 127.5 | 56.7 | 29.6 | 28.1 | 23.8 | 10.8 | 30.0 | 27.3 | 29.1 |
| **0.30** | 1.5 | 2.6 | 0.6 | 301.8 | 184.8 | 213.0 | 214.3 | 127.0 | 50.5 | 27.8 | 24.4 | 20.2 | 8.8 | 28.5 | 25.9 | 27.1 |
| **0.20** | 1.5 | 2.5 | 0.5 | 296.4 | 177.2 | 198.1 | 199.8 | 120.5 | 40.2 | 25.1 | 20.0 | 16.4 | 7.3 | 26.8 | 24.5 | 25.3 |
| **0.10** | 1.4 | 2.3 | 0.5 | 281.6 | 177.2 | 172.7 | 180.3 | 113.1 | 33.5 | 22.1 | 15.2 | 12.0 | 6.0 | 24.2 | 21.7 | 21.8 |
| **0.00** | 1.4 | 2.1 | 0.5 | 258.4 | 166.4 | 146.3 | 157.4 | 101.7 | 24.0 | 18.1 | 9.2 | 8.0 | 4.4 | 18.6 | 17.3 | 17.2 |
| **-0.10** | 1.4 | 1.9 | 0.5 | 231.3 | 158.8 | 116.7 | 130.1 | 90.7 | 17.7 | 13.4 | 5.0 | 4.8 | 2.9 | 9.3 | 9.8 | 10.1 |
| **-0.20** | 1.4 | 1.8 | 0.5 | 199.2 | 138.0 | 89.9 | 100.5 | 63.7 | 11.2 | 8.1 | 2.7 | 2.8 | 1.8 | 4.4 | 5.0 | 5.3 |
| **-0.30** | 1.4 | 1.6 | 0.5 | 150.7 | 111.8 | 62.0 | 72.5 | 29.0 | 7.6 | 5.2 | 1.6 | 1.7 | 1.1 | 2.5 | 2.7 | 2.8 |
| **-0.40** | 1.4 | 1.5 | 0.5 | 87.4 | 70.8 | 37.8 | 44.4 | 14.5 | 5.1 | 3.6 | 1.2 | 1.1 | 0.8 | 1.6 | 1.7 | 1.8 |
| **-0.50** | 1.4 | 1.5 | 0.5 | 45.2 | 40.5 | 22.3 | 24.8 | 8.4 | 3.5 | 2.5 | 0.9 | 0.9 | 0.6 | 1.2 | 1.3 | 1.3 |
| **-0.60** | 1.4 | 1.4 | 0.5 | 24.0 | 21.4 | 13.7 | 12.4 | 5.7 | 2.6 | 2.0 | 0.8 | 0.7 | 0.5 | 0.9 | 1.0 | 1.0 |
| **-0.70** | 1.4 | 1.4 | 0.5 | 15.4 | 13.4 | 9.7 | 7.4 | 4.2 | 2.1 | 1.6 | 0.7 | 0.6 | 0.5 | 0.8 | 0.8 | 0.8 |
| **-0.76** | 1.3 | 1.4 | 0.5 | 15.4 | 13.4 | 9.7 | 6.0 | 3.4 | 1.8 | 1.5 | 0.7 | 0.6 | 0.4 | 0.8 | 0.8 | 0.8 |

*Table 129. The 2022 Tesla Model 3 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 473.0 | 170.8 | 14.1 | 25.9 | 24.1 | 40.4 | - | - | - | - | - | - | - |
| **0.70** | 479.4 | 142.3 | 14.8 | 27.5 | 25.5 | 41.7 | 49.0 | 39.3 | 30.6 | 30.4 | - | - | - |
| **0.60** | 491.3 | 121.0 | 15.4 | 29.3 | 26.7 | 43.4 | 50.8 | 41.6 | 31.5 | 31.6 | - | - | - |
| **0.50** | 478.3 | 93.5 | 16.5 | 30.6 | 27.9 | 44.7 | 53.0 | 43.7 | 33.1 | 32.9 | - | - | - |
| **0.40** | 469.8 | 84.4 | 17.1 | 32.3 | 28.8 | 46.5 | 55.2 | 45.8 | 33.9 | 33.9 | - | - | - |
| **0.30** | 433.6 | 75.1 | 18.3 | 34.1 | 30.3 | 48.1 | 57.4 | 48.2 | 35.3 | 35.2 | - | - | - |
| **0.20** | 395.9 | 62.0 | 19.0 | 36.4 | 31.5 | 50.7 | 60.1 | 50.0 | 36.3 | 36.4 | - | - | - |
| **0.10** | 279.3 | 43.7 | 20.1 | 38.9 | 33.2 | 52.6 | 62.8 | 52.3 | 37.9 | 37.9 | - | - | - |
| **0.00** | 126.9 | 28.3 | 20.6 | 42.6 | 34.8 | 54.6 | 65.3 | 54.3 | 38.9 | 39.4 | - | - | - |
| **-0.10** | 67.5 | 18.3 | 22.2 | 45.9 | 36.9 | 57.3 | 67.2 | 56.5 | 40.2 | 41.2 | - | - | - |
| **-0.20** | 40.5 | 12.6 | 22.9 | 50.7 | 38.8 | 59.9 | 69.8 | 58.5 | 41.2 | 42.7 | - | - | - |
| **-0.30** | 27.8 | 9.6 | 24.5 | 53.9 | 41.3 | 63.2 | 72.3 | 61.2 | 42.4 | 44.5 | - | - | - |
| **-0.40** | 20.1 | 8.0 | 25.4 | 57.6 | 42.6 | 66.7 | 74.7 | 63.4 | 43.2 | 46.4 | - | - | - |
| **-0.50** | 15.8 | 6.9 | 26.2 | 59.3 | 44.3 | 70.3 | 77.6 | 65.5 | 44.2 | 48.3 | - | - | - |
| **-0.60** | 12.6 | 6.2 | 26.1 | 62.2 | 44.5 | 73.6 | 80.5 | 68.1 | 45.0 | 50.5 | - | - | - |
| **-0.70** | 10.7 | 5.7 | 25.7 | 63.0 | 44.0 | 77.5 | 83.0 | 70.7 | 46.1 | 52.6 | - | - | - |
| **-0.76** | 9.1 | 5.3 | 25.7 | 63.0 | 44.0 | 77.5 | 85.2 | 73.1 | 46.3 | 54.3 | - | - | - |

*Table 130. The 2022 Tesla Model 3 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.5 | 3.1 | 1.3 | 181.8 | 129.6 | 150.1 | 129.7 | 102.8 | 76.6 | 38.0 | 30.9 | 28.9 | 19.2 | 26.2 | 23.5 | 27.5 |
| **0.70** | 1.5 | 3.1 | 1.0 | 197.9 | 138.7 | 168.2 | 149.2 | 102.8 | 76.6 | 38.0 | 31.9 | 29.7 | 18.5 | 27.1 | 25.0 | 28.5 |
| **0.60** | 1.5 | 3.1 | 0.8 | 215.3 | 142.7 | 190.7 | 170.1 | 107.7 | 77.8 | 36.9 | 32.2 | 29.3 | 17.0 | 28.8 | 25.4 | 28.5 |
| **0.50** | 1.5 | 3.1 | 0.7 | 233.2 | 153.4 | 213.2 | 196.8 | 113.3 | 79.6 | 36.7 | 32.7 | 29.0 | 15.7 | 29.9 | 26.4 | 28.9 |
| **0.40** | 1.5 | 3.1 | 0.6 | 252.4 | 156.7 | 234.2 | 218.2 | 117.3 | 77.9 | 35.6 | 32.1 | 27.5 | 13.7 | 30.8 | 26.6 | 28.6 |
| **0.30** | 1.4 | 3.0 | 0.6 | 266.6 | 167.5 | 247.4 | 237.3 | 121.7 | 75.3 | 35.1 | 30.9 | 25.6 | 12.1 | 30.7 | 26.9 | 28.6 |
| **0.20** | 1.4 | 3.0 | 0.6 | 280.9 | 169.7 | 256.3 | 244.5 | 124.6 | 69.5 | 33.3 | 28.1 | 22.0 | 9.8 | 30.0 | 26.3 | 27.5 |
| **0.10** | 1.4 | 2.9 | 0.6 | 290.9 | 179.0 | 254.5 | 245.2 | 127.5 | 64.9 | 32.1 | 24.4 | 18.3 | 8.5 | 28.5 | 25.3 | 26.0 |
| **0.00** | 1.4 | 2.8 | 0.5 | 298.4 | 178.2 | 251.3 | 238.1 | 127.5 | 56.7 | 29.6 | 20.0 | 13.6 | 6.9 | 26.8 | 23.6 | 23.7 |
| **-0.10** | 1.4 | 2.7 | 0.5 | 300.9 | 184.1 | 239.4 | 228.8 | 127.0 | 50.5 | 27.8 | 15.2 | 9.5 | 5.4 | 24.2 | 21.2 | 20.8 |
| **-0.20** | 1.5 | 2.6 | 0.5 | 303.3 | 180.5 | 228.5 | 214.9 | 120.5 | 40.2 | 25.1 | 9.2 | 5.7 | 3.6 | 18.6 | 16.7 | 16.0 |
| **-0.30** | 1.5 | 2.5 | 0.5 | 301.7 | 184.7 | 212.9 | 200.8 | 113.1 | 33.5 | 22.1 | 5.0 | 3.4 | 2.3 | 9.3 | 9.4 | 9.4 |
| **-0.40** | 1.4 | 2.3 | 0.5 | 296.3 | 177.1 | 198.0 | 181.2 | 101.6 | 24.0 | 18.1 | 2.7 | 2.0 | 1.4 | 4.4 | 4.8 | 4.9 |
| **-0.50** | 1.4 | 2.1 | 0.5 | 281.6 | 177.2 | 172.6 | 158.7 | 90.7 | 17.7 | 13.4 | 1.6 | 1.2 | 0.9 | 2.5 | 2.6 | 2.6 |
| **-0.60** | 1.4 | 1.9 | 0.5 | 258.3 | 166.4 | 146.3 | 130.8 | 63.7 | 11.2 | 8.1 | 1.2 | 0.9 | 0.7 | 1.6 | 1.7 | 1.7 |
| **-0.70** | 1.4 | 1.8 | 0.5 | 231.3 | 158.7 | 116.7 | 101.6 | 29.0 | 7.6 | 5.2 | 0.9 | 0.7 | 0.5 | 1.2 | 1.2 | 1.3 |
| **-0.76** | 1.4 | 1.6 | 0.5 | 231.3 | 158.7 | 116.7 | 100.5 | 14.5 | 5.1 | 3.6 | 0.9 | 0.7 | 0.5 | 1.2 | 1.2 | 1.3 |

*Table 131. The 2022 Tesla Model 3 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 473.0 | 170.8 | 13.0 | 21.7 | 20.8 | 33.5 | - | - | - | - | - | - | - |
| **0.70** | 479.4 | 142.3 | 13.6 | 23.0 | 21.9 | 34.5 | - | - | - | - | - | - | - |
| **0.60** | 491.3 | 121.0 | 14.1 | 24.4 | 23.1 | 36.0 | - | - | - | - | - | - | - |
| **0.50** | 478.3 | 93.5 | 14.8 | 25.9 | 24.1 | 37.6 | - | - | - | - | - | - | - |
| **0.40** | 469.8 | 84.4 | 15.4 | 27.5 | 25.5 | 38.8 | - | - | - | - | - | - | - |
| **0.30** | 433.6 | 75.1 | 16.5 | 29.3 | 26.7 | 40.3 | - | - | - | - | - | - | - |
| **0.20** | 395.9 | 62.0 | 17.1 | 30.6 | 27.9 | 41.7 | - | - | - | - | - | - | - |
| **0.10** | 279.3 | 43.7 | 18.3 | 32.3 | 28.8 | 43.4 | 48.9 | 39.3 | 30.5 | 30.4 | - | | - |
| **0.00** | 126.9 | 28.3 | 19.0 | 34.1 | 30.3 | 44.7 | 50.7 | 41.5 | 31.4 | 31.6 | - | - | - |
| **-0.10** | 67.5 | 18.3 | 20.1 | 36.4 | 31.5 | 46.5 | 52.9 | 43.6 | 33.0 | 32.8 | - | - | - |
| **-0.20** | 40.5 | 12.6 | 20.6 | 38.9 | 33.2 | 48.1 | 55.1 | 45.7 | 33.9 | 33.8 | - | - | - |
| **-0.30** | 27.8 | 9.6 | 22.2 | 42.6 | 34.7 | 50.7 | 57.3 | 48.1 | 35.2 | 35.2 | - | - | - |
| **-0.40** | 20.1 | 8.0 | 22.9 | 45.9 | 36.9 | 52.6 | 60.0 | 49.9 | 36.2 | 36.4 | - | - | - |
| **-0.50** | 15.8 | 6.9 | 24.5 | 50.7 | 38.8 | 54.6 | 62.7 | 52.2 | 37.9 | 37.8 | - | - | - |
| **-0.60** | 12.6 | 6.2 | 25.3 | 53.9 | 41.3 | 57.2 | 65.2 | 54.2 | 38.8 | 39.3 | - | - | - |
| **-0.70** | 10.7 | 5.7 | 26.2 | 57.6 | 42.6 | 59.9 | 67.1 | 56.5 | 40.2 | 41.1 | - | - | - |
| **-0.76** | 9.1 | 5.3 | 26.1 | 59.3 | 44.3 | 63.1 | 69.7 | 58.4 | 41.1 | 42.6 | - | - | - |

*Table 132. The 2022 Toyota Camry Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.1 | 1.2 | 0.5 | 4.3 | 4.6 | 3.5 | 1.6 | 3.2 | 1.9 | 1.6 | 8.7 | 4.6 | 3.4 | 32.4 | 34.1 | 32.8 |
| **0.70** | 1.1 | 1.2 | 0.5 | 4.2 | 4.5 | 3.5 | 1.6 | 2.7 | 1.8 | 1.5 | 4.7 | 2.8 | 2.6 | 17.4 | 20.7 | 20.8 |
| **0.60** | 1.1 | 1.2 | 0.5 | 4.2 | 4.4 | 3.4 | 1.6 | 2.4 | 1.7 | 1.3 | 2.9 | 1.8 | 1.6 | 8.0 | 9.6 | 10.0 |
| **0.50** | 1.0 | 1.1 | 0.5 | 4.1 | 4.2 | 3.3 | 1.6 | 2.1 | 1.5 | 1.2 | 1.9 | 1.3 | 1.1 | 4.7 | 5.3 | 5.5 |
| **0.40** | 0.9 | 1.0 | 0.5 | 4.1 | 4.1 | 3.2 | 1.5 | 2.0 | 1.5 | 1.2 | 1.4 | 1.0 | 0.8 | 3.0 | 3.4 | 3.5 |
| **0.30** | 0.9 | 1.0 | 0.5 | 4.0 | 4.0 | 3.1 | 1.5 | 1.9 | 1.5 | 1.1 | 1.1 | 0.8 | 0.7 | 2.2 | 2.4 | 2.5 |
| **0.20** | 0.9 | 1.0 | 0.5 | 4.0 | 3.9 | 3.0 | 1.5 | 1.8 | 1.5 | 1.1 | 0.9 | 0.7 | 0.6 | 1.6 | 1.8 | 1.8 |
| **0.10** | 0.8 | 0.9 | 0.5 | 4.0 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.1 | 0.8 | 0.6 | 0.5 | 1.3 | 1.3 | 1.4 |
| **0.00** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |
| **-0.10** | 0.7 | 0.8 | 0.5 | 3.9 | 3.9 | 3.1 | 1.5 | 1.8 | 1.4 | 1.0 | 0.6 | 0.5 | 0.4 | 0.9 | 0.9 | 0.9 |
| **-0.20** | 0.6 | 0.8 | 0.5 | 3.9 | 3.9 | 3.0 | 1.5 | 1.8 | 1.4 | 1.0 | 0.5 | 0.4 | 0.4 | 0.7 | 0.8 | 0.8 |
| **-0.30** | 0.6 | 0.7 | 0.5 | 3.9 | 3.8 | 3.0 | 1.5 | 1.8 | 1.5 | 1.0 | 0.5 | 0.4 | 0.4 | 0.7 | 0.7 | 0.7 |
| **-0.40** | 0.6 | 0.7 | 0.5 | 3.9 | 3.8 | 3.0 | 1.4 | 1.7 | 1.4 | 1.0 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.50** | 0.5 | 0.6 | 0.5 | 3.8 | 3.8 | 3.0 | 1.4 | 1.7 | 1.4 | 1.0 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 |
| **-0.60** | - | - | 0.5 | 3.7 | 3.6 | 2.8 | 1.4 | 1.7 | 1.4 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.70** | - | - | 0.5 | 3.6 | 3.5 | 2.8 | 1.3 | 1.7 | 1.5 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |
| **-0.76** | - | - | 0.5 | 3.5 | 3.4 | 2.7 | 1.3 | 1.7 | 1.5 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 |

*Table 133. The 2022 Toyota Camry Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 490.1 | 172.1 | 27.1 | 44.7 | 35.4 | 104.6 | 84.2 | 90.3 | 55.2 | 56.2 | 282.8 | 110.3 | 108.1 |
| **0.70** | 507.9 | 147.8 | 29.8 | 48.1 | 36.7 | 110.6 | 84.6 | 92.5 | 55.2 | 56.4 | 286.7 | 110.3 | 108.1 |
| **0.60** | 498.6 | 124.8 | 32.3 | 51.9 | 36.9 | 117.5 | 84.5 | 95.4 | 55.0 | 56.4 | 300.4 | 113.0 | 110.9 |
| **0.50** | 490.9 | 111.3 | 35.2 | 56.7 | 36.3 | 125.7 | 85.3 | 97.7 | 55.2 | 55.7 | 312.7 | 115.5 | 113.6 |
| **0.40** | 455.7 | 101.4 | 37.2 | 61.0 | 34.0 | 134.8 | 85.4 | 100.3 | 55.2 | 55.9 | 327.6 | 118.9 | 116.6 |
| **0.30** | 417.3 | 95.3 | 39.2 | 66.2 | 31.4 | 145.5 | 86.0 | 102.3 | 55.0 | 54.9 | 341.2 | 120.9 | 120.1 |
| **0.20** | 336.9 | 80.2 | 39.8 | 69.8 | 27.4 | 158.3 | 86.0 | 105.8 | 54.4 | 54.7 | 355.0 | 125.0 | 122.8 |
| **0.10** | 204.1 | 57.8 | 40.1 | 72.2 | 24.0 | 172.9 | 87.3 | 109.1 | 54.0 | 53.7 | 371.6 | 127.1 | 126.6 |
| **0.00** | 97.0 | 34.9 | 39.3 | 72.0 | 20.0 | 185.9 | 87.3 | 113.7 | 53.2 | 53.5 | 386.7 | 131.0 | 129.5 |
| **-0.10** | 57.3 | 21.8 | 38.2 | 70.8 | 16.9 | 198.7 | 89.1 | 117.5 | 52.4 | 53.1 | 402.0 | 132.9 | 133.0 |
| **-0.20** | 38.8 | 15.3 | 34.5 | 67.4 | 12.6 | 208.8 | 90.5 | 122.7 | 51.2 | 52.9 | 417.4 | 137.7 | 135.4 |
| **-0.30** | 28.6 | 11.9 | 26.9 | 62.5 | 9.7 | 217.4 | 91.6 | 125.6 | 50.3 | 52.2 | 433.1 | 139.8 | 139.6 |
| **-0.40** | 22.2 | 10.0 | 14.8 | 52.9 | 7.3 | 222.0 | 90.9 | 131.2 | 48.5 | 52.3 | 446.1 | 143.6 | 142.0 |
| **-0.50** | 17.6 | 8.5 | 6.7 | 35.3 | 5.7 | 223.5 | 88.9 | 133.5 | 46.3 | 51.5 | 465.1 | 146.2 | 145.2 |
| **-0.60** | 14.9 | 7.5 | 3.8 | 18.2 | 3.9 | 217.9 | 84.7 | 140.4 | 43.5 | 50.9 | 479.3 | 148.6 | 146.1 |
| **-0.70** | 12.5 | 6.6 | 2.4 | 9.3 | 2.5 | 209.5 | 79.2 | 143.1 | 41.4 | 49.0 | 497.3 | 149.3 | 148.9 |
| **-0.76** | 11.0 | 6.1 | 2.4 | 5.6 | 1.7 | 209.5 | 71.1 | 149.9 | 38.7 | 47.2 | 513.2 | 150.4 | 149.5 |

*Table 134. The 2022 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.6 | 1.8 | 0.6 | 107.3 | 152.1 | 109.5 | 21.6 | 94.1 | 22.2 | 22.7 | 27.6 | 16.9 | 7.7 | 50.1 | 50.1 | 48.5 |
| **0.70** | 1.5 | 1.7 | 0.5 | 107.3 | 152.1 | 109.5 | 21.6 | 77.1 | 15.4 | 17.4 | 27.6 | 16.9 | 7.7 | 50.1 | 50.1 | 48.5 |
| **0.60** | 1.5 | 1.7 | 0.5 | 58.6 | 77.4 | 60.4 | 11.9 | 48.8 | 10.7 | 11.2 | 23.4 | 13.6 | 6.4 | 48.8 | 49.4 | 47.5 |
| **0.50** | 1.5 | 1.6 | 0.5 | 33.4 | 42.6 | 32.3 | 7.2 | 22.7 | 7.4 | 6.7 | 19.7 | 10.6 | 5.4 | 47.2 | 47.4 | 45.8 |
| **0.40** | 1.4 | 1.6 | 0.5 | 21.6 | 26.7 | 21.3 | 5.2 | 13.1 | 5.3 | 4.5 | 13.7 | 6.9 | 4.3 | 42.1 | 43.2 | 41.2 |
| **0.30** | 1.4 | 1.6 | 0.5 | 15.8 | 19.0 | 15.2 | 4.0 | 8.5 | 3.8 | 3.4 | 8.7 | 4.6 | 3.4 | 32.4 | 34.1 | 32.8 |
| **0.20** | 1.4 | 1.5 | 0.5 | 12.1 | 13.9 | 11.5 | 3.3 | 6.1 | 2.9 | 2.7 | 4.7 | 2.8 | 2.6 | 17.4 | 20.7 | 20.8 |
| **0.10** | 1.3 | 1.5 | 0.5 | 9.6 | 10.8 | 8.8 | 2.7 | 4.8 | 2.5 | 2.2 | 2.9 | 1.8 | 1.6 | 8.0 | 9.6 | 10.0 |
| **0.00** | 1.3 | 1.4 | 0.5 | 7.8 | 8.7 | 7.0 | 2.4 | 3.8 | 2.2 | 1.9 | 1.9 | 1.3 | 1.1 | 4.7 | 5.3 | 5.5 |
| **-0.10** | 1.3 | 1.4 | 0.5 | 6.6 | 7.2 | 5.7 | 2.1 | 3.2 | 2.0 | 1.6 | 1.4 | 1.0 | 0.8 | 3.0 | 3.4 | 3.5 |
| **-0.20** | 1.2 | 1.3 | 0.5 | 5.7 | 6.2 | 5.0 | 2.0 | 2.7 | 1.8 | 1.5 | 1.1 | 0.8 | 0.7 | 2.2 | 2.4 | 2.5 |
| **-0.30** | 1.1 | 1.3 | 0.5 | 5.2 | 5.6 | 4.4 | 1.8 | 2.4 | 1.7 | 1.3 | 0.9 | 0.7 | 0.6 | 1.6 | 1.8 | 1.8 |
| **-0.40** | 1.1 | 1.2 | 0.5 | 4.8 | 5.2 | 4.1 | 1.8 | 2.1 | 1.6 | 1.2 | 0.8 | 0.6 | 0.5 | 1.3 | 1.3 | 1.4 |
| **-0.50** | 1.1 | 1.2 | 0.5 | 4.5 | 4.8 | 3.8 | 1.7 | 2.0 | 1.5 | 1.2 | 0.7 | 0.5 | 0.5 | 1.0 | 1.1 | 1.1 |
| **-0.60** | 1.0 | 1.1 | 0.5 | 4.3 | 4.6 | 3.6 | 1.7 | 1.9 | 1.5 | 1.1 | 0.6 | 0.5 | 0.4 | 0.9 | 0.9 | 0.9 |
| **-0.70** | 0.9 | 1.0 | 0.5 | 4.2 | 4.5 | 3.5 | 1.6 | 1.8 | 1.5 | 1.1 | 0.5 | 0.4 | 0.4 | 0.7 | 0.8 | 0.8 |
| **-0.76** | 0.9 | 1.0 | 0.5 | 4.2 | 4.4 | 3.4 | 1.6 | 1.8 | 1.5 | 1.1 | 0.5 | 0.4 | 0.4 | 0.7 | 0.7 | 0.7 |

*Table 135. The 2022 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 490.1 | 172.1 | 20.0 | 33.9 | 28.1 | 64.0 | 63.4 | 63.9 | 40.6 | 40.8 | - | - | - |
| **0.70** | 507.9 | 147.8 | 21.5 | 33.9 | 28.1 | 64.0 | 64.4 | 64.6 | 41.8 | 41.9 | - | - | - |
| **0.60** | 498.6 | 124.8 | 23.1 | 35.4 | 29.3 | 66.8 | 66.3 | 66.1 | 43.1 | 43.1 | - | - | - |
| **0.50** | 490.9 | 111.3 | 25.0 | 37.3 | 30.8 | 70.1 | 68.3 | 67.5 | 44.1 | 44.2 | - | - | - |
| **0.40** | 455.7 | 101.4 | 27.1 | 39.3 | 32.2 | 73.1 | 69.8 | 69.3 | 45.4 | 45.4 | - | - | - |
| **0.30** | 417.3 | 95.3 | 29.8 | 41.9 | 34.1 | 76.7 | 71.0 | 70.6 | 46.6 | 46.6 | - | - | - |
| **0.20** | 336.9 | 80.2 | 32.3 | 44.7 | 35.4 | 80.8 | 72.3 | 72.2 | 47.8 | 47.7 | - | - | - |
| **0.10** | 204.1 | 57.8 | 35.2 | 48.1 | 36.7 | 84.7 | 74.0 | 74.2 | 48.9 | 49.2 | - | - | - |
| **0.00** | 97.0 | 34.9 | 37.2 | 51.9 | 36.9 | 89.0 | 75.5 | 76.8 | 50.1 | 50.5 | - | - | - |
| **-0.10** | 57.3 | 21.8 | 39.2 | 56.7 | 36.3 | 94.0 | 77.2 | 79.6 | 50.8 | 51.8 | - | - | - |
| **-0.20** | 38.8 | 15.3 | 39.8 | 61.0 | 34.0 | 99.0 | 79.1 | 81.8 | 52.3 | 53.1 | - | - | - |
| **-0.30** | 28.6 | 11.9 | 40.1 | 66.2 | 31.4 | 104.5 | 81.0 | 84.2 | 53.3 | 54.1 | - | - | - |
| **-0.40** | 22.2 | 10.0 | 39.3 | 69.8 | 27.4 | 110.5 | 82.4 | 85.9 | 54.0 | 55.1 | - | - | - |
| **-0.50** | 17.6 | 8.5 | 38.2 | 72.2 | 24.0 | 117.4 | 83.7 | 87.6 | 54.4 | 55.8 | 151.4 | - | - |
| **-0.60** | 14.9 | 7.5 | 34.4 | 72.0 | 20.0 | 125.6 | 84.0 | 90.2 | 55.1 | 56.1 | 158.7 | - | - |
| **-0.70** | 12.5 | 6.6 | 26.9 | 70.8 | 16.9 | 134.7 | 84.1 | 92.4 | 55.1 | 56.6 | 166.2 | 67.6 | 71.0 |
| **-0.76** | 11.0 | 6.1 | 26.9 | 67.4 | 12.6 | 145.3 | 84.3 | 95.3 | 54.9 | 56.3 | 170.3 | 69.5 | 73.3 |

*Table 136. The 2022 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.6 | 1.9 | 0.8 | 277.3 | 254.8 | 189.9 | 58.3 | 111.0 | 72.1 | 37.5 | 33.5 | 26.0 | 15.1 | 43.7 | 44.7 | 43.2 |
| **0.70** | 1.6 | 1.9 | 0.8 | 277.3 | 254.8 | 189.9 | 58.3 | 112.8 | 67.9 | 37.1 | 33.5 | 26.0 | 15.1 | 43.7 | 44.7 | 43.2 |
| **0.60** | 1.6 | 1.8 | 0.7 | 297.1 | 277.6 | 196.7 | 57.7 | 116.8 | 63.6 | 36.9 | 33.1 | 24.1 | 13.2 | 46.4 | 47.2 | 45.5 |
| **0.50** | 1.6 | 1.8 | 0.7 | 311.1 | 297.6 | 207.3 | 57.8 | 117.0 | 56.9 | 35.1 | 32.9 | 22.3 | 11.2 | 48.8 | 48.9 | 47.2 |
| **0.40** | 1.6 | 1.8 | 0.6 | 324.4 | 317.2 | 215.2 | 56.9 | 117.2 | 51.5 | 33.5 | 30.4 | 19.5 | 9.2 | 49.6 | 50.3 | 48.4 |
| **0.30** | 1.6 | 1.8 | 0.6 | 330.2 | 332.3 | 227.1 | 56.4 | 113.7 | 45.0 | 31.2 | 27.6 | 16.9 | 7.7 | 50.1 | 50.1 | 48.5 |
| **0.20** | 1.6 | 1.8 | 0.5 | 333.9 | 344.4 | 231.3 | 54.0 | 108.6 | 38.5 | 29.0 | 23.4 | 13.6 | 6.4 | 48.8 | 49.4 | 47.5 |
| **0.10** | 1.6 | 1.8 | 0.5 | 331.5 | 353.8 | 236.8 | 52.3 | 99.6 | 30.0 | 26.6 | 19.7 | 10.6 | 5.4 | 47.2 | 47.4 | 45.8 |
| **0.00** | 1.6 | 1.8 | 0.5 | 319.4 | 357.9 | 234.9 | 49.1 | 94.1 | 22.2 | 22.7 | 13.7 | 6.9 | 4.3 | 42.1 | 43.2 | 41.2 |
| **-0.10** | 1.6 | 1.8 | 0.5 | 296.6 | 356.0 | 231.3 | 46.2 | 77.1 | 15.4 | 17.4 | 8.7 | 4.6 | 3.4 | 32.4 | 34.1 | 32.8 |
| **-0.20** | 1.6 | 1.8 | 0.5 | 263.8 | 344.4 | 219.2 | 41.8 | 48.8 | 10.7 | 11.2 | 4.7 | 2.8 | 2.6 | 17.4 | 20.7 | 20.8 |
| **-0.30** | 1.5 | 1.7 | 0.5 | 215.8 | 311.1 | 199.4 | 37.8 | 22.7 | 7.4 | 6.7 | 2.9 | 1.8 | 1.6 | 8.0 | 9.6 | 10.0 |
| **-0.40** | 1.5 | 1.6 | 0.5 | 158.8 | 251.7 | 157.2 | 31.3 | 13.1 | 5.3 | 4.5 | 1.9 | 1.3 | 1.1 | 4.7 | 5.3 | 5.5 |
| **-0.50** | 1.5 | 1.6 | 0.5 | 107.3 | 152.1 | 109.5 | 21.6 | 8.5 | 3.8 | 3.4 | 1.4 | 1.0 | 0.8 | 3.0 | 3.4 | 3.5 |
| **-0.60** | 1.4 | 1.6 | 0.5 | 58.6 | 77.4 | 60.4 | 11.9 | 6.1 | 2.9 | 2.7 | 1.1 | 0.8 | 0.7 | 2.2 | 2.4 | 2.5 |
| **-0.70** | 1.4 | 1.6 | 0.5 | 33.4 | 42.6 | 32.3 | 7.2 | 4.8 | 2.5 | 2.2 | 0.9 | 0.7 | 0.6 | 1.6 | 1.8 | 1.8 |
| **-0.76** | 1.3 | 1.5 | 0.5 | 21.6 | 26.7 | 21.3 | 5.2 | 4.6 | 2.3 | 2.0 | 0.8 | 0.6 | 0.5 | 1.3 | 1.3 | 1.4 |

*Table 137. The 2022 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 490.1 | 172.1 | 16.8 | 25.3 | 21.3 | 41.2 | 38.2 | 39.7 | 26.9 | 28.1 | - | - | - |
| **0.70** | 507.9 | 147.8 | 16.8 | 26.3 | 22.1 | 41.9 | 39.1 | 40.6 | 26.9 | 28.1 | - | - | - |
| **0.60** | 498.6 | 124.8 | 17.8 | 27.7 | 23.0 | 43.8 | 41.5 | 42.3 | 28.0 | 29.1 | - | - | - |
| **0.50** | 490.9 | 111.3 | 18.8 | 29.1 | 24.1 | 45.3 | 43.7 | 44.3 | 29.2 | 30.4 | - | - | - |
| **0.40** | 455.7 | 101.4 | 20.0 | 30.6 | 25.4 | 48.0 | 45.9 | 46.3 | 30.7 | 31.3 | - | - | - |
| **0.30** | 417.3 | 95.3 | 21.5 | 32.1 | 26.6 | 50.3 | 47.9 | 48.4 | 31.8 | 32.6 | - | - | - |
| **0.20** | 336.9 | 80.2 | 23.1 | 33.9 | 28.1 | 52.9 | 49.8 | 50.8 | 32.9 | 33.6 | - | - | - |
| **0.10** | 204.1 | 57.8 | 25.0 | 35.3 | 29.3 | 56.0 | 52.2 | 52.8 | 34.1 | 34.9 | - | - | - |
| **0.00** | 97.0 | 34.9 | 27.1 | 37.3 | 30.8 | 59.1 | 54.3 | 54.8 | 35.7 | 36.1 | - | - | - |
| **-0.10** | 57.3 | 21.8 | 29.8 | 39.3 | 32.2 | 62.4 | 56.3 | 56.7 | 36.8 | 37.4 | - | - | - |
| **-0.20** | 38.8 | 15.3 | 32.3 | 41.9 | 34.1 | 65.1 | 58.5 | 58.4 | 38.1 | 38.3 | - | - | - |
| **-0.30** | 28.6 | 11.9 | 35.2 | 44.7 | 35.4 | 68.3 | 60.2 | 60.4 | 39.3 | 39.5 | - | - | - |
| **-0.40** | 22.2 | 10.0 | 37.2 | 48.1 | 36.7 | 71.4 | 62.1 | 62.6 | 40.5 | 40.7 | - | - | - |
| **-0.50** | 17.6 | 8.5 | 39.2 | 51.9 | 36.9 | 75.0 | 64.3 | 64.4 | 41.7 | 41.8 | - | - | - |
| **-0.60** | 14.9 | 7.5 | 39.8 | 56.7 | 36.2 | 78.3 | 66.1 | 66.0 | 43.0 | 43.0 | - | - | - |
| **-0.70** | 12.5 | 6.6 | 40.1 | 61.0 | 34.0 | 83.0 | 68.2 | 67.4 | 43.9 | 44.1 | - | - | - |
| **-0.76** | 11.0 | 6.1 | 39.3 | 66.1 | 31.3 | 84.6 | 69.6 | 69.2 | 45.2 | 45.3 | - | - | - |

*Table 138. The 2022 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.7 | 2.2 | 1.5 | 187.0 | 171.3 | 137.7 | 61.2 | 94.5 | 69.5 | 36.6 | 31.7 | 27.4 | 17.5 | 37.0 | 38.7 | 38.1 |
| **0.70** | 1.7 | 2.1 | 1.1 | 187.0 | 171.3 | 137.7 | 60.8 | 99.1 | 71.7 | 36.3 | 31.7 | 27.4 | 17.5 | 37.0 | 38.7 | 38.1 |
| **0.60** | 1.7 | 2.1 | 0.9 | 198.3 | 179.9 | 144.1 | 59.9 | 104.4 | 73.7 | 36.6 | 32.4 | 26.8 | 16.4 | 40.2 | 41.8 | 40.5 |
| **0.50** | 1.6 | 2.0 | 0.8 | 210.0 | 190.6 | 152.9 | 59.8 | 107.3 | 73.3 | 36.9 | 33.5 | 26.0 | 15.1 | 43.7 | 44.7 | 43.2 |
| **0.40** | 1.6 | 2.0 | 0.7 | 223.8 | 203.0 | 160.5 | 58.9 | 111.0 | 72.1 | 37.5 | 33.1 | 24.1 | 13.2 | 46.4 | 47.2 | 45.5 |
| **0.30** | 1.6 | 1.9 | 0.7 | 239.0 | 218.0 | 171.1 | 58.4 | 112.8 | 67.9 | 37.1 | 32.9 | 22.3 | 11.2 | 48.8 | 48.9 | 47.2 |
| **0.20** | 1.6 | 1.9 | 0.6 | 257.6 | 235.0 | 179.5 | 58.1 | 116.8 | 63.6 | 36.9 | 30.4 | 19.5 | 9.2 | 49.6 | 50.3 | 48.4 |
| **0.10** | 1.6 | 1.8 | 0.6 | 277.3 | 254.7 | 189.9 | 57.8 | 117.0 | 56.9 | 35.1 | 27.6 | 16.9 | 7.7 | 50.1 | 50.1 | 48.5 |
| **0.00** | 1.6 | 1.8 | 0.5 | 297.0 | 277.5 | 196.6 | 57.2 | 117.2 | 51.5 | 33.5 | 23.4 | 13.6 | 6.4 | 48.8 | 49.4 | 47.5 |
| **-0.10** | 1.6 | 1.8 | 0.5 | 311.0 | 297.5 | 207.3 | 56.9 | 113.7 | 45.0 | 31.2 | 19.7 | 10.6 | 5.4 | 47.2 | 47.4 | 45.8 |
| **-0.20** | 1.6 | 1.8 | 0.5 | 324.3 | 317.1 | 215.1 | 56.1 | 108.6 | 38.5 | 29.0 | 13.7 | 6.9 | 4.3 | 42.1 | 43.2 | 41.2 |
| **-0.30** | 1.6 | 1.8 | 0.5 | 330.1 | 332.2 | 227.1 | 55.4 | 99.6 | 30.0 | 26.6 | 8.7 | 4.6 | 3.4 | 32.4 | 34.1 | 32.8 |
| **-0.40** | 1.6 | 1.8 | 0.5 | 333.8 | 344.3 | 231.2 | 53.1 | 94.1 | 22.2 | 22.7 | 4.7 | 2.8 | 2.6 | 17.4 | 20.7 | 20.8 |
| **-0.50** | 1.6 | 1.8 | 0.5 | 331.4 | 353.7 | 236.8 | 51.2 | 77.1 | 15.4 | 17.4 | 2.9 | 1.8 | 1.6 | 8.0 | 9.6 | 10.0 |
| **-0.60** | 1.6 | 1.8 | 0.5 | 319.3 | 357.8 | 234.8 | 48.0 | 48.7 | 10.7 | 11.2 | 1.9 | 1.3 | 1.1 | 4.7 | 5.3 | 5.5 |
| **-0.70** | 1.5 | 1.7 | 0.5 | 296.5 | 355.9 | 231.3 | 44.8 | 22.7 | 7.4 | 6.7 | 1.4 | 1.0 | 0.8 | 3.0 | 3.4 | 3.5 |
| **-0.76** | 1.5 | 1.7 | 0.5 | 263.8 | 344.3 | 219.1 | 41.8 | 13.1 | 5.3 | 5.4 | 1.1 | 0.8 | 0.7 | 2.2 | 2.4 | 2.5 |

*Table 139. The 2022 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 490.1 | 172.1 | 15.1 | 23.0 | 19.8 | 34.0 | - | - | - | - | - | - | - |
| **0.70** | 507.9 | 147.8 | 15.1 | 24.1 | 20.5 | 34.6 | - | - | - | - | - | - | - |
| **0.60** | 498.6 | 124.8 | 16.0 | 25.3 | 21.3 | 35.9 | - | - | - | - | - | - | - |
| **0.50** | 490.9 | 111.3 | 16.8 | 26.3 | 22.1 | 37.7 | - | - | - | - | - | - | - |
| **0.40** | 455.7 | 101.4 | 17.8 | 27.7 | 23.0 | 39.5 | 34.0 | 35.9 | 23.1 | 24.6 | - | - | - |
| **0.30** | 417.3 | 95.3 | 18.8 | 29.1 | 24.0 | 41.2 | 36.3 | 37.8 | 24.3 | 25.7 | - | - | - |
| **0.20** | 336.9 | 80.2 | 20.0 | 30.6 | 25.4 | 43.1 | 38.2 | 39.6 | 25.6 | 26.9 | - | - | - |
| **0.10** | 204.1 | 57.8 | 21.4 | 32.1 | 26.5 | 44.6 | 40.5 | 41.4 | 26.8 | 28.1 | - | - | - |
| **0.00** | 97.0 | 34.9 | 23.1 | 33.9 | 28.1 | 46.8 | 42.5 | 43.2 | 28.0 | 29.1 | - | - | - |
| **-0.10** | 57.3 | 21.8 | 25.0 | 35.3 | 29.3 | 49.4 | 44.9 | 45.3 | 29.2 | 30.3 | - | - | - |
| **-0.20** | 38.8 | 15.3 | 27.1 | 37.3 | 30.8 | 51.8 | 47.0 | 47.5 | 30.6 | 31.3 | - | - | - |
| **-0.30** | 28.6 | 11.9 | 29.8 | 39.3 | 32.2 | 54.6 | 49.0 | 49.5 | 31.8 | 32.5 | - | - | - |
| **-0.40** | 22.2 | 10.0 | 32.3 | 41.9 | 34.1 | 57.6 | 51.0 | 51.9 | 32.9 | 33.5 | - | - | - |
| **-0.50** | 17.6 | 8.5 | 35.2 | 44.7 | 35.3 | 61.0 | 53.5 | 53.7 | 34.0 | 34.8 | - | - | - |
| **-0.60** | 14.9 | 7.5 | 37.2 | 48.1 | 36.7 | 63.9 | 55.4 | 55.8 | 35.6 | 36.0 | - | - | - |
| **-0.70** | 12.5 | 6.6 | 39.2 | 51.9 | 36.9 | 66.7 | 57.6 | 57.6 | 36.8 | 37.3 | - | - | - |
| **-0.76** | 11.0 | 6.1 | 39.8 | 51.9 | 36.9 | 70.0 | 58.4 | 58.3 | 38.0 | 38.3 | - | - | |

*Table 140. The 2018 Ford F-150 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.8 | 0.8 | 0.4 | 2.9 | 2.8 | 2.4 | 1.6 | 2.6 | 2.0 | 1.6 | 4.9 | 4.1 | 2.3 | 10.6 | 11.2 | 9.8 |
| **0.70** | 0.8 | 0.8 | 0.4 | 2.7 | 2.7 | 2.3 | 1.4 | 2.6 | 2.0 | 1.6 | 3.7 | 3.1 | 1.8 | 7.8 | 8.1 | 7.2 |
| **0.60** | 0.8 | 0.8 | 0.4 | 2.6 | 2.6 | 2.2 | 1.4 | 2.1 | 1.7 | 1.4 | 2.5 | 2.2 | 1.3 | 4.7 | 4.8 | 4.5 |
| **0.50** | 0.8 | 0.8 | 0.4 | 2.5 | 2.5 | 2.2 | 1.3 | 1.7 | 1.4 | 1.2 | 1.7 | 1.5 | 1.0 | 2.5 | 2.5 | 2.5 |
| **0.40** | 0.8 | 0.7 | 0.4 | 2.5 | 2.5 | 2.1 | 1.3 | 1.5 | 1.3 | 1.1 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| **0.30** | 0.8 | 0.7 | 0.4 | 2.4 | 2.4 | 2.1 | 1.2 | 1.3 | 1.2 | 1.0 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **0.20** | 0.7 | 0.7 | 0.4 | 2.4 | 2.4 | 2.0 | 1.2 | 1.2 | 1.1 | 0.9 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **0.10** | 0.7 | 0.7 | 0.4 | 2.3 | 2.4 | 1.9 | 1.2 | 1.1 | 1.0 | 0.9 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| **0.00** | 0.7 | 0.7 | 0.4 | 2.3 | 2.3 | 1.9 | 1.1 | 1.1 | 0.9 | 0.9 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 |
| **-0.10** | 0.7 | 0.7 | 0.3 | 2.2 | 2.3 | 1.9 | 1.1 | 1.0 | 0.9 | 0.8 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.20** | 0.7 | 0.7 | 0.3 | 2.1 | 2.3 | 1.8 | 1.1 | 1.0 | 0.9 | 0.8 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.30** | 0.7 | 0.7 | 0.3 | 2.1 | 2.3 | 1.8 | 1.0 | 1.0 | 0.9 | 0.8 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.40** | 0.7 | 0.7 | 0.3 | 2.1 | 2.2 | 1.7 | 1.0 | 0.9 | 0.8 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| **-0.50** | 0.6 | 0.6 | 0.3 | 2.0 | 2.1 | 1.7 | 1.0 | 0.9 | 0.8 | 0.7 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 |
| **-0.60** | 0.6 | 0.6 | 0.3 | 2.0 | 2.0 | 1.6 | 1.0 | 0.9 | 0.8 | 0.7 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 |
| **-0.70** | 0.6 | 0.6 | 0.3 | 1.9 | 1.9 | 1.5 | 1.0 | 0.9 | 0.8 | 0.7 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 |
| **-0.76** | 0.6 | 0.6 | 0.3 | 1.9 | 1.9 | 1.5 | 0.9 | 0.8 | 0.8 | 0.7 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 |

*Table 141. The 2018 Ford F-150 Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 250.5 | 91.5 | 34.6 | 54.4 | 28.0 | 127.9 | 66.4 | 74.5 | 42.0 | 37.6 | 183.3 | 83.5 | 73.7 |
| **0.70** | 240.7 | 85.7 | 36.3 | 57.0 | 28.0 | 127.9 | 67.9 | 75.3 | 42.1 | 37.5 | 187.7 | 86.9 | 76.5 |
| **0.60** | 222.2 | 77.9 | 37.8 | 59.0 | 28.0 | 134.9 | 70.1 | 76.5 | 41.7 | 37.2 | 193.9 | 89.1 | 79.2 |
| **0.50** | 205.2 | 70.8 | 39.2 | 61.0 | 27.7 | 143.0 | 71.9 | 76.8 | 41.6 | 36.9 | 201.7 | 93.3 | 81.5 |
| **0.40** | 183.0 | 62.5 | 39.7 | 61.7 | 27.3 | 148.5 | 73.8 | 78.4 | 41.2 | 36.4 | 210.0 | 96.2 | 83.7 |
| **0.30** | 162.3 | 54.8 | 39.5 | 62.0 | 26.4 | 157.2 | 74.4 | 78.0 | 40.7 | 35.9 | 219.5 | 100.5 | 86.7 |
| **0.20** | 133.2 | 45.8 | 37.8 | 61.7 | 25.7 | 162.7 | 74.6 | 78.8 | 40.1 | 35.3 | 230.9 | 103.6 | 89.4 |
| **0.10** | 103.4 | 37.6 | 35.7 | 60.5 | 24.1 | 170.9 | 73.8 | 78.5 | 39.6 | 34.5 | 242.4 | 108.5 | 93.1 |
| **0.00** | 70.8 | 29.2 | 32.6 | 56.8 | 22.6 | 175.4 | 72.8 | 79.6 | 38.8 | 33.6 | 256.1 | 111.4 | 96.6 |
| **-0.10** | 47.7 | 22.7 | 29.5 | 53.1 | 20.2 | 182.6 | 71.8 | 78.3 | 38.0 | 32.9 | 270.3 | 116.0 | 99.7 |
| **-0.20** | 33.2 | 18.1 | 25.4 | 47.9 | 18.1 | 185.0 | 70.4 | 78.9 | 37.0 | 31.7 | 285.8 | 118.1 | 102.0 |
| **-0.30** | 23.7 | 14.6 | 20.4 | 43.2 | 15.5 | 190.5 | 69.0 | 75.7 | 36.0 | 30.6 | 303.2 | 122.3 | 104.0 |
| **-0.40** | 17.7 | 12.1 | 15.1 | 37.8 | 13.5 | 187.7 | 67.1 | 74.5 | 34.8 | 29.3 | 321.3 | 124.9 | 106.0 |
| **-0.50** | 14.0 | 10.4 | 8.9 | 31.7 | 10.6 | 185.5 | 64.9 | 69.9 | 33.2 | 28.0 | 342.6 | 129.4 | 108.0 |
| **-0.60** | 11.6 | 9.0 | 4.9 | 24.1 | 8.1 | 174.0 | 62.7 | 68.5 | 31.5 | 26.5 | 363.4 | 131.9 | 109.2 |
| **-0.70** | 10.1 | 8.0 | 3.0 | 15.3 | 5.7 | 163.2 | 59.8 | 62.1 | 29.7 | 25.2 | 390.4 | 136.5 | 110.9 |
| **-0.76** | 8.8 | 7.3 | 3.0 | 15.3 | 5.7 | 146.6 | 58.7 | 61.2 | 29.3 | 24.8 | 392.7 | 136.6 | 110.5 |

*Table 142. The 2018 Ford F-150 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.1 | 1.0 | 0.6 | 77.7 | 72.0 | 34.7 | 6.0 | 30.9 | 15.1 | 7.5 | 9.0 | 7.9 | 4.5 | 18.5 | 20.1 | 17.7 |
| **0.70** | 1.1 | 1.0 | 0.5 | 59.7 | 52.1 | 22.6 | 5.3 | 27.0 | 13.1 | 6.6 | 8.0 | 7.0 | 3.9 | 16.8 | 18.4 | 16.0 |
| **0.60** | 1.0 | 1.0 | 0.5 | 38.4 | 33.4 | 14.1 | 4.6 | 22.2 | 10.3 | 5.6 | 7.0 | 6.1 | 3.4 | 15.1 | 16.6 | 14.2 |
| **0.50** | 1.0 | 1.0 | 0.5 | 21.6 | 19.1 | 9.1 | 4.0 | 17.1 | 8.0 | 4.6 | 6.0 | 5.2 | 2.9 | 13.1 | 14.1 | 12.0 |
| **0.40** | 1.0 | 1.0 | 0.4 | 13.2 | 11.7 | 6.7 | 3.4 | 11.3 | 5.6 | 3.6 | 4.9 | 4.1 | 2.3 | 10.6 | 11.2 | 9.8 |
| **0.30** | 1.0 | 0.9 | 0.4 | 9.0 | 7.9 | 5.3 | 2.9 | 7.2 | 4.2 | 2.9 | 3.7 | 3.1 | 1.8 | 7.8 | 8.1 | 7.2 |
| **0.20** | 1.0 | 0.9 | 0.4 | 6.6 | 5.7 | 4.3 | 2.5 | 4.9 | 3.2 | 2.3 | 2.5 | 2.2 | 1.3 | 4.7 | 4.8 | 4.5 |
| **0.10** | 0.9 | 0.9 | 0.4 | 5.3 | 4.6 | 3.7 | 2.2 | 3.4 | 2.5 | 1.9 | 1.7 | 1.5 | 1.0 | 2.5 | 2.5 | 2.5 |
| **0.00** | 0.9 | 0.9 | 0.4 | 4.2 | 3.7 | 3.2 | 2.0 | 2.6 | 2.0 | 1.6 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| **-0.10** | 0.9 | 0.8 | 0.4 | 3.6 | 3.3 | 2.9 | 1.8 | 2.1 | 1.7 | 1.4 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **-0.20** | 0.9 | 0.8 | 0.4 | 3.2 | 3.0 | 2.6 | 1.7 | 1.7 | 1.4 | 1.2 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **-0.30** | 0.8 | 0.8 | 0.4 | 2.9 | 2.8 | 2.4 | 1.6 | 1.5 | 1.3 | 1.1 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| **-0.40** | 0.8 | 0.8 | 0.4 | 2.7 | 2.7 | 2.3 | 1.4 | 1.3 | 1.2 | 1.0 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 |
| **-0.50** | 0.8 | 0.8 | 0.4 | 2.6 | 2.6 | 2.2 | 1.4 | 1.2 | 1.1 | 0.9 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| **-0.60** | 0.8 | 0.7 | 0.3 | 2.5 | 2.5 | 2.2 | 1.3 | 1.1 | 1.0 | 0.9 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.70** | 0.8 | 0.7 | 0.3 | 2.5 | 2.5 | 2.1 | 1.3 | 1.1 | 0.9 | 0.9 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **-0.76** | 0.8 | 0.7 | 0.3 | 2.5 | 2.5 | 2.1 | 1.3 | 1.1 | 0.9 | 0.9 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |

*Table 143. The 2018 Ford F-150 Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 250.5 | 91.5 | 25.8 | 37.5 | 23.3 | 49.2 | 40.5 | 40.0 | 30.0 | 26.5 | - | - | - |
| **0.70** | 240.7 | 85.7 | 27.5 | 37.5 | 23.3 | 51.0 | 41.6 | 40.6 | 30.7 | 27.1 | - | - | - |
| **0.60** | 222.2 | 77.9 | 29.5 | 39.9 | 24.4 | 55.0 | 42.8 | 41.9 | 31.2 | 28.0 | - | - | - |
| **0.50** | 205.2 | 70.8 | 31.3 | 42.3 | 25.5 | 59.3 | 44.5 | 43.2 | 32.4 | 28.7 | - | - | - |
| **0.40** | 183.0 | 62.5 | 33.0 | 44.7 | 26.4 | 63.5 | 45.9 | 44.8 | 32.7 | 29.5 | - | - | - |
| **0.30** | 162.3 | 54.8 | 34.6 | 47.1 | 27.0 | 68.5 | 47.4 | 46.4 | 33.7 | 30.5 | - | - | - |
| **0.20** | 133.2 | 45.8 | 36.3 | 49.4 | 27.5 | 73.9 | 48.7 | 48.8 | 34.1 | 31.3 | - | - | - |
| **0.10** | 103.4 | 37.6 | 37.8 | 52.1 | 27.7 | 79.9 | 50.2 | 51.1 | 35.4 | 32.1 | - | - | - |
| **0.00** | 70.8 | 29.2 | 39.2 | 54.4 | 28.0 | 86.8 | 51.8 | 54.1 | 36.1 | 33.0 | - | - | - |
| **-0.10** | 47.7 | 22.7 | 39.7 | 57.0 | 27.9 | 92.9 | 53.3 | 56.2 | 37.2 | 33.7 | - | - | - |
| **-0.20** | 33.2 | 18.1 | 39.4 | 58.9 | 28.0 | 99.1 | 54.6 | 58.8 | 37.7 | 34.5 | - | - | - |
| **-0.30** | 23.7 | 14.6 | 37.8 | 60.9 | 27.7 | 105.7 | 56.4 | 60.6 | 39.0 | 35.3 | - | - | - |
| **-0.40** | 17.7 | 12.1 | 35.7 | 61.7 | 27.3 | 113.7 | 58.2 | 63.2 | 39.9 | 36.0 | - | - | - |
| **-0.50** | 14.0 | 10.4 | 32.6 | 62.0 | 26.4 | 122.1 | 59.6 | 64.9 | 41.0 | 36.7 | - | - | - |
| **-0.60** | 11.6 | 9.0 | 29.5 | 61.6 | 25.7 | 130.6 | 61.5 | 67.3 | 41.5 | 37.1 | - | - | - |
| **-0.70** | 10.1 | 8.0 | 25.4 | 60.5 | 24.1 | 138.2 | 62.9 | 70.3 | 41.8 | 37.4 | - | - | - |
| **-0.76** | 8.8 | 7.3 | 25.4 | 56.8 | 22.5 | 142.7 | 62.9 | 70.5 | 41.9 | 37.6 | - | - | - |

*Table 144. The 2018 Ford F-150 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.4 | 1.3 | 0.9 | 142.7 | 151.4 | 100.2 | 15.6 | 48.8 | 25.5 | 12.5 | 11.2 | 10.0 | 5.8 | 20.9 | 22.7 | 20.8 |
| **0.70** | 1.4 | 1.2 | 0.9 | 142.7 | 151.4 | 100.2 | 15.6 | 47.7 | 24.7 | 11.8 | 10.6 | 9.4 | 5.4 | 20.8 | 22.5 | 20.2 |
| **0.60** | 1.3 | 1.2 | 0.8 | 146.4 | 160.0 | 101.4 | 14.5 | 45.3 | 23.3 | 11.0 | 9.9 | 8.7 | 5.0 | 19.7 | 21.4 | 19.1 |
| **0.50** | 1.3 | 1.2 | 0.7 | 144.2 | 159.1 | 97.5 | 13.4 | 42.4 | 21.7 | 10.2 | 9.0 | 7.9 | 4.5 | 18.5 | 20.1 | 17.7 |
| **0.40** | 1.2 | 1.2 | 0.6 | 143.2 | 156.3 | 92.0 | 12.3 | 38.7 | 19.4 | 9.3 | 8.0 | 7.0 | 3.9 | 16.8 | 18.4 | 16.0 |
| **0.30** | 1.2 | 1.1 | 0.6 | 135.7 | 144.8 | 86.6 | 11.2 | 35.0 | 17.5 | 8.4 | 7.0 | 6.1 | 3.4 | 15.1 | 16.6 | 14.2 |
| **0.20** | 1.2 | 1.1 | 0.5 | 129.8 | 133.6 | 77.9 | 10.0 | 30.9 | 15.1 | 7.5 | 6.0 | 5.2 | 2.9 | 13.1 | 14.1 | 12.0 |
| **0.10** | 1.1 | 1.1 | 0.5 | 119.3 | 119.5 | 67.9 | 8.9 | 27.0 | 13.1 | 6.6 | 4.9 | 4.1 | 2.3 | 10.6 | 11.2 | 9.8 |
| **0.00** | 1.1 | 1.1 | 0.5 | 107.8 | 106.6 | 57.3 | 7.8 | 22.2 | 10.3 | 5.6 | 3.7 | 3.1 | 1.8 | 7.8 | 8.1 | 7.2 |
| **-0.10** | 1.1 | 1.0 | 0.4 | 94.2 | 89.0 | 45.9 | 6.9 | 17.1 | 8.0 | 4.6 | 2.5 | 2.2 | 1.3 | 4.7 | 4.8 | 4.5 |
| **-0.20** | 1.1 | 1.0 | 0.4 | 77.7 | 72.0 | 34.8 | 6.0 | 11.3 | 5.6 | 3.6 | 1.7 | 1.5 | 1.0 | 2.5 | 2.5 | 2.5 |
| **-0.30** | 1.0 | 1.0 | 0.4 | 59.8 | 52.1 | 22.6 | 5.3 | 7.2 | 4.2 | 2.9 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| **-0.40** | 1.0 | 1.0 | 0.4 | 38.4 | 33.4 | 14.1 | 4.6 | 4.9 | 3.2 | 2.3 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **-0.50** | 1.0 | 0.9 | 0.4 | 21.6 | 19.1 | 9.1 | 4.0 | 3.4 | 2.5 | 1.9 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **-0.60** | 1.0 | 0.9 | 0.4 | 13.2 | 11.7 | 6.8 | 3.4 | 2.6 | 2.0 | 1.6 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |
| **-0.70** | 0.9 | 0.9 | 0.4 | 9.0 | 7.9 | 5.3 | 2.9 | 2.1 | 1.7 | 1.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 |
| **-0.76** | 0.9 | 0.9 | 0.4 | 6.6 | 5.7 | 4.3 | 2.5 | 2.1 | 1.7 | 1.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 |

*Table 145. The 2018 Ford F-150 Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 250.5 | 91.5 | 19.3 | 25.1 | 17.6 | 26.8 | - | - | - | - | - | - | - |
| **0.70** | 240.7 | 85.7 | 19.3 | 25.1 | 17.6 | 28.1 | - | - | - | - | - | - | - |
| **0.60** | 222.2 | 77.9 | 20.9 | 27.1 | 18.5 | 29.4 | - | - | - | - | - | - | - |
| **0.50** | 205.2 | 70.8 | 22.6 | 29.3 | 19.4 | 30.4 | - | - | - | - | - | - | - |
| **0.40** | 183.0 | 62.5 | 24.2 | 31.2 | 20.4 | 31.6 | - | - | - | - | - | - | - |
| **0.30** | 162.3 | 54.8 | 25.8 | 33.3 | 21.2 | 33.1 | - | - | - | - | - | - | - |
| **0.20** | 133.2 | 45.8 | 27.5 | 35.4 | 22.3 | 35.0 | - | - | - | - | - | - | - |
| **0.10** | 103.4 | 37.6 | 29.5 | 37.5 | 23.3 | 37.2 | 30.4 | 30.2 | 23.4 | 20.4 | - | - | - |
| **0.00** | 70.8 | 29.2 | 31.3 | 39.9 | 24.4 | 39.8 | 31.7 | 31.4 | 24.2 | 21.1 | - | - | - |
| **-0.10** | 47.7 | 22.7 | 33.0 | 42.3 | 25.4 | 42.6 | 32.8 | 32.9 | 25.2 | 21.8 | - | - | - |
| **-0.20** | 33.2 | 18.1 | 34.6 | 44.7 | 26.4 | 45.7 | 33.9 | 33.8 | 25.9 | 22.5 | - | - | - |
| **-0.30** | 23.7 | 14.6 | 36.3 | 47.0 | 27.0 | 49.1 | 35.2 | 35.3 | 26.9 | 23.3 | - | - | - |
| **-0.40** | 17.7 | 12.1 | 37.8 | 49.3 | 27.5 | 52.6 | 36.6 | 36.1 | 27.5 | 24.0 | - | - | - |
| **-0.50** | 14.0 | 10.4 | 39.2 | 52.1 | 27.7 | 57.0 | 37.9 | 37.6 | 28.4 | 24.8 | - | - | - |
| **-0.60** | 11.6 | 9.0 | 39.7 | 54.4 | 28.0 | 61.5 | 39.2 | 38.4 | 29.2 | 25.5 | - | - | - |
| **-0.70** | 10.1 | 8.0 | 39.4 | 56.9 | 27.9 | 66.2 | 40.4 | 39.9 | 29.9 | 26.4 | - | - | - |
| **-0.76** | 8.8 | 7.3 | 37.8 | 58.9 | 28.0 | 66.2 | 41.6 | 40.7 | 30.5 | 27.3 | - | - | - |

*Table 146. The 2018 Ford F-150 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.6 | 1.5 | 1.9 | 123.1 | 123.2 | 87.6 | 19.5 | 47.5 | 27.2 | 14.1 | 11.5 | 10.3 | 6.0 | 20.7 | 22.5 | 20.8 |
| **0.70** | 1.6 | 1.4 | 1.5 | 128.5 | 128.5 | 90.8 | 18.9 | 47.5 | 27.2 | 14.1 | 11.5 | 10.3 | 6.0 | 20.7 | 22.5 | 20.8 |
| **0.60** | 1.6 | 1.4 | 1.2 | 134.9 | 134.1 | 92.0 | 18.2 | 48.5 | 26.8 | 13.6 | 11.2 | 10.0 | 5.8 | 20.9 | 22.7 | 20.8 |
| **0.50** | 1.5 | 1.4 | 0.9 | 137.6 | 138.1 | 94.1 | 17.4 | 49.1 | 26.4 | 13.1 | 10.6 | 9.4 | 5.4 | 20.8 | 22.5 | 20.2 |
| **0.40** | 1.4 | 1.3 | 0.8 | 141.8 | 145.5 | 97.0 | 16.5 | 48.8 | 25.5 | 12.5 | 9.9 | 8.7 | 5.0 | 19.7 | 21.4 | 19.1 |
| **0.30** | 1.4 | 1.3 | 0.7 | 142.6 | 151.4 | 100.2 | 15.6 | 47.7 | 24.7 | 11.8 | 9.0 | 7.9 | 4.5 | 18.5 | 20.1 | 17.7 |
| **0.20** | 1.4 | 1.2 | 0.6 | 146.4 | 160.0 | 101.4 | 14.5 | 45.3 | 23.3 | 11.0 | 8.0 | 7.0 | 3.9 | 16.8 | 18.4 | 16.0 |
| **0.10** | 1.3 | 1.2 | 0.6 | 144.2 | 159.1 | 97.5 | 13.4 | 42.4 | 21.7 | 10.2 | 7.0 | 6.1 | 3.4 | 15.1 | 16.6 | 14.2 |
| **0.00** | 1.3 | 1.2 | 0.5 | 143.1 | 156.3 | 92.0 | 12.3 | 38.7 | 19.4 | 9.3 | 6.0 | 5.2 | 2.9 | 13.1 | 14.1 | 12.0 |
| **-0.10** | 1.2 | 1.2 | 0.5 | 135.7 | 144.8 | 86.6 | 11.2 | 35.0 | 17.5 | 8.4 | 4.9 | 4.1 | 2.3 | 10.6 | 11.2 | 9.8 |
| **-0.20** | 1.2 | 1.1 | 0.5 | 129.8 | 133.6 | 77.8 | 10.0 | 30.9 | 15.1 | 7.5 | 3.7 | 3.1 | 1.8 | 7.8 | 8.1 | 7.2 |
| **-0.30** | 1.2 | 1.1 | 0.4 | 119.3 | 119.5 | 67.8 | 8.9 | 27.0 | 13.1 | 6.6 | 2.5 | 2.2 | 1.3 | 4.7 | 4.8 | 4.5 |
| **-0.40** | 1.1 | 1.1 | 0.4 | 107.8 | 106.5 | 57.3 | 7.8 | 22.2 | 10.3 | 5.6 | 1.7 | 1.5 | 1.0 | 2.5 | 2.5 | 2.5 |
| **-0.50** | 1.1 | 1.1 | 0.4 | 94.2 | 88.9 | 45.9 | 6.9 | 17.1 | 8.0 | 4.6 | 1.2 | 1.1 | 0.8 | 1.6 | 1.6 | 1.4 |
| **-0.60** | 1.1 | 1.0 | 0.4 | 77.6 | 72.0 | 34.7 | 6.0 | 11.3 | 5.6 | 3.6 | 0.9 | 0.8 | 0.6 | 1.1 | 1.1 | 0.9 |
| **-0.70** | 1.0 | 1.0 | 0.4 | 59.7 | 52.1 | 22.6 | 5.3 | 7.2 | 4.2 | 2.9 | 0.6 | 0.6 | 0.5 | 0.8 | 0.8 | 0.7 |
| **-0.76** | 1.0 | 1.0 | 0.4 | 59.7 | 52.1 | 22.6 | 5.3 | 4.9 | 3.2 | 2.3 | 0.5 | 0.5 | 0.4 | 0.6 | 0.6 | 0.5 |

*Table 147. The 2018 Ford F-150 Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 250.5 | 91.5 | 16.8 | 18.7 | 14.6 | 21.2 | - | - | - | - | - | - | - |
| **0.70** | 240.7 | 85.7 | 16.8 | 20.1 | 15.2 | 21.2 | - | - | - | - | - | - | - |
| **0.60** | 222.2 | 77.9 | 18.0 | 21.5 | 16.0 | 22.2 | - | - | - | - | - | - | - |
| **0.50** | 205.2 | 70.8 | 19.3 | 23.2 | 16.7 | 23.4 | - | - | - | - | - | - | - |
| **0.40** | 183.0 | 62.5 | 20.9 | 25.0 | 17.6 | 24.5 | - | - | - | - | - | - | - |
| **0.30** | 162.3 | 54.8 | 22.6 | 27.1 | 18.5 | 25.5 | - | - | - | - | - | - | - |
| **0.20** | 133.2 | 45.8 | 24.2 | 29.3 | 19.4 | 26.8 | - | - | - | - | - | - | - |
| **0.10** | 103.4 | 37.6 | 25.8 | 31.2 | 20.4 | 28.1 | - | - | - | - | - | - | - |
| **0.00** | 70.8 | 29.2 | 27.5 | 33.3 | 21.2 | 29.3 | - | - | - | - | - | - | - |
| **-0.10** | 47.7 | 22.7 | 29.5 | 35.4 | 22.3 | 30.4 | - | - | - | - | - | - | - |
| **-0.20** | 33.2 | 18.1 | 31.3 | 37.5 | 23.3 | 31.6 | - | - | - | - | - | - | - |
| **-0.30** | 23.7 | 14.6 | 33.0 | 39.9 | 24.4 | 33.1 | - | - | - | - | - | - | - |
| **-0.40** | 17.7 | 12.1 | 34.6 | 42.2 | 25.4 | 35.0 | - | - | - | - | - | - | - |
| **-0.50** | 14.0 | 10.4 | 36.3 | 44.7 | 26.4 | 37.1 | - | - | - | - | - | - | - |
| **-0.60** | 11.6 | 9.0 | 37.8 | 47.0 | 27.0 | 39.8 | 30.3 | 30.1 | 23.4 | 20.3 | - | - | - |
| **-0.70** | 10.1 | 8.0 | 39.2 | 49.3 | 27.5 | 42.6 | 31.6 | 31.3 | 24.1 | 21.1 | - | - | - |
| **-0.76** | 8.8 | 7.3 | 39.7 | 52.1 | 27.7 | 45.7 | 32.2 | 32.4 | 24.5 | 21.3 | - | - | - |

*Table 148. The 2018 Toyota Camry Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.8 | 0.9 | 0.2 | 3.1 | 3.3 | 2.4 | 1.1 | 3.1 | 1.8 | 1.1 | 7.2 | 5.8 | 3.1 | 25.2 | 22.9 | 18.3 |
| **0.70** | 0.8 | 0.8 | 0.2 | 2.6 | 2.8 | 2.1 | 1.1 | 3.1 | 1.8 | 1.1 | 5.0 | 4.2 | 2.5 | 18.2 | 16.9 | 13.2 |
| **0.60** | 0.7 | 0.8 | 0.2 | 2.4 | 2.5 | 1.9 | 1.1 | 2.2 | 1.4 | 0.8 | 3.5 | 3.0 | 1.8 | 10.8 | 10.2 | 7.9 |
| **0.50** | 0.7 | 0.8 | 0.2 | 2.1 | 2.2 | 1.8 | 1.1 | 1.7 | 1.0 | 0.6 | 2.2 | 1.9 | 1.2 | 6.0 | 5.7 | 4.6 |
| **0.40** | 0.7 | 0.8 | 0.3 | 1.9 | 2.0 | 1.7 | 1.0 | 1.3 | 0.8 | 0.5 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| **0.30** | 0.7 | 0.8 | 0.3 | 1.8 | 1.8 | 1.6 | 1.0 | 1.0 | 0.6 | 0.4 | 1.0 | 0.9 | 0.6 | 2.9 | 2.7 | 2.2 |
| **0.20** | 0.7 | 0.8 | 0.3 | 1.6 | 1.7 | 1.5 | 1.0 | 0.8 | 0.5 | 0.4 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **0.10** | 0.7 | 0.7 | 0.2 | 1.6 | 1.6 | 1.4 | 0.9 | 0.7 | 0.4 | 0.4 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.1 |
| **0.00** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.4 | 1.0 | 0.7 | 0.4 | 0.5 | 0.4 | 0.3 | 0.3 | 0.9 | 0.9 | 0.8 |
| **-0.10** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.5 | 0.9 | 0.6 | 0.4 | 0.5 | 0.3 | 0.3 | 0.2 | 0.7 | 0.7 | 0.6 |
| **-0.20** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.5 | 0.9 | 0.6 | 0.4 | 0.5 | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 | 0.5 |
| **-0.30** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.5 | 0.9 | 0.6 | 0.5 | 0.5 | 0.2 | 0.2 | 0.1 | 0.4 | 0.4 | 0.4 |
| **-0.40** | 0.7 | 0.7 | 0.3 | 1.5 | 1.6 | 1.5 | 0.9 | 0.6 | 0.5 | 0.5 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.3 |
| **-0.50** | 0.7 | 0.6 | 0.3 | 1.5 | 1.5 | 1.5 | 0.9 | 0.6 | 0.5 | 0.5 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.3 |
| **-0.60** | 0.6 | 0.6 | 0.3 | 1.5 | 1.5 | 1.5 | 0.8 | 0.6 | 0.6 | 0.5 | 0.2 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 |
| **-0.70** | 0.6 | 0.5 | 0.3 | 1.5 | 1.6 | 1.4 | 0.8 | 0.6 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |
| **-0.76** | 0.6 | 0.5 | 0.3 | 1.5 | 1.6 | 1.4 | 0.8 | 0.6 | 0.5 | 0.5 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |

*Table 149. The 2018 Toyota Camry Lab Tested Aim Effects at 22-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 499.2 | 190.0 | 49.3 | 91.2 | 56.4 | 188.3 | 120.3 | 133.5 | 69.4 | 70.3 | 267.9 | 109.0 | 114.9 |
| **0.70** | 459.5 | 168.0 | 51.1 | 96.7 | 56.6 | 188.3 | 127.1 | 138.7 | 71.0 | 71.0 | 277.2 | 112.8 | 120.9 |
| **0.60** | 414.7 | 157.6 | 54.0 | 100.6 | 54.8 | 199.8 | 130.8 | 147.2 | 72.0 | 72.1 | 291.1 | 117.2 | 122.8 |
| **0.50** | 336.3 | 152.1 | 55.6 | 105.4 | 53.7 | 211.5 | 136.7 | 149.9 | 74.5 | 73.4 | 306.8 | 120.9 | 126.9 |
| **0.40** | 277.8 | 129.7 | 58.0 | 108.6 | 50.3 | 223.2 | 139.9 | 160.5 | 75.8 | 74.2 | 323.4 | 126.8 | 131.0 |
| **0.30** | 208.7 | 103.7 | 59.3 | 113.3 | 47.1 | 232.7 | 144.6 | 164.2 | 77.6 | 75.5 | 342.8 | 130.2 | 134.5 |
| **0.20** | 171.1 | 79.3 | 60.2 | 114.9 | 40.4 | 245.2 | 147.3 | 169.5 | 79.0 | 78.4 | 365.9 | 134.1 | 138.7 |
| **0.10** | 123.6 | 62.9 | 60.9 | 118.0 | 34.0 | 254.7 | 152.2 | 175.4 | 81.7 | 80.3 | 389.3 | 136.4 | 142.2 |
| **0.00** | 87.6 | 43.7 | 60.7 | 116.7 | 26.4 | 266.7 | 154.0 | 179.3 | 83.2 | 81.4 | 417.4 | 141.2 | 147.1 |
| **-0.10** | 52.8 | 26.1 | 58.6 | 114.7 | 23.3 | 276.4 | 157.9 | 181.2 | 85.4 | 82.2 | 446.7 | 143.9 | 150.5 |
| **-0.20** | 33.3 | 16.1 | 54.3 | 108.1 | 20.9 | 290.3 | 157.2 | 183.9 | 85.7 | 83.8 | 476.0 | 147.2 | 154.1 |
| **-0.30** | 23.0 | 11.6 | 45.8 | 100.4 | 19.3 | 299.2 | 157.7 | 184.0 | 85.9 | 82.1 | 504.7 | 151.6 | 158.0 |
| **-0.40** | 15.2 | 8.3 | 33.4 | 88.1 | 16.0 | 309.9 | 156.5 | 187.4 | 84.1 | 82.8 | 544.9 | 154.8 | 164.0 |
| **-0.50** | 11.5 | 5.9 | 19.9 | 71.3 | 13.4 | 318.2 | 155.6 | 185.4 | 84.0 | 82.6 | 579.9 | 160.6 | 165.8 |
| **-0.60** | 8.4 | 4.3 | 11.1 | 50.0 | 10.7 | 322.0 | 153.8 | 189.7 | 82.4 | 82.6 | 619.5 | 164.1 | 171.6 |
| **-0.70** | 6.7 | 3.1 | 7.4 | 30.9 | 7.7 | 321.4 | 153.1 | 185.0 | 81.9 | 82.6 | 658.4 | 170.3 | 177.2 |
| **-0.76** | 5.3 | 2.7 | 7.4 | 30.9 | 7.7 | 319.6 | 151.3 | 184.2 | 82.4 | 84.1 | 664.2 | 170.9 | 178.3 |

*Table 150. The 2018 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 1.1 | 1.0 | 0.3 | 160.2 | 166.5 | 97.6 | 36.6 | 55.9 | 19.2 | 18.5 | 17.1 | 12.9 | 5.3 | 33.6 | 30.0 | 24.3 |
| **0.70** | 1.1 | 1.0 | 0.2 | 115.6 | 121.7 | 67.9 | 24.2 | 44.9 | 15.9 | 14.4 | 13.5 | 9.9 | 4.9 | 33.4 | 30.2 | 24.6 |
| **0.60** | 1.1 | 1.0 | 0.2 | 68.0 | 71.2 | 38.2 | 13.9 | 34.2 | 13.3 | 11.1 | 11.4 | 8.6 | 4.5 | 32.3 | 29.2 | 23.5 |
| **0.50** | 1.1 | 1.0 | 0.2 | 40.2 | 40.4 | 23.2 | 7.0 | 25.0 | 10.7 | 8.9 | 8.6 | 6.8 | 3.7 | 29.8 | 27.3 | 22.2 |
| **0.40** | 1.1 | 1.0 | 0.2 | 26.6 | 27.4 | 16.0 | 4.7 | 15.9 | 7.8 | 6.8 | 7.2 | 5.8 | 3.1 | 25.2 | 22.9 | 18.3 |
| **0.30** | 1.0 | 1.0 | 0.2 | 18.9 | 19.6 | 11.5 | 3.7 | 9.8 | 5.1 | 4.1 | 5.0 | 4.2 | 2.5 | 18.3 | 16.9 | 13.2 |
| **0.20** | 1.0 | 0.9 | 0.2 | 12.8 | 13.6 | 8.1 | 3.0 | 6.5 | 3.3 | 2.4 | 3.5 | 3.0 | 1.8 | 10.8 | 10.2 | 7.9 |
| **0.10** | 0.9 | 0.9 | 0.2 | 8.7 | 9.1 | 5.6 | 2.3 | 4.5 | 2.4 | 1.6 | 2.2 | 1.9 | 1.2 | 6.0 | 5.7 | 4.6 |
| **0.00** | 0.9 | 0.9 | 0.2 | 6.5 | 6.5 | 4.2 | 1.8 | 3.1 | 1.8 | 1.1 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| **-0.10** | 0.8 | 0.9 | 0.3 | 4.8 | 5.0 | 3.3 | 1.5 | 2.2 | 1.4 | 0.8 | 1.0 | 0.9 | 0.6 | 2.9 | 2.7 | 2.2 |
| **-0.20** | 0.8 | 0.9 | 0.3 | 3.7 | 4.0 | 2.7 | 1.2 | 1.7 | 1.0 | 0.6 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **-0.30** | 0.8 | 0.9 | 0.3 | 3.1 | 3.3 | 2.4 | 1.1 | 1.3 | 0.8 | 0.5 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.1 |
| **-0.40** | 0.8 | 0.9 | 0.2 | 2.6 | 2.8 | 2.1 | 1.1 | 1.0 | 0.6 | 0.4 | 0.4 | 0.3 | 0.3 | 0.9 | 0.9 | 0.8 |
| **-0.50** | 0.7 | 0.8 | 0.3 | 2.4 | 2.5 | 1.9 | 1.1 | 0.8 | 0.5 | 0.4 | 0.3 | 0.3 | 0.2 | 0.7 | 0.7 | 0.6 |
| **-0.60** | 0.7 | 0.8 | 0.3 | 2.1 | 2.2 | 1.8 | 1.1 | 0.7 | 0.4 | 0.4 | 0.2 | 0.2 | 0.2 | 0.5 | 0.5 | 0.5 |
| **-0.70** | 0.7 | 0.8 | 0.3 | 1.9 | 2.0 | 1.7 | 1.0 | 0.7 | 0.4 | 0.5 | 0.2 | 0.2 | 0.1 | 0.4 | 0.4 | 0.4 |
| **-0.76** | 0.7 | 0.8 | 0.3 | 1.9 | 2.0 | 1.7 | 1.0 | 0.7 | 0.4 | 0.5 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.3 |

*Table 151. The 2018 Toyota Camry Lab Tested Aim Effects at 36-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 499.2 | 190.0 | 37.8 | 60.3 | 48.3 | 77.9 | 58.5 | 64.1 | 40.4 | 43.3 | - | - | - |
| **0.70** | 459.5 | 168.0 | 40.4 | 60.3 | 48.3 | 80.6 | 60.4 | 66.0 | 41.6 | 44.2 | - | - | - |
| **0.60** | 414.7 | 157.6 | 42.4 | 63.8 | 49.8 | 86.7 | 62.4 | 69.1 | 43.1 | 45.7 | - | - | - |
| **0.50** | 336.3 | 152.1 | 44.9 | 68.2 | 51.7 | 92.7 | 65.6 | 71.9 | 44.8 | 47.0 | - | - | - |
| **0.40** | 277.8 | 129.7 | 46.6 | 71.9 | 53.0 | 100.1 | 68.7 | 74.8 | 46.0 | 48.9 | - | - | - |
| **0.30** | 208.7 | 103.7 | 49.3 | 76.9 | 54.8 | 108.6 | 72.0 | 77.3 | 47.9 | 50.7 | - | - | - |
| **0.20** | 171.1 | 79.3 | 51.1 | 81.5 | 55.3 | 117.1 | 74.7 | 80.8 | 49.3 | 52.2 | - | - | - |
| **0.10** | 123.6 | 62.9 | 54.0 | 86.9 | 56.8 | 126.0 | 77.9 | 84.5 | 51.1 | 53.7 | - | - | - |
| **0.00** | 87.6 | 43.7 | 55.6 | 91.2 | 56.3 | 136.6 | 81.3 | 88.3 | 51.9 | 55.4 | - | - | - |
| **-0.10** | 52.8 | 26.1 | 58.0 | 96.7 | 56.6 | 145.4 | 84.3 | 92.7 | 53.3 | 56.9 | - | - | - |
| **-0.20** | 33.3 | 16.1 | 59.3 | 100.6 | 54.7 | 154.0 | 89.2 | 96.4 | 55.5 | 58.5 | - | - | - |
| **-0.30** | 23.0 | 11.6 | 60.2 | 105.3 | 53.7 | 163.4 | 92.6 | 101.2 | 56.8 | 60.2 | - | - | - |
| **-0.40** | 15.2 | 8.3 | 60.9 | 108.6 | 50.3 | 173.2 | 97.5 | 105.1 | 58.8 | 62.0 | - | - | - |
| **-0.50** | 11.5 | 5.9 | 60.7 | 113.2 | 47.0 | 182.4 | 101.2 | 111.0 | 60.0 | 63.9 | - | - | - |
| **-0.60** | 8.4 | 4.3 | 58.6 | 114.9 | 40.4 | 192.0 | 106.2 | 115.8 | 62.2 | 65.8 | - | - | - |
| **-0.70** | 6.7 | 3.1 | 54.3 | 117.9 | 34.0 | 202.2 | 110.0 | 121.4 | 64.4 | 67.2 | - | - | - |
| **-0.76** | 5.3 | 2.7 | 54.3 | 116.7 | 26.4 | 211.2 | 111.6 | 122.0 | 65.1 | 67.3 | - | - | - |

*Table 152. The 2018 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.9 | 1.1 | 0.8 | 232.4 | 204.7 | 132.0 | 52.1 | 91.1 | 45.6 | 32.5 | 22.2 | 19.3 | 8.6 | 31.9 | 29.1 | 24.2 |
| **0.70** | 0.9 | 1.0 | 0.8 | 232.4 | 204.7 | 132.0 | 52.1 | 87.8 | 39.2 | 32.1 | 21.5 | 18.0 | 7.0 | 32.7 | 29.3 | 24.1 |
| **0.60** | 1.0 | 1.0 | 0.7 | 241.0 | 209.1 | 131.1 | 50.4 | 85.6 | 33.0 | 31.4 | 19.1 | 15.0 | 5.7 | 33.2 | 30.0 | 24.7 |
| **0.50** | 1.0 | 1.0 | 0.5 | 245.7 | 217.3 | 133.8 | 50.3 | 78.8 | 25.5 | 30.2 | 17.1 | 12.9 | 5.3 | 33.6 | 30.0 | 24.3 |
| **0.40** | 1.0 | 1.1 | 0.4 | 252.4 | 217.5 | 134.8 | 49.1 | 73.8 | 23.1 | 27.0 | 13.5 | 9.9 | 4.9 | 33.4 | 30.2 | 24.6 |
| **0.30** | 1.0 | 1.1 | 0.3 | 253.6 | 222.3 | 135.8 | 48.5 | 64.0 | 21.2 | 22.5 | 11.4 | 8.6 | 4.5 | 32.3 | 29.2 | 23.5 |
| **0.20** | 1.1 | 1.1 | 0.2 | 249.5 | 222.4 | 135.0 | 47.4 | 55.9 | 19.2 | 18.5 | 8.6 | 6.8 | 3.7 | 29.8 | 27.3 | 22.2 |
| **0.10** | 1.1 | 1.0 | 0.2 | 241.0 | 223.0 | 133.8 | 46.4 | 44.9 | 15.9 | 14.4 | 7.2 | 5.8 | 3.1 | 25.2 | 22.9 | 18.3 |
| **0.00** | 1.1 | 1.1 | 0.2 | 226.2 | 214.5 | 128.2 | 44.6 | 34.2 | 13.3 | 11.1 | 5.0 | 4.2 | 2.5 | 18.3 | 16.9 | 13.2 |
| **-0.10** | 1.1 | 1.0 | 0.2 | 203.7 | 201.0 | 119.6 | 42.0 | 25.0 | 10.7 | 8.9 | 3.5 | 3.0 | 1.8 | 10.8 | 10.2 | 7.9 |
| **-0.20** | 1.1 | 1.1 | 0.2 | 160.2 | 166.5 | 97.6 | 36.6 | 15.9 | 7.8 | 6.8 | 2.2 | 1.9 | 1.2 | 6.0 | 5.7 | 4.6 |
| **-0.30** | 1.1 | 1.1 | 0.2 | 115.6 | 121.7 | 67.9 | 24.2 | 9.8 | 5.1 | 4.1 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| **-0.40** | 1.1 | 1.0 | 0.2 | 68.0 | 71.2 | 38.2 | 13.9 | 6.5 | 3.3 | 2.4 | 1.0 | 0.9 | 0.6 | 2.9 | 2.7 | 2.2 |
| **-0.50** | 1.1 | 1.0 | 0.2 | 40.2 | 40.4 | 23.2 | 7.0 | 4.5 | 2.4 | 1.6 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **-0.60** | 1.0 | 1.0 | 0.3 | 26.6 | 27.4 | 16.0 | 4.7 | 3.1 | 1.8 | 1.1 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.1 |
| **-0.70** | 0.9 | 0.9 | 0.3 | 18.9 | 19.6 | 11.5 | 3.7 | 2.2 | 1.4 | 0.8 | 0.4 | 0.3 | 0.3 | 0.9 | 0.9 | 0.8 |
| **-0.76** | 0.9 | 0.9 | 0.3 | 12.8 | 13.6 | 8.1 | 3.0 | 2.2 | 1.4 | 0.8 | 0.4 | 0.3 | 0.3 | 0.9 | 0.9 | 0.8 |

*Table 153. The 2018 Toyota Camry Lab Tested Aim Effects at 48-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 499.2 | 190.0 | 29.8 | 40.0 | 33.2 | 34.5 | - | - | - | - | - | - | - |
| **0.70** | 459.5 | 168.0 | 29.8 | 40.0 | 33.2 | 36.6 | - | - | - | - | - | - | - |
| **0.60** | 414.7 | 157.6 | 31.7 | 43.0 | 35.9 | 39.1 | - | - | - | - | - | - | - |
| **0.50** | 336.3 | 152.1 | 33.3 | 46.3 | 38.8 | 42.2 | - | - | - | - | - | - | - |
| **0.40** | 277.8 | 129.7 | 35.5 | 50.0 | 41.1 | 45.2 | - | - | - | - | - | - | - |
| **0.30** | 208.7 | 103.7 | 37.8 | 53.1 | 43.9 | 48.8 | - | - | - | - | - | - | - |
| **0.20** | 171.1 | 79.3 | 40.4 | 56.9 | 46.1 | 52.1 | - | - | - | - | - | - | - |
| **0.10** | 123.6 | 62.9 | 42.4 | 60.3 | 48.2 | 56.3 | 39.6 | 43.5 | 27.3 | 31.1 | - | - | - |
| **0.00** | 87.6 | 43.7 | 44.9 | 63.8 | 49.8 | 60.5 | 41.5 | 46.2 | 28.7 | 33.0 | - | - | - |
| **-0.10** | 52.8 | 26.1 | 46.6 | 68.2 | 51.6 | 65.7 | 43.6 | 48.3 | 30.1 | 34.6 | - | - | - |
| **-0.20** | 33.3 | 16.1 | 49.3 | 71.9 | 53.0 | 71.4 | 45.4 | 50.9 | 31.9 | 36.1 | - | - | - |
| **-0.30** | 23.0 | 11.6 | 51.1 | 76.8 | 54.7 | 77.8 | 47.9 | 53.6 | 33.6 | 37.4 | - | - | - |
| **-0.40** | 15.2 | 8.3 | 54.0 | 81.5 | 55.3 | 83.6 | 50.3 | 55.8 | 35.3 | 39.0 | - | - | - |
| **-0.50** | 11.5 | 5.9 | 55.6 | 86.8 | 56.8 | 89.9 | 53.0 | 58.5 | 36.7 | 40.4 | - | - | - |
| **-0.60** | 8.4 | 4.3 | 58.0 | 91.1 | 56.3 | 96.5 | 55.1 | 61.1 | 38.7 | 41.6 | - | - | - |
| **-0.70** | 6.7 | 3.1 | 59.3 | 96.6 | 56.5 | 105.1 | 58.3 | 63.9 | 40.2 | 43.1 | - | - | - |
| **-0.76** | 5.3 | 2.7 | 60.2 | 100.5 | 54.7 | 105.1 | 60.8 | 66.7 | 41.9 | 44.5 | - | - | - |

*Table 154. The 2018 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations Above the Horizon*

| Aim Angle (degrees) | Test Point or Subpoint Illuminance Values in lux | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4a** | **4b** | **4c** | **4d** | **5a** | **5b** | **5c** | **6a** | **6b** | **6c** | **7a** | **7b** | **7c** |
| **0.76** | 0.9 | 1.2 | 2.3 | 186.9 | 168.1 | 118.1 | 53.1 | 87.8 | 53.3 | 33.0 | 23.2 | 20.7 | 10.2 | 30.6 | 28.0 | 23.3 |
| **0.70** | 0.9 | 1.2 | 1.5 | 196.5 | 176.3 | 121.4 | 53.7 | 87.8 | 53.3 | 33.0 | 23.2 | 20.7 | 10.2 | 30.6 | 28.0 | 23.3 |
| **0.60** | 0.9 | 1.2 | 1.1 | 206.5 | 180.1 | 123.1 | 52.8 | 90.4 | 52.1 | 33.0 | 22.2 | 19.3 | 8.6 | 31.9 | 29.1 | 24.2 |
| **0.50** | 0.9 | 1.2 | 0.8 | 214.4 | 188.5 | 125.9 | 53.0 | 90.6 | 49.0 | 32.6 | 21.5 | 18.0 | 7.0 | 32.7 | 29.3 | 24.1 |
| **0.40** | 0.9 | 1.1 | 0.7 | 223.9 | 195.3 | 126.7 | 51.9 | 91.1 | 45.6 | 32.5 | 19.1 | 15.0 | 5.7 | 33.2 | 30.0 | 24.7 |
| **0.30** | 0.9 | 1.1 | 0.5 | 232.4 | 204.6 | 131.9 | 52.1 | 87.8 | 39.2 | 32.1 | 17.1 | 12.9 | 5.3 | 33.6 | 30.0 | 24.3 |
| **0.20** | 1.0 | 1.0 | 0.4 | 241.0 | 209.1 | 131.1 | 50.4 | 85.6 | 33.0 | 31.4 | 13.5 | 9.9 | 4.9 | 33.4 | 30.2 | 24.6 |
| **0.10** | 0.9 | 1.0 | 0.3 | 245.7 | 217.2 | 133.8 | 50.3 | 78.8 | 25.5 | 30.2 | 11.4 | 8.6 | 4.5 | 32.3 | 29.2 | 23.5 |
| **0.00** | 1.0 | 1.0 | 0.2 | 252.4 | 217.4 | 134.8 | 49.1 | 73.8 | 23.1 | 27.0 | 8.6 | 6.8 | 3.7 | 29.8 | 27.3 | 22.2 |
| **-0.10** | 1.0 | 1.1 | 0.2 | 253.6 | 222.2 | 135.8 | 48.5 | 64.0 | 21.2 | 22.5 | 7.2 | 5.8 | 3.1 | 25.2 | 22.9 | 18.3 |
| **-0.20** | 1.0 | 1.1 | 0.2 | 249.4 | 222.4 | 135.0 | 47.3 | 55.9 | 19.2 | 18.5 | 5.0 | 4.2 | 2.5 | 18.3 | 16.9 | 13.2 |
| **-0.30** | 1.1 | 1.1 | 0.2 | 241.0 | 223.0 | 133.7 | 46.4 | 44.9 | 15.9 | 14.4 | 3.5 | 3.0 | 1.8 | 10.8 | 10.2 | 7.9 |
| **-0.40** | 1.1 | 1.0 | 0.2 | 226.2 | 214.4 | 128.2 | 44.6 | 34.2 | 13.3 | 11.1 | 2.2 | 1.9 | 1.2 | 6.0 | 5.7 | 4.6 |
| **-0.50** | 1.1 | 1.1 | 0.2 | 203.6 | 201.0 | 119.6 | 42.0 | 25.0 | 10.7 | 8.9 | 1.4 | 1.2 | 0.8 | 4.1 | 3.8 | 3.1 |
| **-0.60** | 1.1 | 1.0 | 0.2 | 160.1 | 166.5 | 97.5 | 36.6 | 15.9 | 7.8 | 6.8 | 1.0 | 0.9 | 0.6 | 2.9 | 2.7 | 2.2 |
| **-0.70** | 1.1 | 1.1 | 0.2 | 115.6 | 121.7 | 67.8 | 24.1 | 9.8 | 5.1 | 4.1 | 0.7 | 0.6 | 0.4 | 1.9 | 1.9 | 1.5 |
| **-0.76** | 1.1 | 1.0 | 0.3 | 115.6 | 121.7 | 67.8 | 24.1 | 6.5 | 3.3 | 2.4 | 0.5 | 0.5 | 0.3 | 1.3 | 1.2 | 1.1 |

*Table 155. The 2018 Toyota Camry Lab Tested Aim Effects at 54-inch Mounting Height – Test Locations at and Below*

| Aim Angle (degrees) | Test Point Illuminance Values in lux | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **0.76** | 499.2 | 190.0 | 26.4 | 28.8 | 24.5 | 27.2 | - | - | - | - | - | - | - |
| **0.70** | 459.5 | 168.0 | 26.4 | 31.2 | 26.3 | 27.2 | - | - | - | - | - | - | - |
| **0.60** | 414.7 | 157.6 | 28.2 | 34.1 | 28.4 | 28.6 | - | - | - | - | - | - | - |
| **0.50** | 336.3 | 152.1 | 29.8 | 37.0 | 30.4 | 29.7 | - | - | - | - | - | - | - |
| **0.40** | 277.8 | 129.7 | 31.7 | 40.0 | 33.2 | 31.3 | - | - | - | - | - | - | - |
| **0.30** | 208.7 | 103.7 | 33.3 | 43.0 | 35.9 | 32.6 | - | - | - | - | - | - | - |
| **0.20** | 171.1 | 79.3 | 35.5 | 46.3 | 38.8 | 34.5 | - | - | - | - | - | - | - |
| **0.10** | 123.6 | 62.9 | 37.8 | 49.9 | 41.1 | 36.6 | - | - | - | - | - | - | - |
| **0.00** | 87.6 | 43.7 | 40.4 | 53.1 | 43.8 | 39.0 | - | - | - | - | - | - | - |
| **-0.10** | 52.8 | 26.1 | 42.4 | 56.8 | 46.1 | 42.2 | - | - | - | - | - | - | - |
| **-0.20** | 33.3 | 16.1 | 44.9 | 60.2 | 48.2 | 45.1 | - | - | - | - | - | - | - |
| **-0.30** | 23.0 | 11.6 | 46.6 | 63.8 | 49.8 | 48.8 | - | - | - | - | - | - | - |
| **-0.40** | 15.2 | 8.3 | 49.3 | 68.2 | 51.6 | 52.0 | - | - | - | - | - | - | - |
| **-0.50** | 11.5 | 5.9 | 51.1 | 71.9 | 52.9 | 56.2 | - | - | - | - | - | - | - |
| **-0.60** | 8.4 | 4.3 | 53.9 | 76.8 | 54.7 | 60.5 | 39.5 | 43.4 | 27.3 | 31.1 | - | - | - |
| **-0.70** | 6.7 | 3.1 | 55.6 | 81.4 | 55.2 | 65.6 | 41.4 | 46.1 | 28.7 | 32.9 | - | - | - |
| **-0.76** | 5.3 | 2.7 | 58.0 | 86.8 | 56.8 | 71.3 | 42.5 | 47.2 | 29.1 | 33.4 | - | - | - |

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