IES

IESVE
Trial Support Material

www.iesve.com

RadianceIES
Essentials

RadianceIES Essentials

RadianceIES is a detailed 3D simulation tool designed to predict daylight performance, and render the appearance of internal spaces prior to construction.

It uses sophisticated ray-tracing techniques to produce photo-realistic images and numerical data, which can be assessed in different formats, taking into account:

– Building location and site
– Date and time of simulation
– Sky conditions (from a selection of internationally recognised conditions)
– Material surface properties
– Shading
– Adjacent buildings

There are no limitations on the number of materials and geometry that can be simulated. Both luminance (what the eye sees) and surface or working plane illuminance (what the surface receives) can be analysed.

For detailed assistance:

– There is a glossary of Radiance terminology available at *https://help.iesve.com/ve2019/radiance_glossary.htm#*
– If you are trying to determine what inputs to use, try the guidelines available at *https://help.iesve.com/ve2019/radianceies__lighting_simulation.htm#* for more detail.
– Or find out more general information on Radiance at *https://help.iesve.com/ve2019/radiance.htm#*
– Accelerad is a free suite of tools designed to increase the speed of both lighting and daylighting analysis and visualisation. If you purchase IES, you can ask our support team to assist you with this feature enabler installation, which can then be linked to RadianceIES and improve certain simulation run-times for certain newer GPU's.

General Knowledge

In Radiance we are simulating using a virtual camera and not trying to model the eye. This is why we often use the term photorealistic simulation (the eye is a very complex instrument compared to a camera). The default exposure is set to an average over the whole image, this can result in images which are either over-exposed or under-exposed with respect to some features which you may be interested in. Change the exposure either up or down as required.

The ray-tracing techniques used run an algorithm that is stochastic in nature, i.e. using random processes to approximate the enormous number of photons that exist in real life. These processes are controlled by a series of complex parameters which impose limits on the complexity of the algorithm (to make simulations usable).

This means that if you run multiple simulations, the answers will be broadly similar (less than 0.5% difference), but you will not get exactly the same answer each time.

Never spend a long time creating a model and then expect to get results out at the last minute (i.e. don't spend all week modelling and expect to get the correct results on Friday afternoon). Instead, iterate (design is iterative), do a bit of modelling then try a test simulation or two before refining the model. (This can also be true for most other areas of simulation). These test simulations should be inexpensive (i.e. Low/Medium quality), don't waste time waiting for a complex simulation, which you are going to throw away once you have refined the model. If you want a more complex simulation, use what would be non-productive time to run the simulation i.e. lunchtime or overnight. Test simulations should be tidied up (i.e. deleted) when you have an improved simulation.

RadianceIES Batch Simulations

RadianceIES now uses the Parallel Simulation approach when generating Luminance and Illuminance images, and sensor and advanced simulations. After the simulate button has been selected, you can instantly select the next combination of image settings and again simulate. This process can start a queue for parallel simulations to progress through. You can right click and specify the priority for a task if it becomes more urgent.

RadianceIES Simulation

As you start the simulation, think of what the purpose is, to guide your selections in each tab.
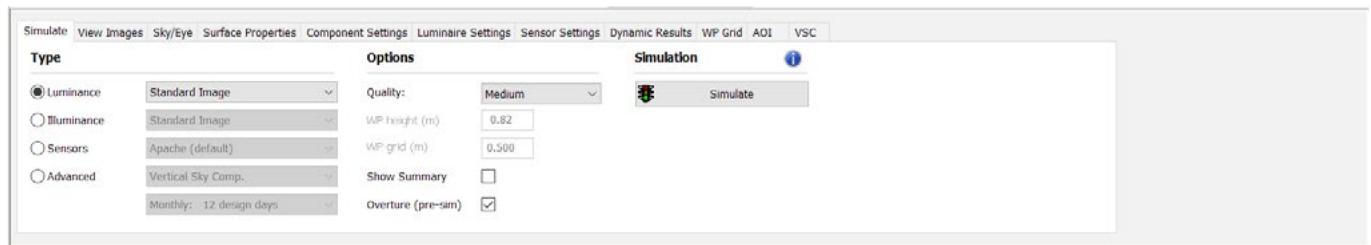
The **Simulate** tab is where you will choose the simulation type you wish to perform and what quality it should be.
The input parameters come from the geometry of your model, and what you program in on the other tabs.

The different types of simulation available are:

– **LUMINANCE:** produces rendered, coloured, images, of what light is reflected off the surfaces in the model,
both for internal and external photo-realistic type views i.e. an image that looks like a photograph..

   – Standard image, can be performed with a variety of settings

   – Daylight Glare Probability requires a hemispherical fisheye as the view parameter

– **ILLUMINANCE:** produces rendered, greyscale, images of the light striking the internal or external surfaces of the model,
useful for evaluating metrics linked to illumination.

   – Standard image, and working plane images can be performed with a variety of settings, including a coloured reproduction image
   showing the quantity of light using different metrics

   – Dynamic Working Plane simulations require the quality to be set to Dynamic Quality

– **SENSORS** are addressed in a separate document

– **ADVANCED** Simulations differ in that they do not create a rendered image, instead they plot data on the model.

   – Vertical Sky Comp. presents a pass/fail table and colours the windows accordingly on the model viewer

   – Annual Dynamic (UDI); Annual Sunlight Exposure (ASE) and Spatial Daylight Autonomy (sDA). These options should be simulated
   with the quality set to Dynamic Quality. The results are then processed, and plotted on the WP Grid according to which options
   are selected.

In general, the higher the quality chosen for the simulation, the more detailed it will be, but the longer it will take to run.

– The Image quality should be set to low/medium initially when testing your view and date/time parameters. The quality should then
be increased when you are happy with the view. If you choose to run a custom quality simulation, be sure to note your settings in
case you wish to make changes and compare with another simulation.

– High-resolution photo-realistic images can be created to enable clients to visualise how the building will look as well as provide
technical results of how it will operate.

– The "Custom" quality button opens a dialog box to allow the setting of individual simulation parameters for experienced users.

Standardised settings such as the working plane height and grid can be set by selecting the **RadianceIES** drop-down menu and choosing
Simulation Options. Here you can also set information such as default window frame width.

General Interest Link

If you are interested, you can read more about these ten key daylight & electric light metrics that are available in IESVE 2019:

1. Illuminance
2. Useful Daylight Illuminance (UDI)
3. Daylight Factor
4. Uniformity
5. Vertical Sky Component (VSC)
6. Spatial Daylight Autonomy (sDA)
7. Annual Sunlight Exposure (ASE)
8. Luminance
9. Daylight Glare Probability (DGP)
10. Room Cavity Ratio

http://www.iesve.com/discoveries/article/7726/ten-key-daylight-and-electric-metrics

Keyboard Options

The following keyboard functions are available:

– Ctrl X – delete selected
– Ctrl A – activate Axonometric view
– Ctrl P – activate Plan view
– Ctrl R – activate Right view
– Ctrl L – activate Left view
– Ctrl F – activate Front view
– Ctrl B – activate Back view
– Ctrl O – open Model
  Ctrl N – new Model
– Ctrl S – save Model
  Ctrl S – save Model