

**NAME**

*ies2rad* – convert IES luminaire data to RADIANCE description

**SYNOPSIS**

**ies2rad** [ *options* ] [ *file file ...* ]

**DESCRIPTION**

*Ies2rad* converts one or more IES luminaire data files to an equivalent RADIANCE scene description. The light source geometry will always be centered at the origin aimed in the negative Z direction, with the 0 degree plane along the x-axis—the IES photometric horizontal or length. The IES width is oriented along the y axis, and the IES up becomes the RADIANCE z-axis.

The IES(NA) LM-63 standard provides a limited range of light source shapes (“luminous openings”), different in each version of the standard. Of these shapes, *ies2rad* supports rectangles, boxes, points (as 1mm spheres), disks (as 1mm high vertical cylinders), vertical cylinders, and spheres. Some versions of the standard also define ellipses, ellipsoids, and horizontal cylinders. *Ies2rad* will approximate near-circular ellipses as disks, near-spherical ellipsoids as spheres, and horizontal cylinders as boxes.

The 1995 IES standard once included the materials and geometry format (MGF) which can describe detailed luminaire and light source geometry, but it was never used. *Ies2rad* still supports MGF.

*Ies2rad* assigns light source colors based on information in a lamp lookup table. Since most lamps are distinctly colored, it is often desirable to override this lookup procedure and use a neutral value that will produce color-balanced renderings. In general, it is important to consider lamp color when an odd assortment of fixture types is being used to illuminate the same scene, and the rendering can always be balanced by **pfilt**(1) to a specific white value later.

**OPTIONS****-l libdir**

Set the library directory path to *libdir*. This is where all relative pathnames will begin for output file names. For light sources that will be used by many people, this should be set to some central location included in the RAYPATH environment variable. The default is the current working directory.

**-p prefdir**

Set the library subdirectory path to *prefdir*. This is the subdirectory from the library where all output files will be placed. It is often most convenient to use a subdirectory for the storage of light sources, since there tend to be many files and placing them all in one directory is very messy. The default value is the empty string.

**-o outname**

Set the output file name root to *outname*. This overrides the default output file name root which is the same as the input file. This option may be used for only one input file, and is required when reading data from the standard input.

**-s**

Send the scene information to the standard output rather than a separate file. This is appropriate when calling *ies2rad* from within a scene description via an inline command. The data file(s) will still be written based on the output file name root, but, since this information is unaffected by command line options, it is safe to have multiple invocations of *ies2rad* using the same input file and different output options. The **-s** option may be used for only one input file.

**-d units**

Output dimensions are in *units*, which is one of the letters respectively. The letter specification may be followed by a slash (/) and an optional divisor. For example, *-dm/1000* would be millimeters. The default output is in meters, regardless of the original units in the IES input file. Note that there is no space in this option.

**-i rad**

Ignore the crude geometry given by the IES input file and use instead an illum sphere with radius *rad*. This option may be useful when the user wishes to add a more accurate geometric description to the light source model, though this need is obviated by the recent LM-63-1995 specification, which uses MGF detail geometry. (See **-g** option below.)

- g** If the IES file contains MGF detail geometry, compile this geometry into a separate octree and create a single instance referencing it instead of including the converted geometry directly in the Radiance output file. This can result in a considerable memory savings for luminaires which are later duplicated many times in a scene, though the appearance may suffer for certain luminaires since the enclosed glow sources will not light the local geometry as they would otherwise.
- f *lampdat***  
Use *lampdat* instead of the default lamp lookup table (*lamp.tab*) to map lamp names to xy chromaticity and lumen depreciation data. It is often helpful to have customized lookup tables for specific manufacturers and applications.
- t *lamp***  
Use the given lamp type for all input files. Normally, *ies2rad* looks at the header lines of the IES file to try and determine what lamp is being used in the fixture. If any of the lines is matched by a pattern in the lamp lookup table (see the **-f** option above), that color and depreciation factor will be used instead of the default (see the **-c** and **-u** options). The *lamp* specification is also looked up in the lamp table unless it is set to “default”, in which case the default color is used instead.
- c *red grn blu***  
Use the given color if the type of the lamp is unknown or the **-t** option is set to “default”. If unspecified, the default color will be white.
- u *lamp***  
Set the default lamp color according to the entry for *lamp* in the lookup table (see the **-f** option). This is the color that will be used if the input specification does not match any lamp type patterns. This option is used instead of the **-c** option.
- m *factor***  
Multiply all output quantities by *factor*. This is the best way to scale fixture brightness for different lamps, but care should be taken when this option is applied to multiple files.

## EXIT STATUS

0 if successful, 1 if not.

## ENVIRONMENT

RAYPATH

Colon-separated list of directories to search for lamp lookup table

## FILES

The output files will be created in the current directory (no matter which directory the input files came from) unless the **-l** or **-p** options are used.

<*luminaire*>.ies

The IES LM-63 input file. May also be from the standard input. If the standard input is the source, the **-o** option must be specified, to provide a filename.

<*luminaire*>.rad

The RADIANCE scene description. May also be sent to the standard output.

<*luminaire*>.dat

The IES candela values.

<*luminaire*>+.dat

The IES tilt data. If tilt data is not provided (it is mostly needed for luminaires which use metal halide lamps), this file is not generated.

<*luminaire*>.oct

If the **-g** option is given, the compiled MGF geometry is placed in this octree file.

<*RAYPATH*>/lamp.tab

lamp table

## EXAMPLES

To convert a single IES data file in inches with color balanced output and 15% lumen depreciation, creating the files “fluor01.rad” and “fluor01.dat” in the current directory:

```
ies2rad -di -t default -m .85 fluor01.ies
```

To convert three IES files of various types to tenths of a foot and put them in the library “/usr/local/lib/ray” subdirectory “source/ies”:

```
ies2rad -df/10 -l /usr/local/lib/ray -p source/ies ies01 ies02 ies03
```

To convert a single file and give the output a different name:

```
ies2rad -o fluorescent ies03
```

## REFERENCES

LM-63-86, LM-63-91, LM-63-95, LM-63-02, LM-63-19

*IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information*. IESNA - Lighting Measurement and Testing. Illuminating Engineering Society, 1986, 1991, 1995, 2002, 2019.

LM-75-01

*Goniophotometer Types and Photometric Coordinates*. New York: Illuminating Engineering Society of North America, 2001.

The Materials and Geometry Format

Greg Ward. *The Materials and Geometry Format* <<https://floyd.lbl.gov/mgf/mgfdoc.pdf>>. Lawrence Berkeley Laboratory, 1996.

## AUTHOR

Greg Ward

## BUGS

In pre-1991 standard IES files, all header lines will be examined for a lamp table string match. In post-1991 standard files, only those lamps with the [LAMP] or [LAMPCAT] keywords will be searched. The first match found in the file is always the one used. This method of assigning colors to fixtures is less than perfect, and the IES would do well to include explicit spectral information somehow in their specification.

Not all luminous openings defined in the IES standard are supported. So far, however, we have yet to find IES files which use the unsupported shapes.

## SEE ALSO

**lamp.tab(5), mgf2rad(1), oconv(1), pfilt(1), rad2mgf(1), rpict(1), xform(1)**