Rendering with Autodesk® 3ds Max® Design and mental ray®: Five Easy Steps for AEC Users

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Cheat Sheet – A Summary of the Five Easy Step for rendering with mental ray

It is strongly recommend to downloading the "Easier rendering with mental ray for design workflow" white paper for a deeper understanding of this workflow.

Lighting Scenario A: Exterior Scene during Daytime

Daylight System only

1. Create a Daylight System

2. In the Environment and Effects window, make sure the mr Physical Sky shader has been automatically assigned in the Environment Map slot; this will add the blue gradient background that changes color based on the Sun angle automatically.

3. In the Environment and Effects window, enable the mr Photographic Exposure Control and use the Outdoor Daylight, Clear Sky preset. Adjust the exposure intensity to achieve proper brightness. (15)

4. Final Gather (FG) should be turned on by default and the Bounce value set to 0.

5. Keep the default rendering settings for now and click Render.

Lighting Scenario B: Exterior Scene at Dawn or Dusk

Daylight System+ photometric lights

1. Change the time of the day of the Daylight System to early morning or late afternoon so the sun is just below the horizon

2. Turn off the mr Sun and mr Sky sources in the Daylight System, or reduce their intensity to a minimum (0.01).

3. Lower the exposure value accordingly.

4. Start adding photometric lights according to your needs.

5. Render

Lighting Scenario C: Interior Scene with Sunlight Entering Through Windows or Doors

Daylight System + mr Sky Portals + Final Gather with Multiple Bounces

1. Start by setting up your exterior rendering. Refer to *Lighting Scenario A: Exterior Scene During Daytime*. Once you are satisfied with an exterior rendering, add a mr Sky Portal covering the same size then the opening of space. Make sure the arrow points inside the space.

2. Move your camera inside.

3. Change the Exposure Control to the Indoor Daylight preset: this will adjust the aperture of the camera to interior lighting conditions, which are darker than exterior spaces. The exposure value might need slight adjustment depending on your scene but this is a good place to start.

4. Increase the Final Gather diffuse bounces to ~3-4: this will bounce the light around inside the space.

5. Render

Lighting Scenario D: Interior Scene Using Artificial Light Only

Photometric lights only.

1. Turn off any mr Sky Portal that you have previously added in the windows or door openings.

2. Turn off the Daylight System; we no longer want any lights to come from the mr Sun or mr Sky. Remove the mr Physical Sky shader from the environment map. At this point, if you render, you should get a completely black image. If bright highlights are visible in the reflections of the materials, you forgot to turn off some of these elements.

3. Start with the Exposure Control preset Indoor Nighttime. You will adjust some settings when you start adding artificial light sources, but it's a good starting point.

4. Create Photometric Lights in the space. As a reference, here are typical intensities corresponding to real-world lighting values:

5. Enable Final Gather, with 3-4 Diffuse bounces

6. Render

Animation Scenario A: Animated Objects and a Still Camera

One Final Gather File per frame in a first pass (FGM pass).Then interpolate the FGM solution across multiple frames to render the beauty pass.

1. In the Render Setup window, Common tab, make sure that you have set the Time Output to be Active Time Segment, Range, or a series of Frames.

2. First, you need to render the FGM pass. Open the Render Setup window and navigate to the Indirect Illumination tab, then scroll down to the Reuse section. Set the Mode to One File Per Frame (Best for Animated Objects) and check Calculate FG/GI and Skip Final Rendering. This will enable you to only render the FGM at this point.

3. Under the Final Gather Map section, choose Incrementally Add FG Points to Map File and give a name and location to the .fgm file (by default it will be saved under the project folder renderassets; it is a good idea to leave it there).

4. Click Generate Final Gather Map File Now or Render. This will start the rendering process of the FGM only and save one .fgm per image. Note: this process may take some time to complete, depending on the length and complexity of your animation sequence.

5. Once the FGM rendering process is over, still under the Reuse section, uncheck Calculate FG/GI and Skip Final Rendering. In the Final Gather Map Section, choose Read FG Points Only from Existing Map Files. Click Render. The beauty pass will render using the already calculated FGM file and interpolating over two frames; this will usually take less time than rendering the FGM sequence.

Animation Scenario B: Animated Camera and Still Objects (Walkthrough/Fly-by)

Final Gather Projection first. (FGM pass) Then render the beauty pass.
This technique is faster to render since only the FGM needs to be rendered once instead of rendering it for every frame.

1. In the Render Setup window, Common tab, make sure that you have set the Time Output set to Active Time Segment, Range, or series of Frames.

2. First, you need to render the FGM pass. Open the Render Setup window and navigate to the Indirect Illumination tab, Final Gather section. Choose Project Points From Position Along Camera Path. By default the camera path gets divided into nine different segments into which the FG points will be projected and used to calculate the FGM.

3. Then, go to the Reuse section and set the Mode to Single File Only (Best for Walkthrough and Stills) and check Calculate FG/GI and Skip Final Rendering. This will render only the FGM at this point.

4. Under Final Gather Map, choose Incrementally Add FG Points to Map File and give a name and location to the .fgm file (by default it will be saved under the project folder renderassets; it is a good idea to leave it there).

5. Click either Generate Final Gather Map File Now or Render

6. Once the FGM rendering process is over, still under the Reuse section, uncheck Calculate FG/GI and Skip Final Rendering. Under Final Gather Map, choose Read FG Points Only from Existing Map file. Click Render and the beauty pass will render using the already calculated FGM file.

Animation Scenario C: Animated Camera and Animated Objects

A combination of both techniques.

1. In the Render Setup window, Common tab, make sure that you have set the Time Output to Active Time Segment, Range, or series of Frames.

2. First, you will need to render the FGM file. Start by going to the Render Setup window and navigate to the Indirect Illumination tab, Final Gather section. Choose Project Points From Positions Along Camera Path.

3. Next go to the Reuse section further down the same tab. Set the Mode to One File Per Frame (Preferred for Animated Objects) and check Calculate FG/GI and Skip Final Rendering. This will render only the FGM at this point. Under Final Gather Map, choose Incrementally Add FG Points to Map File and give a name and location to the .fgm file (by default it will be saved under the project folder renderassets; it is a good idea to leave it there).

4. Click either Generate Final Gather Map File Now or Render. This will start the rendering process of the FGM only and save one .fgm per image. Each FGM file (one file per frame) will be divided into the number of segments you have set (nine by default). Remember, this is a combination of both techniques.

5. Once the FGM rendering process is over, still under the Reuse section, uncheck Calculate FG/GI and Skip Final Rendering. Under Final Gather Map, choose Read FG Points Only from Existing Map file. Click Render and the beauty pass will render using the already calculated FGM files.