

SPA Material Bake V2

Bake Complex UE Materials into Optimized Texture Maps

Complete Documentation

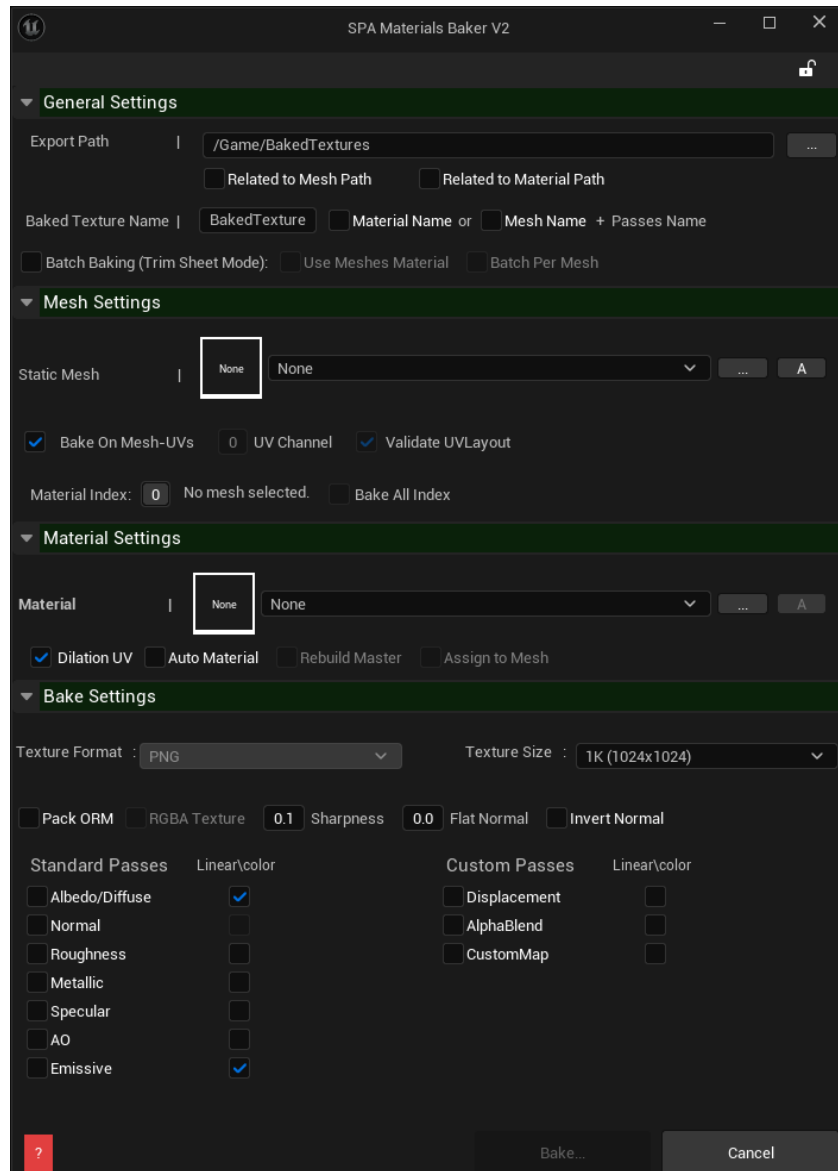


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1. Overview

SPA Materials Baker is an Unreal Editor plugin that allows users, artists and technical teams to bake texture passes from any material Type onto a mesh-UV channel. It is designed for **asset optimization**, **Increase Framerates** and **Draw calls**, look-dev capture, and preparing textures for LOD, mobile, VR, or external pipelines.

SPA Material Bake V2 is a full-feature Unreal Engine 5 material baking toolkit that converts complex shaders into optimized PBR textures.

Core idea:

Any Mesh + Any Material → Bake → Optimized PBR Textures + Auto Materials

Key capabilities:

- Works with any material type
- Generates PBR texture passes
- Automatically creates materials & instances
- Supports world-space and procedural shaders

2. Core Workflow (Bake Pipeline)

Input

- Static Mesh / Skeletal Mesh
- Any material type (layered, procedural, world-aligned)

Process

The Bake button triggers:

- Texture extraction
- Pass generation
- Optional packing (ORM)
- UV processing (tiling / projection)

Output

- PBR texture maps
- Auto-generated material
- Auto-assigned to mesh

💡 *This is designed as a one-click production pipeline, not just a baker.*

3. Mesh Support (Static & Skeletal)

Supported mesh types:

- Static meshes
- Skeletal meshes (characters, animated assets)

Advanced features:

- Multi-material meshes
- Per-material index baking
- "Bake All Index" option

💡 *Each material slot can generate its own texture set automatically.*

4. Material System & Automation

Auto Material Creation

The system can generate a PBR master material and connect:

- BaseColor
- Normal
- ORM (packed) / single texture
- Displacement
- Emissive

Material Instances

One instance per:

- Mesh OR Material index
- Auto texture assignment
- Clean naming system

Auto Assignment

Assigns generated materials back to:

- Static mesh
- Skeletal mesh
- Scene actors



"Create simple material based on selected texture passes"

5. UV & UDIM Workflow

Supported UV Types

- Standard UVs (0–1)
- Overlapping UVs
- Tiled UVs
- UDIM-style layouts (outside 0–1)

Modes

- Bake on Mesh UVs — strict UV layout
- Projection mode — supports tiling & UDIM-style

Internal Handling

- UV wrapping / rebasing
- Seam stitching
- Border dilation

 *Limitation: Outputs single texture atlas (no multi-tile UDIM export)*

6. Texture Baking System

Standard Passes

- Base Color
- Normal
- Roughness
- Metallic
- Specular
- AO
- Emissive

Advanced Options

- Normal map controls
- Linear / sRGB per pass
- Sharpening

Packed Output

ORM packing:

- R → AO
- G → Roughness
- B → Metallic

💡 *"PBR Texture Passes" is a core output concept.*

7. Batch Baking Workflows

1. Batch Baking (Shared Material → Atlas)

- Multiple meshes
- Same material
- Output → single texture set

2. Mesh Materials (Different Materials → Atlas)

- Different materials
- Combined into one atlas

3. Batch Per Mesh

- Each mesh gets its own textures
- Each mesh gets its own material instance

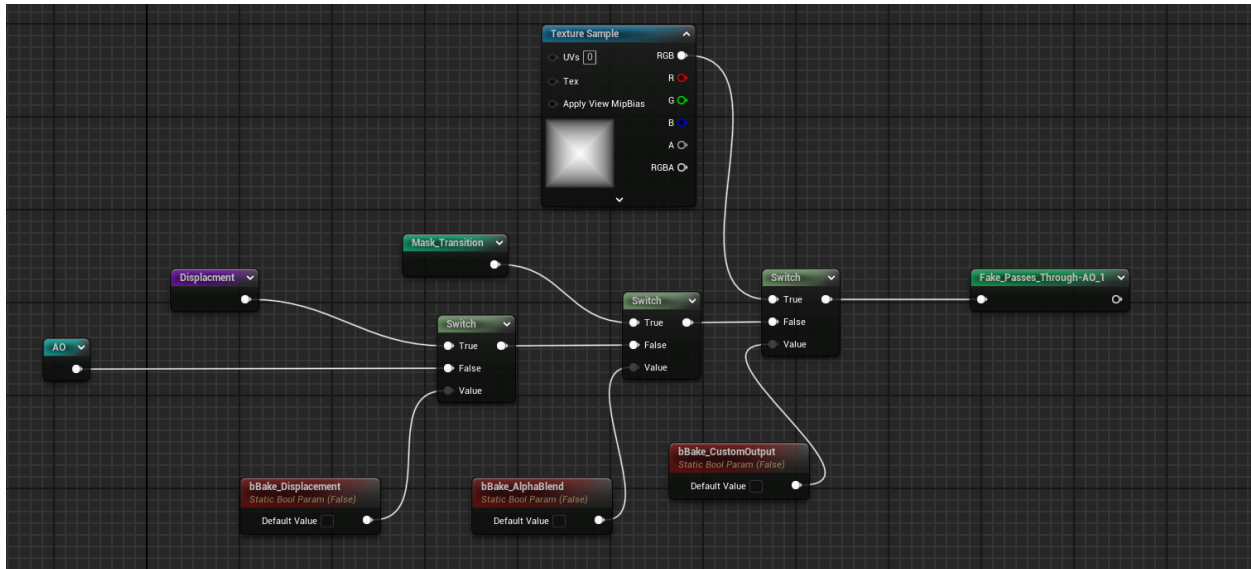
4. Modular Workflow

- Meshes sharing UVs can share textures
- Great for modular environments

💡 *This is not just batching — it's production pipeline automation.*

8. Custom Pass System

it's a Fake Passes That's come out through the AO Pass, you can't select AO with Custom Passes and Must Bake the Custom Passes One by One



As you see, if need any of custom passes need to define a static bool Params in you material.it should exact name:

(**bBake_Displacement** – **bBake_AlphaBlend** _ **bBake_CustomOutput**)

And then connect it to the **Ambient Occlusion** output node.

Supported

- Displacement
- Opacity / Alpha
- Custom data maps

Behavior

- Clean 0–1 output
- Uses shader routing

⚠ *Limitation: Custom passes are mutually exclusive*

💡 *Custom passes use a "fake bake" technique internally.*

9. World Space & Complex Materials

Fully Supports

- World-aligned textures
- Triplanar projection
- Procedural materials
- Layered shaders

💡 *"Expensive shader networks" can be baked into textures.*

⚠ *Known Issue: Some dynamic/world-space materials may behave differently.*

10. Quality & Optimization Controls

Controls

- UV dilation (seam padding)
- Sharpening
- Normal smoothing
- Normal inversion
- Emissive clamp

Extra

- Texture compression handling
- Linear vs sRGB

 *UV dilation prevents texture bleeding.*

11. Editor UX & Visual Help

Features:

- Built-in tooltips (text + images)
- Visual guides for: Batch modes, UV modes, Dilation, Custom passes

 *This is a huge usability advantage — users don't need external docs for many workflows.*

12. Limitations & Best Practices

Limitations

- No multi-tile UDIM export
- No automatic UV atlas generation
- Landscape/decals not supported
- Custom passes cannot run together
- Results may differ from runtime materials
- Some dynamic or world-space effects (e.g., DFAO) may not bake as expected.
-

Best Practices

- ✓ Validate UVs before baking
- ✓ Use Mesh UV mode for clean 0–1 result
- ✓ Apply transforms before baking
- ✓ Regenerate normals if needed
- ✓ Use smaller batches for 4K baking
- ✓ Keep consistent UE version

Final Summary

SPA Material Bake V2 is a full production-ready material baking pipeline, not just a baking tool.

It combines:

- Advanced material support
- Smart batch workflows
- UDIM/tiled UV handling
- Automatic material generation
- Editor-integrated usability