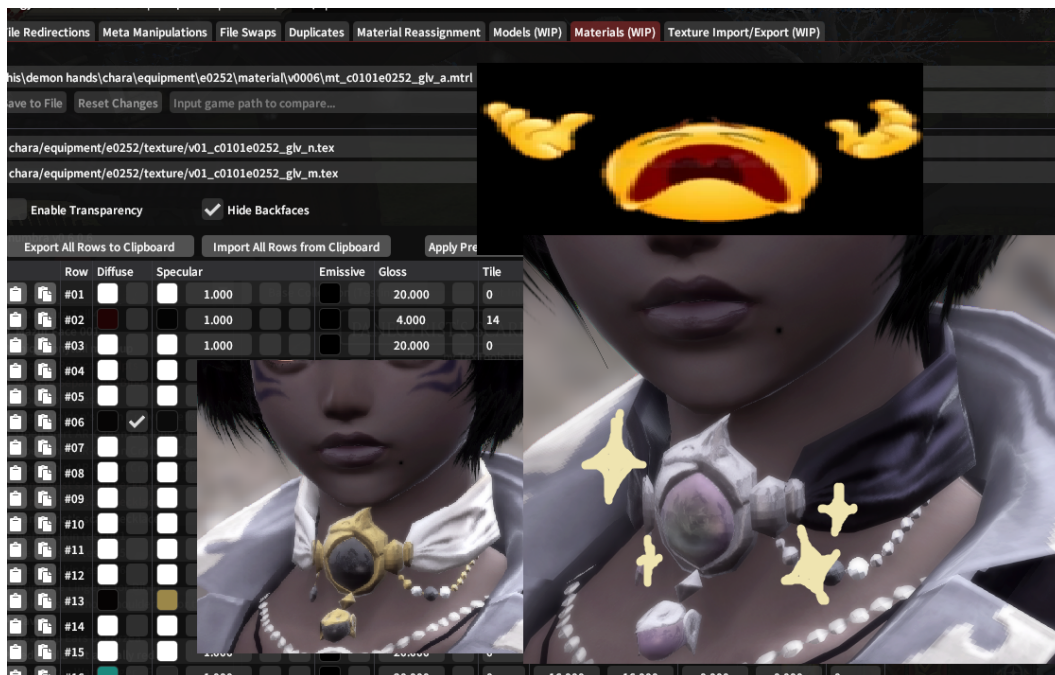


# FishEverlasting's Guide to Colorset Editing in Penumbra

*which can become outdated at any time, but still has a lot of good information about how colorsets work!*

*Last edited: 8/8/2023*



Hi! I'm [FishEverlasting](#), local 3D chick, illustrator, and bug enthusiast! Welcome to my horrible little guide. Please bear with me; this guide tries to be pretty complete, but I may have missed things. It also assumes you already know a little about modding, and have both TexTools and Penumbra at least somewhere on your computer.

*Last edited: 12/18/2022*

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# BASICS (INTRO TO COLORSETS & TEXTTOOLS)

Colorsets are visible in TexTools on the Textures tab of a given item.

How to find colorset in TexTools

1. Find item.
2. Pick material (top, middle dropdown.)
3. On Texture Map dropdown (top, right dropdown), select Colorset.



Colorset row.....    TexTools model view.....    And the colorset row highlighted.

This is how colorsets are controlled and work in FFXIV. A colorset determines the color (diffuse), spectral, glossiness, emissiveness (glow), dyeability, and tile material.<sup>1</sup>

**Color Blending/Row Blending:** Sometimes an object isn't fully white: either it will be gray, or it will look like the white isn't at full opacity, is patchy, painted on, etc. This is called colorset blending, or row blending. There's more info about its specifics on the [TexTools Reference Document \[click here\]](#), but the gist is that FFXIV allows for blending between two (2) colorset Rows.

This can be used in a lot of cool ways--and often is, so keep an eye out for that.

*For more information, see ADVANCED: COLORSET BLENDING below.*

Q: How are colorsets determined on the model?

A: The *opacity of the normal map* determines what colorset goes where. If you want more information on this, check out the [TexTools Reference Document \[click here\]](#). Because it has so much possibility, blending is really finicky, and just keeps getting more

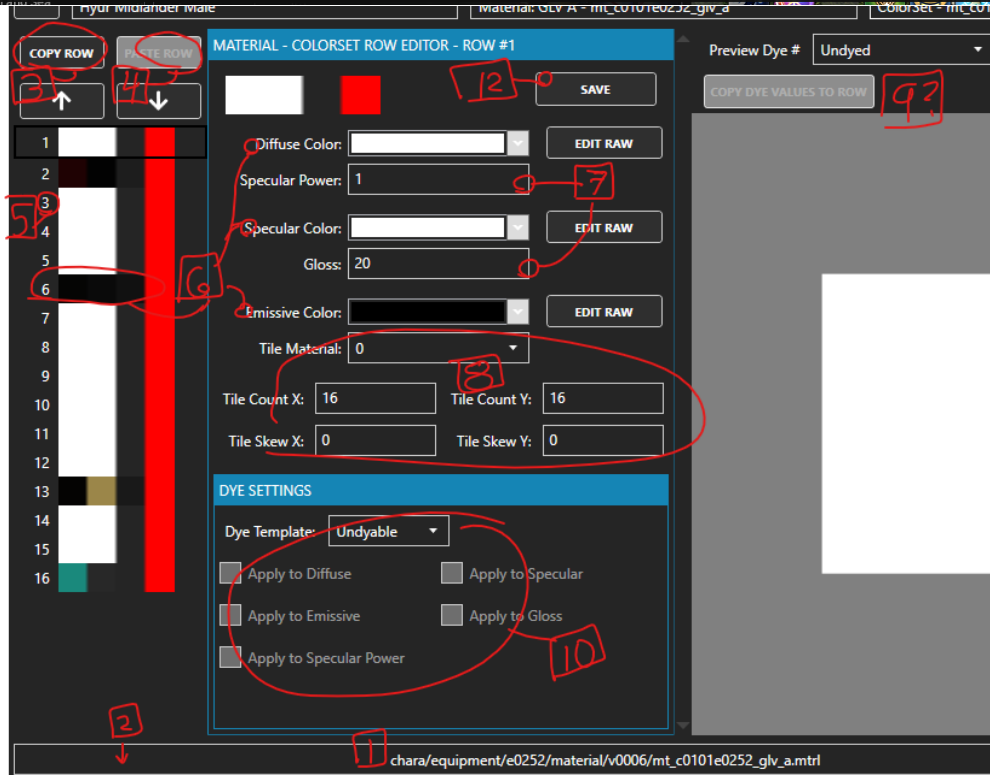
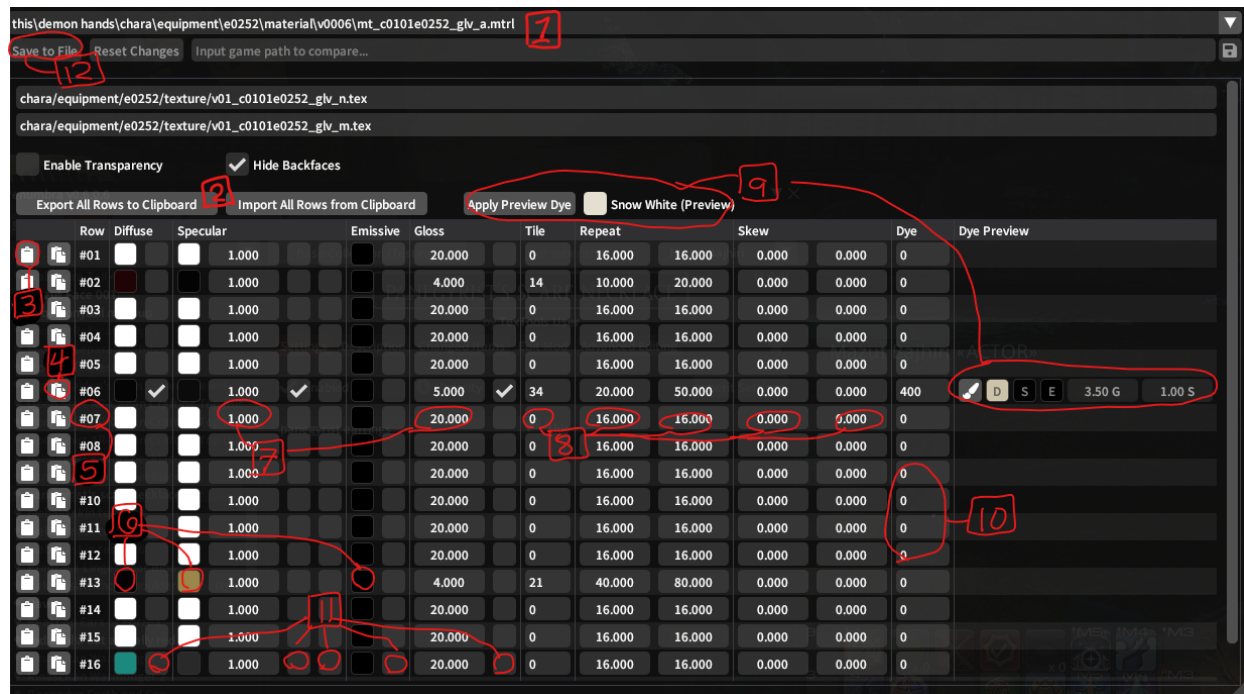
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<sup>1</sup> What do you mean, 'tile material'? I thought materials were something else.

Don't get it twisted! Here, "tile material" is a repeated/tiled bump map style texture that FFXIV uses to apply a nice bit of extra texture for 'cheap', engine-wise. For instance, this is why cloth looks like cloth on ARR items: it's not that the items are particularly HD, it's that they have a setting that says, 'I want you to "build" this out of "cloth-looking stuff".'

so as Square Enix finds new ways to use their own shading method to pack more complex data into it. Your best bet about this is to go look at a bunch of items in Highlight Colorset Row and get a sense of how they're using them. Again, see ADVANCED: COLORSET BLENDING below for a little more information and some examples of what I'm talking about.

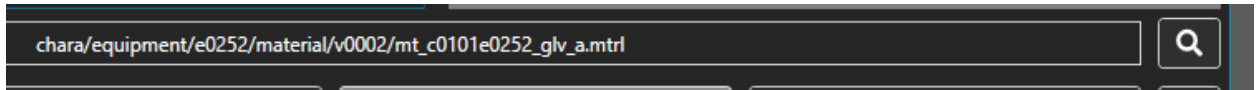
## ANATOMY OF A PENUMBRA COLORSET PAGE



1.



**Material Name:** Covered above. Looks like this in TexTools:



2.

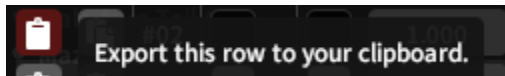


**Export/Import All Rows From/To Clipboard:** Export the whole colorset (or import it) as text. It'll look something like this wild bullshit letter soup:

[illegible]

As you may have guessed, you don't have to parse that! The computer knows! *That being said*, when working with colorsets, you may like to export each of the starting/default colorsets and slap those into, say, a Notepad window. (Label them!) I will be calling this a Notepad Palette, and discussing it later.

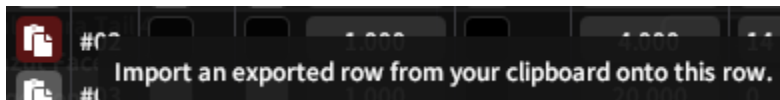
3.



**Export Row:** CTRL+C this row.

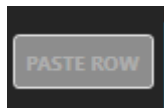
- a. Because this is raw output (ie: `w32aPCw8ADwAPAA8ADwATQAAAAAAAAAgAFAAAAAAAEwAAA==` or something), you can also put this in your Notepad Palette.

b. Same as  Copy Row in Texttools.



4.

**Import Row:** CTRL+V this row. This will slap in whatever row you have in your

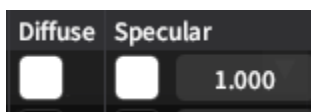


clipboard. Same as  Paste Row in TexTools.

5.



**Row number.** Same # as in TexTools!



6.

**'Color swatch' boxes:** Displays present color value. Click them to change the



color you want. In Texttools, this looks like this:

Diffuse Color: [Color Picker] EDIT RAW

Specular Power: 1

Specular Color: [Color Picker] EDIT RAW

Gloss: 4

| Specular | Emissive | Gloss  |
|----------|----------|--------|
| 1.000    | Base     | 20.000 |

7.

**Your Specular strength and Gloss Strength.** Same as in Textools, here.

Specular Power: 1

Gloss: 4

| Tile | Repeat | Skew  |
|------|--------|-------|
| 0    | 16.000 | 0.000 |

8.

**Tile Material.** Same as this in Textools:

Tile Material: 14

Tile Count X: 10    Tile Count Y: 20

Tile Skew X: 0    Tile Skew Y: 0

Apply Preview Dye Snow White (Preview)

Filter...

- None
- Snow White**
- Ash Grey
- Goobbue Grey
- Slate Grey
- Charcoal Grey
- Soot Black
- Rose Pink

| Dye | Dye Preview |
|-----|-------------|
| 0   |             |
| 0   |             |
| 0   |             |
| 0   |             |
| 0   |             |
| 0   |             |
| 400 |             |

Apply D S E 3.50 G 1.00 S

9.

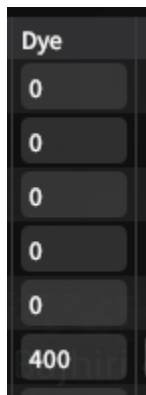
**Dye preview:** This is (kinda) unique to Penumbra colorsets! It'll generate color swatches based on what results you'd get from dyeing a given row, any particular color.

Apply D S E 3.50 G 1.00 S

Apply the selected dye to this row.

You can even tell Penumbra to make the

colorset turn that 'dyed' state as its default. Pretty neat!



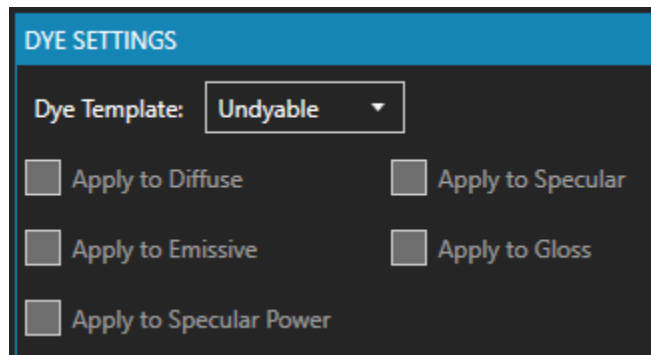
10.

**Dye settings:** This is your 'dye number.' It follows the patterns laid out in the [TexTools Reference Document \[click here\]](#)., under the tab Dye Template & Tile Reference (tabs are at the bottom in a Google Sheet.)

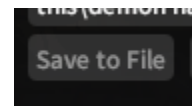


11.

**Dye Application Checkboxes:** These show whether the dye template will apply to this given argument (diffuse, gloss, specular, etc). Same as this, in TexTools:



12. **Save To File:** This will save all the changes you've made on the colorset, to your mod in Penumbra.



- a. **This cannot be undone.** That's why we keep our Notepad Palette! But if you really fuck it up, just import your mod into Penumbra again and start over. (Or copy from there to the old one!)
- b. Once you've hit Save, you can hit Refresh (All/Self/etc, or type /penumbra redraw). If your mod is Enabled (and you have selected the corresponding Option), then you'll see the colorset change in real time! EXCITING!



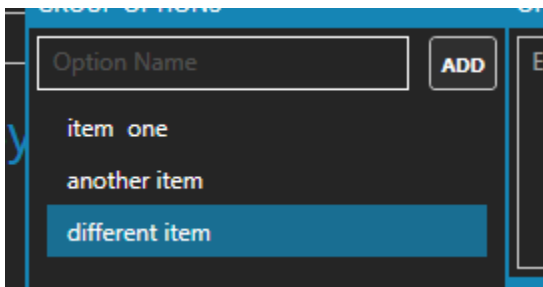
- c. Same as SAVE button in TexTools.

## HOW TO MAKE A COLORSET

1. EITHER: Make an 'editing mod' containing your target item(s) in TexTools, OR make an 'empty mod' in Penumbra.
  - a. *TexTools:* Advanced Modpacks can be made in TexTools while the game

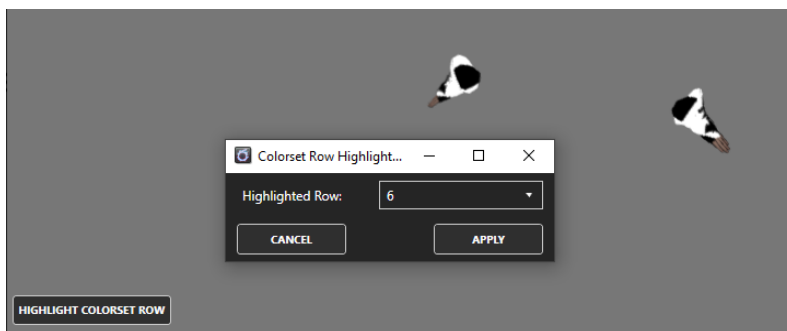
is open.

- b. Recommended: Make separate 'options' for each object you want to play with. *Why?* In Penumbra, their paths will start with \[modpack name]\[option name]\(chara/accessory/etc). So if you label them with what option contains what item, you can find them quite easily.



```
this\demon hands\chara\equipment\e025
this\demon hands\chara\equipment\e025
this\moonward\chara\accessory\a0131\r
this\panegyrist earrings\chara\accessory
```

- c. *Penumbra*: On 'Mods' tab, on the bottom left, there's a
2. Import that mod into Penumbra (if it isn't already.)
3. Locate your colorset (see "Finding Your Colorset In Penumbra" below).
4. Open Notepad, Notepad++, or your text editor of choice. This will be your '**Notepad Palette**'.
5. *Export All Rows To Clipboard*. Put that in your **Notepad Palette**, and label it with what item it comes from, and that it's the Default. You may also like to make a note of which material path it comes from, so that you can find that easier too.
6. Edit away!
  - a. Pick colors in the swatches.
  - b. Change dyeability. (To see what row applies to where, check out the Highlight Colorset Row dialogue in TexTool's Model tab.)



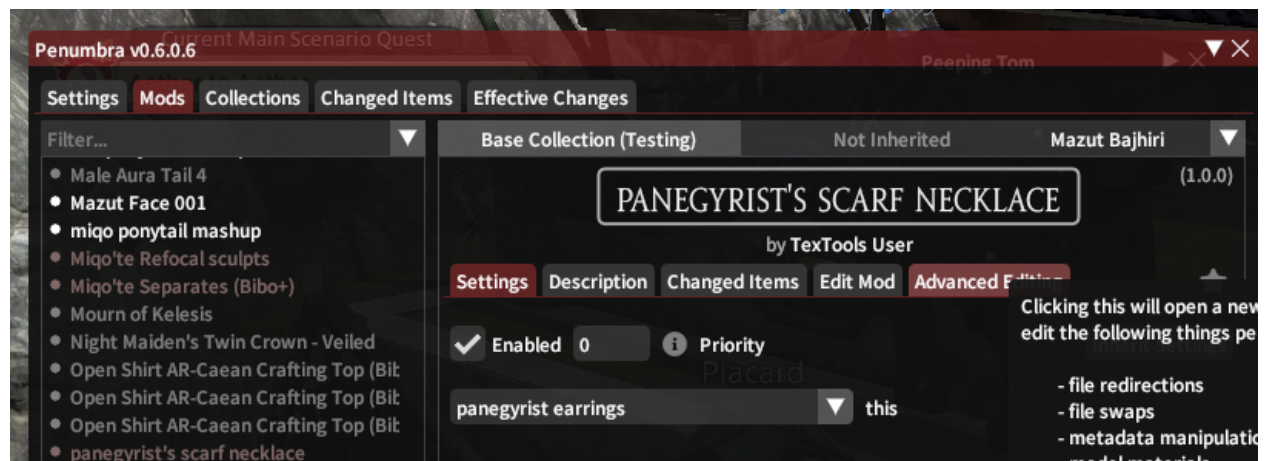
- c. Copy rows from one material to another.
  - i. Note: If you like more than one row (or if there's blending, that's important!) you should copy both to your Notepad Palette (and label them!)
- d. You might like to 'quicksave' your colorsets while you work, just in case. Do this by Export All Rows To Clipboard, then put it in your Notepad Palette, labeling them with what object they are and what order/time you 'quicksaved' them.
- e. If you've irrevocably saved over and messed up your whole object, save what you've done, then import another version of the *same modpack* to

Penumbra, open it in Advanced Editing, find the material, Export All Rows To Clipboard. *Then*, go back and slap that into your messed-up one, to revert it all to the starting point.

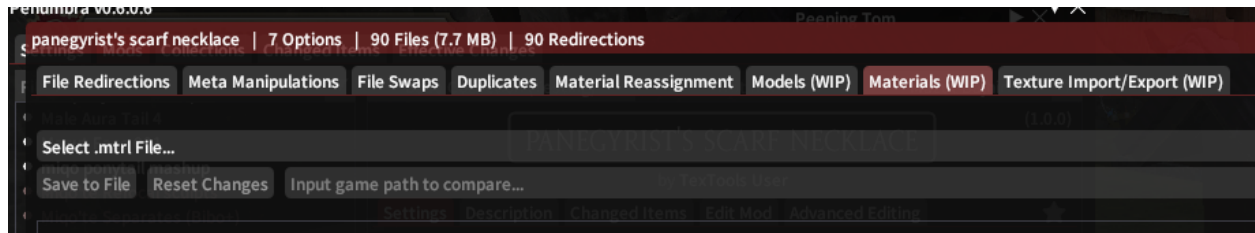
- i. You won't have this issue if you're saving your Default Colorset to your **Notepad Palette!**
- f. Preview dyes. Hell, commit those dyes to the row and turn off dyeability, if you want a part to stay a certain color.
7. When you're done, hit Save To File.
8. Enable your modpack (and correct option) in Penumbra, and redraw your character, either by hitting the buttons at the bottom of the Penumbra window, or by executing '/penumbra redraw'.
9. You should see your new colors on your character!
10. Problems? See TROUBLESHOOTING, TIPS & TRICKS, & FAQ below.
11. Things you can't really do in Penumbra (yet):
  - a. View what row corresponds to what part of the object.
    - i. You can figure this out either by trial and error, or by the TexTools viewer, as outlined in Step 6b.
  - b. Preview without Save To File (sorry, this is how it works in TexTools too, it's just how it works.)
  - c. CTRL+Z undo?
  - d. Make FFXIV use a different shader method :C
  - e. Sometimes dye template options won't show up? I don't know why. But sometimes, completely undyeable items won't show any dyeability template rows. No clue why. You can probably fix this the hard way, by making at least 1 row of it dyeable in TexTools, then packing that up and using that material.

## FINDING A COLORSET/MATERIAL IN PENUMBRA

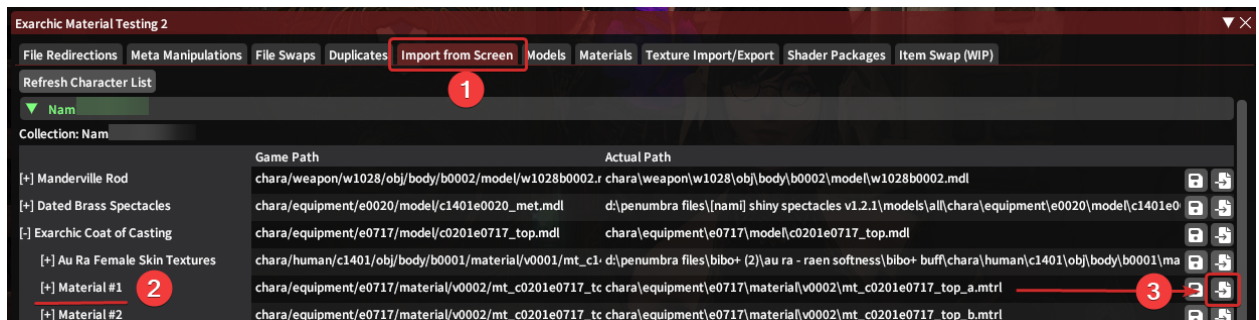
1. Make a modpack with the item you want in it. (Advanced Modpacks can be made in TexTools without closing the game! Very useful.)
2. Import the mod into your Penumbra, and go to Advanced Editing.



3. In the Advanced Editing Window, go to the **Materials** tab.



4. Select your correct .mtrl file: Equip your object so it's displaying correctly, then go to the **Import From Screen** tab and find the relevant material from your gear object. Here's a handy diagram from [NovaQuark's excellent guide to making colorsets from vanilla objects in Penumbra](#):



5. Please note: Variants have different colorsets! So you'll need to determine which variant applies to the object you want. EX: v0001, v0005, etc

## TROUBLESHOOTING, TIPS & TRICKS, & FAQ

Q: *My color isn't the same as the reference object.*

A: Check if there's color blending. This happens often with unique-looking colors, painted-on decals and details, and non-hard edges. It's also used a lot in ShB/EW+ items to add additional, higher-quality colored shading.

Check out the [TexTools Reference Document \[click here\]](#) for some more information on this, but what *you* need to check is the "blending neighbor" of your target row, on the *source item*. If your source row is odd (1, 3, 5, 7, etc), check the row directly after it (rows 1+2, 3+4, etc) Do vice versa for even numbered rows. (row 4 -> rows 3+4). For more information, see ADVANCED: COLORSET BLENDING below.

Q: *Where are my dye template rows?*

A: Sometimes dye template options won't show up? I don't know why. But sometimes, completely undyeable items won't show any dyeability template rows. No clue why. You can probably fix this the hard way, by making at least 1 row of it dyeable in TexTools, then packing that up and using that material.

Q: *I edited the right object, and it had the same colors as the colorset of the thing I wanted to mess with, I **know** it did. What the hell?*

A: Check your variant. Some variants have their own copy of the colorset even though the colorsets *are* the same; I think Penumbra makes those unique to each item, maybe? Maybe not? Anyway, make sure you're editing the right variant.

Q: *I saved everything correctly, but my item isn't displaying any changes on my character.*

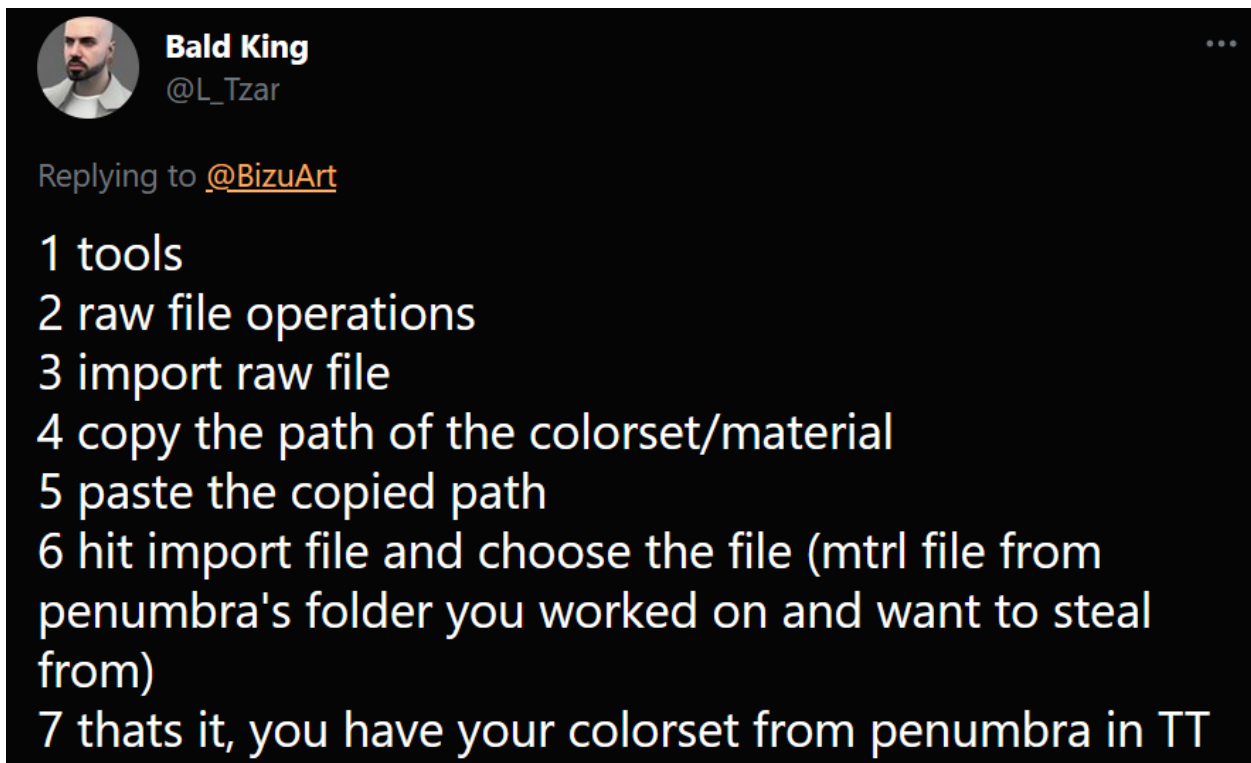
A: Check in Penumbra, and make sure you have the *correct modpack* enabled, AND the correct *option* selected. This one keeps getting me, I'll admit.

Q: *How do I make a gradient between two colors?*

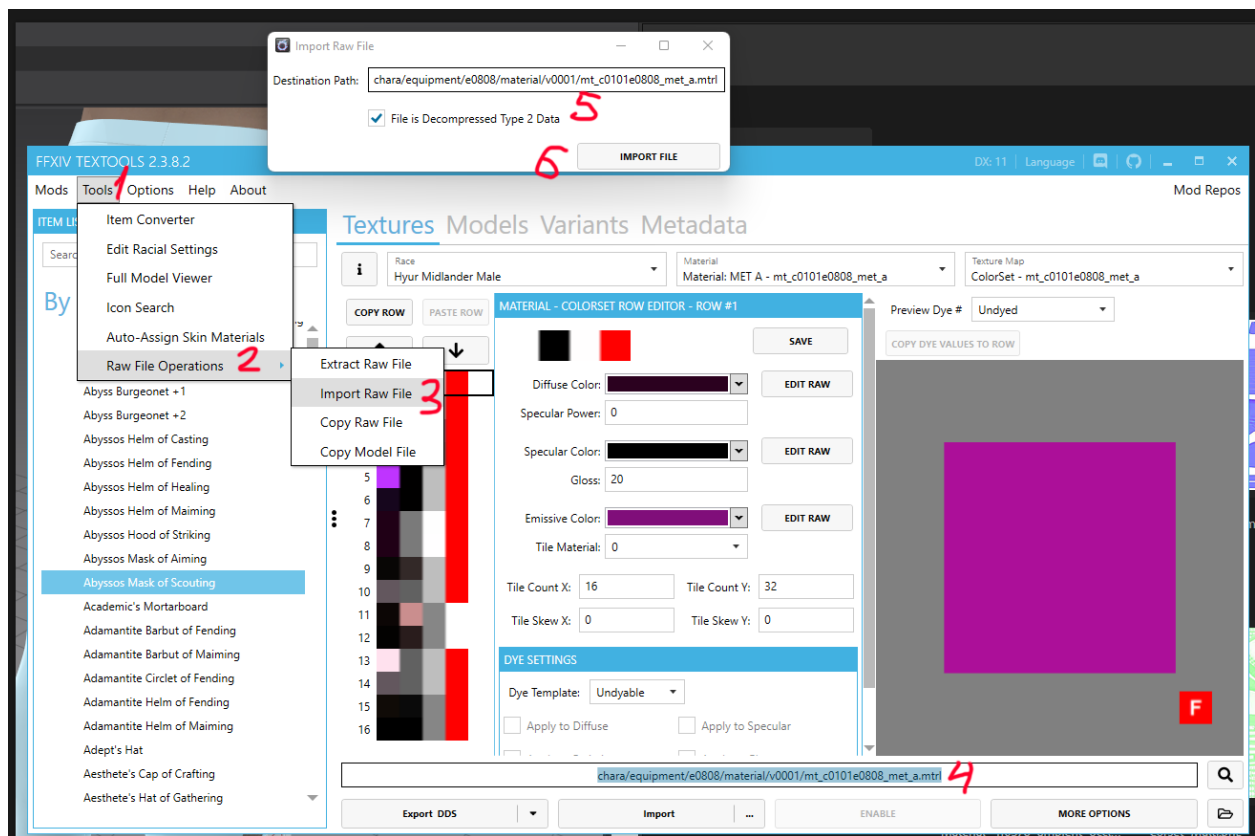
A: See ADVANCED: COLORSET BLENDING below.

Q: *How do I get my colorset from Penumbra into TexTools?*

A: Tsar, mod god, tweeted: [https://twitter.com/L\\_Tzar/status/1599779434164543489](https://twitter.com/L_Tzar/status/1599779434164543489)



Bizu, moddesh goddess, clarifies like so:



## ADVANCED: COLORSET BLENDING



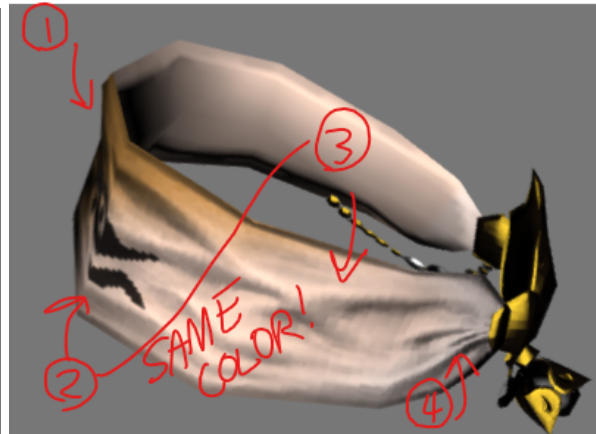
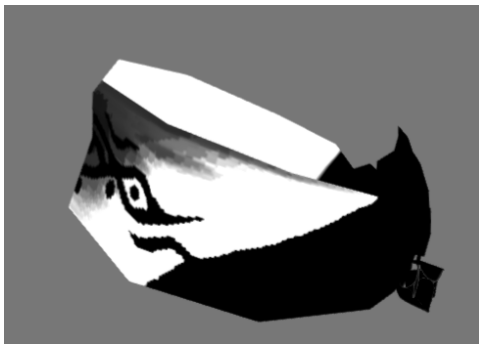
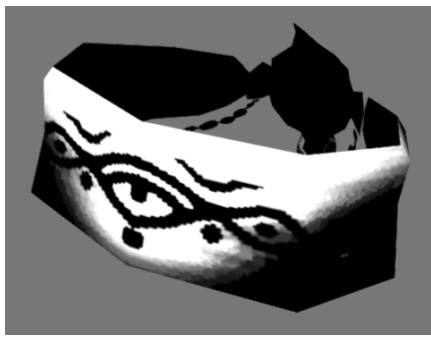
Q: *How did they make this blend so nicely? or How come this is two colors? or How do I make a gradient?*

A: Please brace for some bullshit.

If your source item has blending but your target item doesn't, you might be able to fix that with some advanced work via editing the alpha of the normal map. This will often be because there's a value between the two colorset row alpha values.

TL;DR: Adherence to Row colorset value is determined by how close they are to each of their Blending Neighbor set.

TexTools will display this as white in one row, and grayish & shiny in the other (ie 56% Greyscale value).



*Pictured: Textools 'Highlight Colorset Row' Display showing blending between two rows on Panegyrist's Earring, and the blending workaround used. Note how the devs kept the same color across the hard border, avoiding the 'crunchy color edge' issue seen on many other objects. Neat!*

*Actual math for how to determine how much FFXIV will shade a pixel with a given Row:*

$$\frac{(\text{Target pixel greyscale\% value} - [\text{Row A greyscale\%} - \text{Row B greyscale\%}])}{10} = \% \text{ of Row A at target pixel}$$

For example: if a particular point on the alpha has Greyscale Value=42%, then it's 2%greyscale away from Row 7 (40%) and 4.67%greyscale away from Row 8 (46.67%). Therefore, that pixel will be rendered as 29.98% Row 7, and 70.02% Row 8.

*Q: This sounds annoying and inefficient.*

A: I'm absolutely certain there's got to be some easy way to manage this when *creating* your normal's alpha, but what exactly, is beyond me. I've mostly been using a long and complicated string of swaps between selections and alpha channel values, but I work in Photoshop and don't know how it'd work elsewhere, much less how to explain it neatly. If you read this guide and there's a better way now, PLEASE send me a message at Fish#4218. You'll save my life.

If this guide helped you out, please consider [leaving me a tip!](#) Proceeds go towards groceries, cat food, or (if I'm really lucky) buying a copy of Hair Tools for Blender. ❤️