

I started the development of a white underglaze and a black underglaze for the studio. The reason behind this is due to the amount of material used in the studio and the cost of the underglaze. I looked up the 1 gallon retail cost of these items.

1 gallon of White underglaze = \$130.00

1 gallon of Black underglaze = \$140.00

In cases like this when I'm formulating, I like to have a starting point. I searched on the internet and found a link to a Ceramic Arts Daily article on the topic of making underglazes. Here is the link: <http://ceramicartsdaily.org/ceramic-supplies/underglaze-ceramic-supplies-2/how-to-make-homemade-underglazes/>

A common recipe for an underglaze will consist of 1/3 Frit, 1/3 clay, 1/3 stain and a gum. It did not take long to arrive at a nice looking black underglaze. I used Alberta slip as part of the clay in the recipe due to its iron content. Black Underglaze Recipe:

Frit 3110	50 g
Tile 6 clay	25 g
Alberta slip	25 g
Mason stain 6600	50 g
Macaloid	.85 g
CMC gum	.85 g

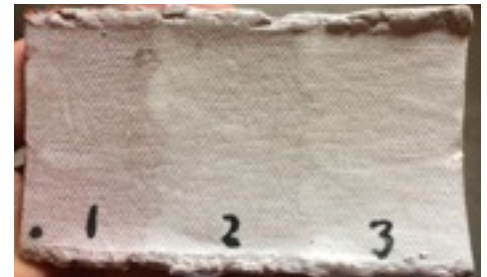
Black underglaze with Duncan Pure Brilliance Clear



Final Black Underglaze



For the white underglaze, I started with using tile 6 clay because it's very white. EPK is a bit more creamy and does contain more iron than Tile 6 or Grolleg. I used quite a bit of an opacifier to start, however the results came back yielding a creamy buff color. There was also a bit of a mud crack effect post firing. I tried a test with 10% titanium dioxide and the result was a beautiful light creamy yellow, but no white. Tin oxide is what got me to a very white looking underglaze. I decided to start with the whitest clay body in the studio as a base, Coleman Porcelain. So I used equal parts Frit 3110 and moist form Coleman Porcelain. This result was a beautiful opaque white glaze, but not underglaze. I had to raise the melting point of this so Alumina hydrate was the next test. 12.5% was getting there, but it was still fluxing. 20% looked very good. I finally found a test that was desirable. At high temp the result was a beautiful opaque Shino looking glaze.



Final White underglaze 1-3 coats



White underglaze at cone 10



White underglaze with Duncan Pure Brilliance Clear

One of the desirable qualities about an underglaze is how it brushes onto the surface of greenware and/or bisque-ware. Gums are added to create this quality. I used 1% cmc gum and 1% Macaloid (Vee gum T). One issue I had was that when I mixed up multiple small batches up this, the overall mixture was not drying in a suitable manner on bisque ware. I wanted to reduce the amount of gum overall so I calculated out how many batches I had made, then added in a batch without gum in it. So I reduced the gums from 1% down to .85%. This result was great. The underglaze brushed on very nicely. It also worked well with a clear glaze over it. Since then, I have done more tests and they have turned out great. The following is the final recipe:

In a blender mix:

Coleman Porcelain	50 g
Frit 3110	50 g
Alumina Hydrate	20 g
Zircopax	10 g
Tin Oxide	10 g
Vee Gum	.85 g
CMC Gum	.85 g