

## **CMC Gum**

**GUM, Aqualon, C.M.C., C. M. C.**

**Alternate Names: C.M.C.**

The term CMC is generic and refers to organic sodium carboxymethylcellulose. Gums are used in ceramics to harden unfired ceramic glazes (cement the particles together) for safer handling of the ware. Highly fritted glazes (lacking clay content) used in factory settings benefit greatly from the addition of gum. Gum additions are often unnecessary if the glaze has natural hardening properties (i.e. from 20% or more clay). Gum is an important addition to stain mixes that are applied over-glaze by stamping or painting.

Gum can act as a suspending agent by virtue of the fact that it thickens the slurry, however the side effects may make the use of other additives more attractive (i.e. an adequate amount of the right clay in the batch, bentonite). In fact CMC containing slurries sometimes do settle out more quickly; adding epsom salts or calcium chloride will help.

An important side effect of gum additions is that they cause slower drying. While this is advantageous for brushing glazes, it can make it very difficult to achieve an adequate glaze thickness and prevent drip marks. Dipping glazes work best if they are both naturally thixotropic and quick drying. Both of these properties can be detrimentally affected by gum additions.

Many people make a CMC gel by mixing 30-40 grams of powder per liter of water. This gel can then be used as part of the water amount when mixing glazes. Incorporating propylene glycol also can work well for making paintable stain mixes (i.e. 1 part thin gel with 1 part glycol).

Veegum CER is a mix of CMC and Veegum T.

Powdered gum can be very difficult to disperse in water thus it is difficult to add it to an existing liquid batch. However if gum powder is mixed with other dry ingredients before adding them to the water it can be done (often 0.5-1.5%). A much more effective method is to boil water, add about 25-35 grams of powdered gum per litre and mix vigorously with a mechanical mixer (it should thin out over time). This mixture must be added during mixing to replace part of the water. It is difficult to set a standard proportion because the amount of gum needed is totally dependent on the glaze's ability to harden. A starting point for glazes that powder or smudge excessively might be 1 part gum solution to 3 parts water. Performance of the mix compared with the side effects can then be evaluated and the proportion adjusted.

Organic binders need to burn away so of course they can cause some problems (e.g. pinholing in glazes). They need to burn away in such a fashion that the particles of mineral and frit are drawn into contact with each other to encourage reaction and prevent crawling.

Depending on time, temperature, pH, gum can be attacked by microbes or molds. If this happens store in a cooler place, make smaller batches, adjust the pH to make a less friendly environment, or add a biocide (i.e. Tektamer, NaN3). Many brush on glazes use CMC and can have a shelf life for this reason.

CMC gum trade name examples are Aqualon from Hercules, Gabrosa from Alzo Nobel.



### **What should the consistency of CMC gum solution be?**

This is CMC 35g/liter gum solution after it has been hot-mixed (using a mixer powerful enough to put plenty of energy into the solution without sucking air bubbles) and cooled to about 30C. As it cools further and sits it will thin and can be poured.



### **Gum content in glazes can have a dramatic effect on drying time**

is a low fire brushing glaze. It has been sitting on this plaster bat for two hours and shows little sign of dewatering. A typical pottery dipping glaze, by contrast, would dewater in seconds! Clearly, such glazes are only good for brushing.

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**\*For dipping use 1% CMC for painting 2-6%**

### **\*To remove CMC**

Flood the glaze with water and let settle. Then syphon off the excess water. If the glaze doesn't settle out in 2 days you have not used enough water. The higher the % of CMC the more water is needed to flush it out.

*\*Potclays UK*

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