

COLOR CHANGING CROSSETTES

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In my experience the best effects for color changing crossettes has been with charcoal-to-silver or glitter-crossette. I've tried different effects and colors but have not achieved the fullness of the charcoal glitter combination. For simplification, I use the Type 1 crossette, either $\frac{3}{4}$ " or the $1\frac{1}{8}$ " dia. Following are the formulas I've used with best results:

Formula #1

Chrysanthemum #8	
Potassium nitrate	52
Sulfur	6
Pine Charcoal	42

Formula #2

Glitter #17	
Potassium nitrate	47
Charcoal	13
Sulfur	13
Antimony sulfide	10
Magnalium	12
Dextrin	5

These formulas are, respectively, from Lancaster's book and Pyrotechnica #2.

Using our tool set, here is my procedure. Figure 1 shows how the sleeve should be marked either with a file or another method (tape, for instance) to determine the point where the two different star mixtures will come in contact with one another. This separation point is very important to keep constant so that all the stars will burn the same and break at the same time.

After the pump has been marked, the star mix is dampened for pumping. Keep in mind that glitter mix moisture should be kept down to not more than 8% (by weight). Although this seems impossibly dry, it can be done by getting your gloved hands into the comp and keep mixing. The comp will have a crumbly texture, but it will stick fine after ramming.

Pumping procedure: The pump is held in the right hand so that the plunger is up and the stop pin is about $\frac{1}{2}$ " above the top of the sleeve (see Figure 2). It is pressed into the glitter mix several times to completely fill the sleeve, holding the plunger in that position.

The loaded pump assembly is placed on a hard surface and then rammed with a mallet to compact the glitter mix. The operator must be careful to ram only to the mark on the side of the sleeve!

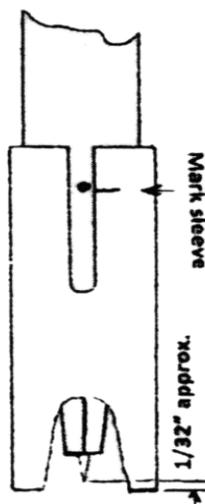


Figure 1

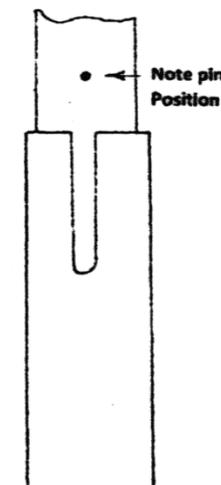


Figure 2

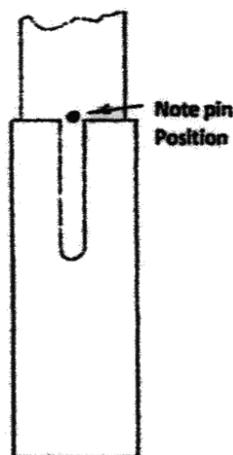


Figure 3

Too much ramming might crush the tip of the pump.

After the mix has been rammed again, the plunger is withdrawn so the pin is approximately $\frac{3}{4}$ " above the top of the sleeve, then it is pressed into the charcoal mix, then rammed until the pin is flush with the top of the sleeve (Figure 3). This completes the actual pumping of the star.

Should the star prove difficult to remove from the pump, it might help to first loosen the star by partially withdrawing the plunger while the star is still in the sleeve, then by pushing the star from the sleeve and carefully removing it from the plunger.

HINT: The pin should always be kept in line with the slot in the sleeve. Any twisting of the plunger may twist the cross shape and spoil the finished star. After about 8 or 10 stars, wash the pump tip.

The star is finished by wrapping. After being thoroughly dried the star is wrapped around the side with one turn of 70 lb Kraft paper, which must extend about $\frac{3}{8}$ " beyond the cavity end. After

the glue dries, the fuse hole must be inspected (Figure 4) to make sure it is unobstructed and full size. A small drill (hand held!) may be used to ream out any irregularities. The bursting charge is a hot mix:

Potassium chlorate	50%
Antimony sulfide	25%
Aluminum, German dark	31%

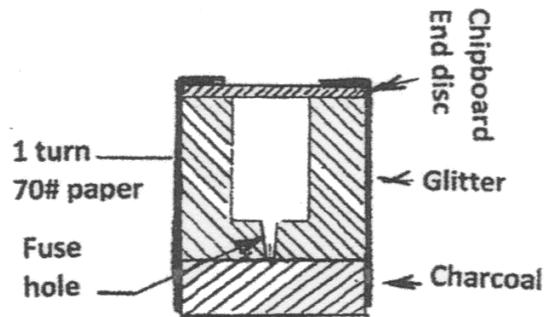


Figure 4: Cross section of finished star

For measuring I use the end cap from a small glass fuse such as was used in cars. For $\frac{3}{4}$ " dia. stars I'd use 1 level cup; $1\frac{1}{8}$ " dia. stars would be $1\frac{1}{2}$ cups. After charging the cavity, a chipboard disc is inserted and then the paper is folded over and glued shut, as in Figure 4

Priming should be unnecessary but to ensure ignition I would tape a piece of black match over the exposed end before loading the stars into the shell.