

## Method for Making Falling Leaves – by John Vargo

This method of making falling leaves was inspired by an article I read in Pyrotechnia VII, published in May, 1981. On page 25 of that publication Troy Fish wrote an article titled “Green and Other Colored Fuel Composition Using Parlon”. On page 26 he suggested that his formulae could be used to make falling leaves. To the best of my knowledge, this article was the inspiration for the popular Go Getter star developed by David Johnson. In 1989 Johnson published a manual titled “Go Getters”, in which he listed three different color formulae for the Go Getter stars. I use these formulae exactly as published with the exception of the type metal used. (*I substitute 200 mesh magnalium*) The rationale is to slow down the burn rate because a fast burn rate is needed for a Go Getter star to perform, whereas Falling Leaves need to burn slowly.

### Safety Considerations:

The Falling Leaves should be made outdoors or in an extremely well-ventilated area. Follow proper pyrotechnic safety precautions when working with these chemicals and procedures. Wear safety glasses, long-sleeved cotton clothing, and a respirator. Vapors from the Acetone and Xylene solvents are extremely flammable; great caution should be taken to prevent accidental ignition.

### Formulae for Falling Leaves Composition:

	Green	Red	Yellow
Barium Nitrate	63.0		37.8
Strontium Nitrate		58.0	23.2
Parlon	25.0	29.0	23.6
Magnalium (200 mesh)	12.0	13.0	12.4
Red Gum	+3.0	+3.0	+3.0
Boric Acid	<u>+3.0</u>	<u>+3.0</u>	<u>+3.0</u>
<b>Total Parts</b>	106.0	106.0	106.0

In his publication “Go Getters” (page 3) David Johnson states that the yellow can be produced by mixing 60% green composition and 40% red. The yellow color can be adjusted by changing these percentages.

### Materials:

- Wooden Spoons
- 1 qt. plastic mixing bowls
- Newspaper
- (2) 1” wide x 1/16” thick strips of wood to run the entire length of the work surface
- Non-porous rolling pin
- 4 small wood clamps
- Clothes line and spring-type clothes pins
- Gram scale
- Sharp scissors
- Felt-tipped marker

### Chemicals:

- Acetone (90%)
- Xylene (10%)
- Falling Leaves composition

### Work Area Preparation:

Cover your work table with a single layer of newspaper, laying pieces end to end with an overlap of a couple of inches. Lay the paper up to the table edge closest to where you will be working.

Place a wooden strip along the full length of the table and up to the table's edge. Clamp each end of the wood strip down to the table. Lay a second wooden strip parallel to the first strip and clamp the second strip to the table. The space between two wooden strips is determined by the width of the rolling pin you will be using. Position the second wood strip on the table just wide enough for the rolling pin edges to ride on top of the wooden strips. (*The intent is for the rolling pin to ride along the wooden strips similar to a railroad track thereby creating a 1/16" space above the newspaper.*)



### Mixing and Measuring Ingredients:

Start with a pre-mix of 90% acetone and 10% Xylene. Combine these in an HDPE plastic sealable bottle.

Ensure all dry chemicals are finely powdered. Ball-mill oxidizers separately; then, ball-mill all of the remaining chemicals together (EXCEPT the magnalium) for approximately 1-2 hours.

**CAUTION: NEVER BALL-MILL MAGNALIUM, OR ANY METAL. THE MAGNALIUM WILL BE ADDED ONLY AFTER ALL OTHER CHEMICALS ARE MILLED AND MIXED.**

Mix the oxidizer and other chemicals, EXCEPT the magnalium, in a gallon Zip-Lock freezer bag. Manually rock the bag back and forth for several minutes until the ingredients appear thoroughly mixed. Add magnalium into the bag, re-seal and continue manually mixing. I generally make 1000 gram batches.

For final process, weigh out 1000 grams of the mixed composition and place it into a 1 quart mixing bowl. Next weigh out approximately 20% of the acetone/xylene pre-mix, which would equal 200 grams of the liquid for a 1000 gram batch of composition. You may need to add a little more liquid if the mix is too thick.

### Procedure:

Pour the acetone/xylene mixture into the dry composition. Using a wooden spoon begin stirring for about 1 minute to ensure that all of the composition is wetted to the consistency of pancake batter. Without hesitation, pour the contents of the bowl along the length of the table between the wooden rails.



Immediately lay a single layer of newspaper end to end with a couple of inches of overlap between sheets, and up to the edge of the table, covering the wet composition.



Place rolling pin in the center of the work area with each edge of the rolling pin resting on the edges of the wooden rails. Begin rolling toward the ends of the rails; spreading the composition to a uniform thickness.



The composition sets up rapidly, in about 1 minute; therefore you must be prepared to work quickly. If left past 1 minute, the composition becomes very difficult to roll.



Immediately unclamp both wooden rails from the table and set aside. With a sharp scissors cut into sections near where the paper overlaps. Using a marker write the color on each section of newspaper; it is important to label each section of the newspaper with the name of the color being made as there is no other way to differentiate the colors otherwise.



Hang sheets on clothes line with spring-type clothes pins. Let them dry for approximately 1 hour and then cut into  $\frac{1}{2}$  to  $\frac{3}{4}$  inch strips. Cut width is determined by desired burn time. Allow the cut strips to dry for 24 hours before priming.

## Priming and Assembly into Shell:

Prime the leaves by grasping a group of six leaves between your thumb and forefinger; then dip them together approximately ¼" deep into nitro-cellulose/BP slurry. Then just barely touch the primed end into a granular BP. Set these on the edge of a surface leaving the primed end to overhang the edge.

