

## WPAG 2011

## Black Powder Manufacturing Workshop Instructions

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**INTRODUCTION:**

Each group, of 6 groups, will make at least three (3) batches of BP (Black Powder). The purpose of this workshop is to make 2FA or 4FA BP for use by WPAG members and secondly demonstrate a way to make BP **without** the need to ball mill live BP in a closed container for hours. All ball milling is done to reduce the oxidizer ( $\text{KNO}_3$ ) and the fuel (Charcoal/Sulfur and Dextrin) to a very fine powder, only 20 – 30 minutes of milling is necessary. The oxidizer and fuel are milled separately. The charcoal used to make this BP is young branches from sugar maple, 2" or less in diameter with the bark left on. The YM charcoal will be combined with sulfur and dextrin and milled in a ball mill for 20 - 30 minutes. The Potassium nitrate plus 1% anti cake reagent (Cab-O-Sil optional) was also ball milled for 30 minutes prior to the workshop. The standard BP formula used is as follows (Each batch total weight is 103 grams).

- Potassium nitrate,  $\text{KNO}_3$       75 parts
- Charcoal, C                              15 parts
- Sulfur, S                                  10 parts
- Dextrin, Dx                              2 parts
- Cab-O-Sil (optional)                1 part



Figure 1 Safety glasses & gloves; 100 mesh screen, mixing container & lid, wooden paddles & plastic laminate; Potassium nitrate (oxidant), Fuel (charcoal, sulfur & dextrin).



Figure 2 Distilled water, syringe & cup, red plastic putty knife, 8 mesh screen, rubber mallet & wooden ram, special round cutter.

**MIXING PROCEDURE:**

- 1) Place a 100 mesh screen over a piece of clean news print paper.
- 2) Empty the Potassium nitrate (oxidizer) and the pre-milled fuel (charcoal, sulfur, dextrin) into a clean mixing container.
- 3) Using a wood paddle, mix for 20 to 30 revolutions.
- 4) **Holding the screen in a vertical position, place the top of the mixing container against the screen and lower unto the paper. Rotate the container, as demonstrated, over the screen until most of the mix passes through.**
- 5) **Force the remaining mix through the screen using the plastic laminate paddle, breaking up any lumps by squeezing or pressing them through the screen.**
- 6) **Dump the screened mix back into the mixing container.**
- 7) **Mix for 80 to 100 revolutions.**
- 8) Repeat steps 4 thru 7 above two more times then go to step 9.
- 9) Carefully measure out 14 mls of distilled water, using a syringe, and discharge into a paper cup. Add the water to the green mix.
- 10) Use the wooden paddle to work the water into the mix until uniformly moist. When the mix has all turned to a dark charcoal color (no more light gray spots) you are done.
- 11) With a wooden rammer, pound the mix to form a hard cake in the bottom of the mixing container.
- 12) Place the lid on the container and let it stand for at least 15 minutes.
- 13) To make 2FA use ¼" (4 mesh) screen, for 4FA use 1/8" (8 mesh) screen. Place the screen on a piece of clean news print.
- 14) Invert the mixing container over the screen and tap the bottom to dump the BP cake onto the screen.



- 15) Break up the cake using the plastic putty knife and the rolling cutter until all the pieces fall thru the 4 (2FA) or 8 (4FA) mesh screen.
- 16) Dump the grained BP back into the mixing container and place a label on the container e.g. BP1 (your group ID) and the type of charcoal fuel use e.g. YM (young maple) or TMRK (Tamarack) or JP (Jack Pine). Drying will be done at a designated area per WPAG safety rules.
- 17) Spread the moist grained BP on a doubled sheet of news print and place into a drier or . . . air dry using a fan to improve air movement.
- 18) Dump the dried BP unto an 8 mesh screen (for 2FA) or a 12 mesh screen (for 4FA) and vibrate the screen to sift the BP. What stays on an 8 mesh screen is 2FA and what stays on a 12 mesh screen is 4FA. What passes through the 12 mesh screen is 6FA and finer.