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## Immersion Dyeing using PRO Vat Dyes

*Vat Dyes are a unique class of dye, similar to Indigo. The dye powder is not soluble in water, nor does it have any affinity for cellulose or silk fibers, until it goes through a process called reduction. Reduction takes place at a specific temperature, usually 120° to 140°F (50° to 60°C). Once the dye is reduced, it is referred to as being in its leuco form. This leuco form is usually a completely different color than the dye itself, many times the color's complement on the color wheel. After the dye adheres to the fiber, it re-oxidizes when exposed to the air, producing the color you are seeking, as well as it becoming insoluble again. Vat dyes lend themselves beautifully to bound resist techniques, like shibori, because they discharge the ground color and deposit a new color all in one step. It's just like magic! Always do test samples before working on a large project. For additional information, visit our website at [www.prochemical.com](http://www.prochemical.com).*

✘ While Vat Dyes and the chemicals used are comparatively safe and non-toxic, it is best to treat them all with caution. Wear rubber gloves to minimize contact with hands. Eye protection is urged as you are working with alkalies and strong reducing agents. Always work in a well ventilated area. Good house-keeping is essential to good results. Utensils used for dyeing should never be used for food preparation. See caution for Lye (Sodium Hydroxide) below.

### Caution

LYE (Sodium Hydroxide) Can cause severe burns to skin, eyes and mucous membranes upon contact. Do not inhale fumes. Harmful if swallowed or misused.

First Aid: Eyes: Immediately flush eyes with cool water for 20 minutes. Get medical attention immediately. Skin: flush area with water for 15 minutes and then wash with soap and water. Get medical attention immediately. Swallowed: Rinse mouth with cold water, and drink one or two glasses of milk or water. DO NOT drink citrus juice or other acidic fluids. DO not induce vomiting. Get medical attention immediately.

Directions for use: Protective clothing, gloves, goggles and respirator should be used when mixing into solution. ALWAYS add Lye to COLD water! NEVER add water (hot or cold) to Lye. Replace cap immediately after use.

Storage & Disposal: Keep out of reach of Children. In case of spillage sweep into dust pan, empty down sink and flush with COLD water. Do not use aluminum utensils.

- ✘ Wear rubber gloves, apron or old clothes.
- ✘ Utensils used for dyeing should never be used for food preparation.

### Supplies

PRO Vat Dye Powder

Lye

Thiox

PRO Dye Activator or Soda Ash

Synthrapol

Ivory Soap

## Procedure

**1. Scour the fabric** by machine washing in HOT 140°F (60°C) water, or by hand in a pot on the stove with ½ tsp (2 gm) PRO Dye Activator or Soda Ash and ½ tsp (2.5 ml) Synthrapol per pound of fabric (454 gm, or 3 to 4 yards cotton muslin, or 8 yards 8mm China Silk, or 3 Medium T-shirts, or 1 sweatshirt). Rinse thoroughly. Keep fabric damp while preparing the dye bath.

**2. Prepare dye bath** by measuring 2½ gallons (10 liters) of room temperature 75° to 95°F (24° to 35°C) water for every pound (454 gm) of fabric into a large plastic, stainless steel, enamel or non-reactive metal container. Container should be large enough for the fabric to move freely and to stir the dye bath without spilling.

**3. Dissolve dye powder.** Measure the desired amount of dye powder, from the chart below, in 1 cup (250 ml) room temperature 75° to 95°F (24° to 35°C) water and set aside. If you are seeking a pale or medium depth of shade, you can still use the amounts listed for “Dark”, but remove the fabric after a minimum of 2 minutes in the dye bath.

	Dark	Black
Dye Powder	3 Tbl (22.7 gm)	6 Tbl (45gm)

**4. Measure of 1 cup (250 ml) COLD water** in a glass, Pyrex, or stainless steel container. Carefully add the Lye, from the chart below to the COLD water. Remember to ALWAYS add Lye to water. Wear goggles and protective clothing.

	All colors , except Black	Black
Lye	2 Tbl (27 gm)	4 Tbl (54 gm)

**5. Measure the Thiox** from the chart below and dissolve in the lye solution.

	All colors , except Black	Black
Thiox	2 ½ tsp (9 gm)	5 tsp (18 gm)

**6. Stir the dissolved dye, lye and Thiox** into the dye bath water and heat to 140° F(60°C). Once the bath reaches this temperature, your vat should be fully reduced and reached its leuco form. One way to tell is to put a small white plastic spoon gently in the vat and observe the color as you slowly remove it from the bath and watch it change to the desired color as it gets oxidized.

**7. Gently add your scoured and damp fabric** to the bath and dye for 2 to 30 minutes, depending upon the color and desired depth of shade. Then remove the fabric by squeezing out the excess liquid below the surface of the dye bath, trying not to drip anything back into the dye bath. Any drips or excessive stirring will add oxygen back into the vat, shortening the life of your bath.

**8. Rinse the fabric** in room temperature 75° to 95°F (24° to 35°C) water and hang the fabric to oxidize for a minimum of 10 minutes. This oxidation time allows the air to reach all the surfaces of the fabric, changing the dye back to its original insoluble form.

**9. Final wash.** As a final step, we recommend “soaping” the fabrics to prevent any crocking (rubbing off) of any insoluble vat dye deposited on the surface of the cloth, and thereby firmly fixing the dye within the fiber. Take a bar of Ivory soap and shave a couple of tablespoons worth of the soap into 2½ gallons (10 liters) of water. Bring this soapy water to a boil and continue washing your fabric at a gentle simmer for 15-20 minutes. Rinse well and dry.

NOTE: These vats can be stored over time and used again. Make sure they are tightly covered. When ready to use again, heat the vat in a stainless steel or enamel pan. Add the same amount of Thiox that was used originally to make the vat and heat gently (no higher than 140° F(60°C)) until the vat is reduced.

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