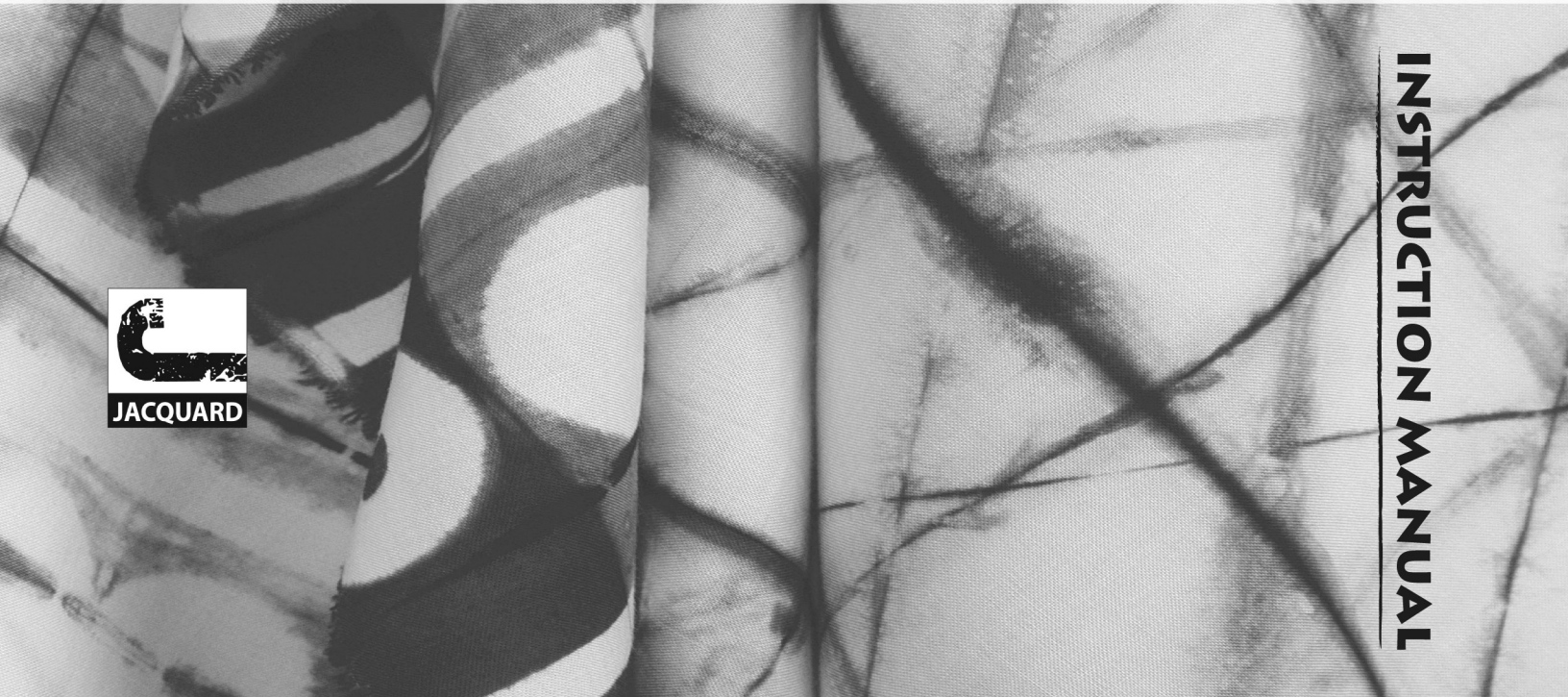
INDIGO DYE KIT

Natural Dye Method



JACQUARD

INSTRUCTION MANUAL

Indigo, Magical Indigo!

Indigo is one of the oldest dyes used for coloring fabrics and the one Indigo is one of the oldest known fabric dyes and it is still used today to color blue jeans. Indigo is extracted from the leaves of a plant of the same name, Indigofera tinctoria, through a process of fermentation. Indigo grows in subtropical climates, including the southern United States. Throughout history, the precious blue dye was revered and sought after as a valuable commodity. Fabrics dyed with indigo were not only used for fashion but also for religious rituals and to distinguish social and political status. The process of dyeing with indigo has changed very little over time. Today, the distinctive blue dye still provides one of the most wonderous and rewarding dyeing experiences available to any dyer.



Dyeing with indigo is unique compared to other dye processes. This is because, in its natural form, indigo is insoluble in water and must be chemically "reduced" to its water-soluble form to create a usable dye bath. Reduction is a process whereby oxygen is removed from the dye molecule, and in this reduced state, indigo is bright green in color. In the reduced green state, the indigo dye can penetrate and saturate the fibers of the fabric. When the fabric is removed from the dye vat it is still green but slowly begins to turn blue as the indigo reacts with the oxygen in the air. As the indigo oxidizes, it returns to its insoluble form, forming blue pigments which become trapped inside the fabric, permanently coloring the fibers.

Although recipes for indigo vats vary from region to region and from culture to culture, all are based on reducing the dye into the green water-soluble form. The indigo dye in this kit is already 60% reduced. Traditionally, indigo would be pasted with alcohol and heated with various reagents to dissolve it in water. Jacquard's Pre-Reduced Indigo system allows the dye to easily dissolve in water, which makes setting up a dye vat virtually effortless.

History

Indigo has been used for dyeing cloth throughout history and in many distinct cultures. For most of its history, indigo had only been used in climates where it could be grown, such as India, Indonesia, Japan, China, Egypt, Africa, Central and South America. Indigo has a more recent history in Europe where it became a highly valuable trade item. Early examples of indigo have been found in manuscripts and burial sites. There is evidence of indigo dyed cloth found entombed with Egyptian mummies going back 5,000 years. It has also been found in archeological ruins in Peru, Guatemala, China, Japan, and Africa. In 2016, archeologists found a 6,200-year-old scrap of fabric in Peru dyed with indigo, extending the known use of the dye by more than 1000 years. Most of these cultures developed a tied resist technique to create patterns with their indigo dyeing and each has its own unique characteristics. India is credited for being the country where indigo was first domesticated. The Indian indigo industry was described by explorer Marco Polo in his travels in the latter part of the 13th century.

India was the primary source of indigo for most of Europe, where the climate was not suitable for indigo cultivation. Prior to the opening of trade routes, most of Europe used woad, a plant from the mustard family, to achieve a blue color. Woad, however, was inferior in quality to indigo and as indigo became more popular, woad farmers and industrialists (called the Woadites) felt the need to protect their livelihood. This led to indigo being outlawed for a time in England, Germany, and France around the end of the 16th century to protect the interests of Woadites. At that time Indigo was quite expensive because it had to be transported by caravan land routes by way of Arabian traders. It was not until sea trade routes opened that indigo became available to a wider segment of the European population. With the demand for indigo rising in the 16th century, the Dutch and British East India Companies imported massive quantities and the cultivation of indigo in India began on an unprecedented scale. In the late 1700's the British established large plantations in India for the commercial cultivation and production of indigo. Other British and European colonies established indigo plantations in South America, Jamaica, South Carolina, and the Virgin Islands to help keep up with demand.

In Japan, indigo became important for dyeing cotton when silk was outlawed during the Edo period (1603-1868). Indigo dyes cotton particularly well, while most other dyes available at the time did not. The Japanese elevated indigo dyeing to a high art form called shibori.

The Japanese patterns of tied and paste resists are highly refined, detailed, and complex.

In Western Africa there are many tribes that use indigo in their own unique way. In Hausa, the specialty is a shiny—almost black—indigo cloth. The fabric is overloaded with dye and then beaten for a burnished metallic effect. This cloth is highly prized and used in turbans by the Tuareg nomads of the Sahara Desert. African tied resist patterning is often characterized by larger motifs and are sometimes imbued with spiritual significance.

Indigo was grown in the Americas long before Europeans established their plantations. The French introduced indigo into Louisiana where it became the number one export. Native Americans who were enslaved were the earliest workers on the indigo plantations and many of them did not survive the harsh conditions. It was thought at the time that diseases were caused by indigo processing, and that African slaves would not be susceptible to such disease. It is also possible that African slaves were brought to the south because of their specialized knowledge of indigo production—after all, very few Europeans had any experience with it. After several years of indigo crop infestations at the end of the 18th century, slave-owners in the south turned to sugar, cotton, and tobacco.

Eliza Lucas Pinckney is credited with first cultivating indigo in South Carolina. She shared her knowledge with many other farmers and contributed to the state's robust economy in the mid-1700's. Around this time indigo was also the main export crop from British East Florida and was grown in Georgia and other southern states. Indigo became the dye for the blue coats of the American Revolution. For a brief period where the paper currency of the colonies became worthless, cubes of indigo even replaced money.

In 1897, the German chemist Johann von Baeyer developed a synthetic indigo for which he won the Nobel Prize for chemistry in 1905. This synthetic indigo could be produced in a lab with a consistent quality and a price that was competitive with natural indigo, leaving land and other natural resources available for other crops. Within 10 years, the production of natural indigo dropped 90%. Possessing all the qualities of natural indigo, synthetic indigo makes up the majority of the world's indigo today.

Instructions:

Before you start, gather all the items required and prepare a work area.
In addition to the kit, you will need:

- 5 gal/18.93 L plastic bucket with lid or cover
- Stirring stick long enough to reach the bottom of the container without having to submerge your hands
- Water
- Natural fabrics, garments or yarn



Other items helpful to have on hand are:

- A hang line or a shallow pan to place your fabric in while oxidizing.
- A piece of plastic for the floor covering the area where you will have the indigo vat and more if you are hanging pieces to oxidize.
- Paper towels or rags to clean up drips

NOTE: **Remember, never use utensils that have been used for dyeing for food preparation.**

Setting up the indigo vat:

1. Fill a 5 gal/18.93 L bucket with 4 gal/15.14 L warm tap water. For a faster dyeing process, use hot water.
2. While stirring, slowly empty the Soda Ash packet into the water.
3. Empty the jar of Pre-reduced Indigo Dye into the water. Stir gently.
4. Add the Reducer (Sodium Hydrosulfite) last
5. Gently but thoroughly stir the vat in just one direction. Once the vat is well-mixed slow down and reverse the direction of the stirring as you drag the stir stick along the outer edge of the vat before slowly removing it. Cover the vat with a lid and allow it to settle for at least 15 minutes to ½ hour.
6. After the vat has settled, remove the lid. The top of the dye bath may be covered with thin blue skin (rather than the traditional foamy 'flower,' which may also be present). The dye bath should be a clear yellow or yellow-green color under the thin layer of blue floating on the dye bath. If it is not, wait another ½ hour and check again.

Dyeing:



1. Fold, tie or bind your garment or fiber. (See "Pattern Ideas" on pages 7-11.) There is plenty of dye in the vat if you want to experiment on some scrap pieces first.
2. Thoroughly wet or soak your fabric in plain water.
3. When you are ready to begin dyeing, remove the cover from the vat. If there is a thin blue skin on top, gently move it to the side while wearing gloves.
4. Squeeze excess water and air out of your fabric.
5. While your fabric is still compressed, slowly submerge the item into the dye vat. Once submerged, gently manipulate the item for 30 sec to 1 minute to ensure the dye penetrates the unbound parts evenly. You may work the piece in the vat underneath the surface for several minutes to achieve max color density. Do not drop the fabric in the vat and let it sink to the bottom. There will be residue that has settled on the bottom of the vat, and it can leave spots on your dyed item.
6. When you are ready to take the fabric out of the vat, squeeze it just below the surface as you slowly remove it. You want to prevent splashing as this introduces oxygen back into the vat. The fabric will be the same yellow-green of the vat at first.
7. As you remove the item from the vat it will slowly begin to turn from green to blue as oxygen hits it. Let it oxidize for 20 minutes or longer. Turn or flip pieces to make sure all areas are exposed to oxygen.
8. For darker shades, repeat steps 4 – 7. Every additional dip will result in a deeper shade of blue. Once the desired depth of shade is achieved, untie and rinse, followed by a wash with mild detergent and warm water.
9. When the dyeing session is over, use your stir stick to gently stir the vat, like before, in a circular motion. Place lid back onto vat and let settle for at least an hour before using it again. The vat will keep for several days and can be used again. When there is no green left in the vat, it is spent, but it can be revived by adding more reducer.

10. When ready to dispose of the vat, empty contents down the drain. Clean up bucket and utensils with a powdered cleanser or soap.

A little more helpful information:

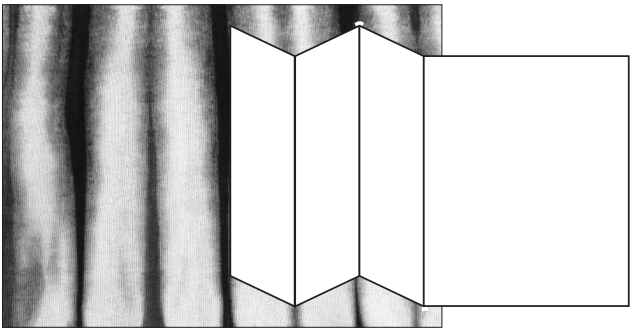
- Store the vat in an area where the temperature will remain between 68-85° F / 20-29° C, a comfortable room temperature. Keep out of reach of children and animals. Always store with a lid on the container.
- Keep in mind that the color is much darker when wet
- When dyeing silk or wool, it is helpful to use ¼ cup of white vinegar per gallon of water in the initial rinse. This helps protect those protein fibers after exposure to soda ash (high pH).
- Using hot water in the initial vat lengthens the amount of time it can be used to dye.
- Anything that blocks oxygen from the fabric will leave a white mark on the final product. Use Jacquard's Water-based Resist or white school glue to draw on the fabric before dyeing to block the air and create faux-batik patterns. Allow to dry, then dip in indigo for less than 10 seconds. When rinsed/washed the drawing will be left permanently on the fabric as white undyed lines.
- If the dye bath is not green in color, this indicates a problem with the reducer, such as age or exposure to heat or oxygen. 50 grams (~4TBS) of Jacquard's Color Remover, thiourea dioxide, or sodium hydrosulfite can be substituted to reduce the vat.
- More dips results in darker color, but there is a limit to how much dye the fabric can hold and it varies by type of fiber. When the dye begins to stick to itself, this is called "crocking" and this can cause the dye to rub off on other clothes or even furniture. Crocking rarely happens with 5 dips or fewer, but it can be remedied by an hour soak in hot water with a ¼ cup of soda ash, followed by a normal wash.

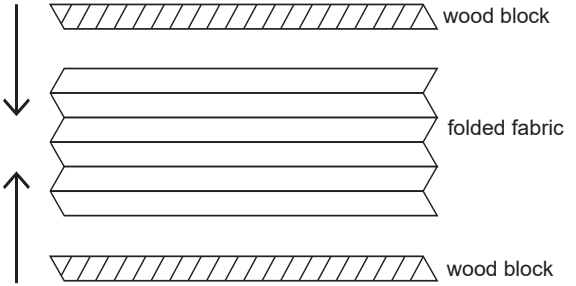
Pattern ideas

One of the most exciting things about dyeing with indigo is that it is easy to get great resist patterns on fabric. Here are some ideas to get you started.

Basic accordion fold:

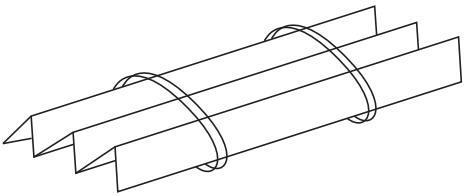
One of the easiest folds, which can produce endless results, is the accordion fold. This simple back and forth fold, when clamped with your wood blocks and rubber bands, will give you an endless variety of patterns.



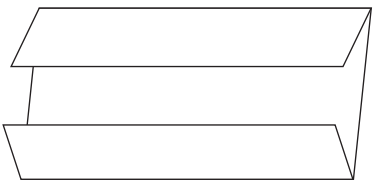


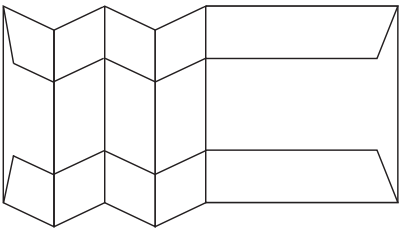
For another effect, just use the rubber bands around the folded fabric.

Here are some other variations on the accordion fold.

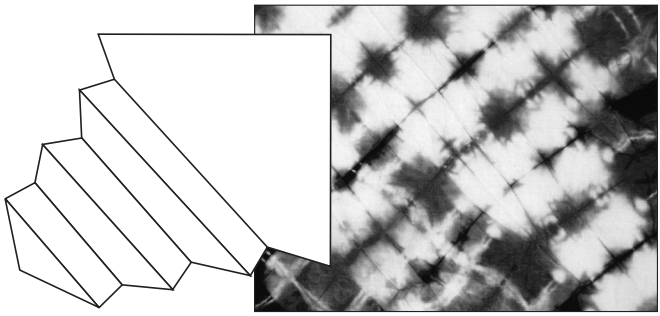


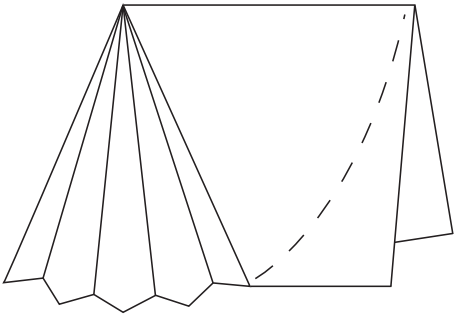
a.) Fold into thirds.....and then do an accordion fold.





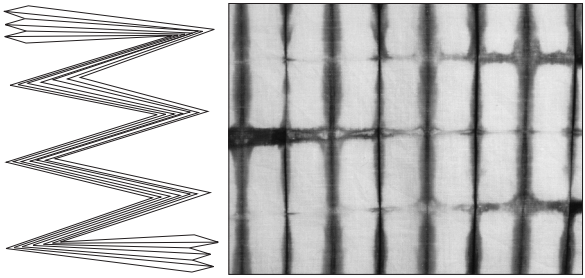
b.) Start the accordion fold from the corner.



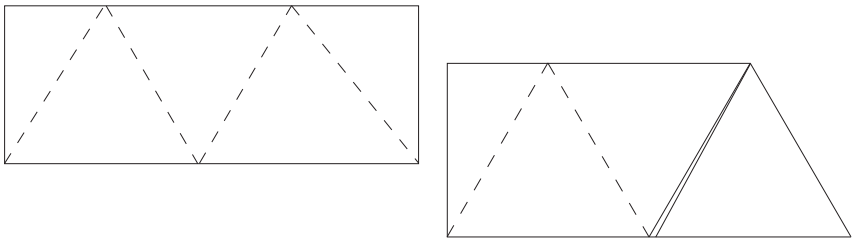


c.) Pivot the folding from a specific point, as in making a fan.

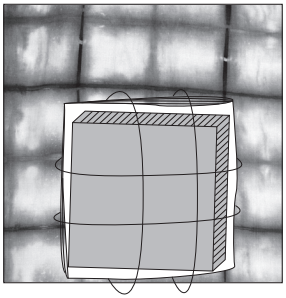
d.) After accordion folding into a strip, fold the strip back and forth.

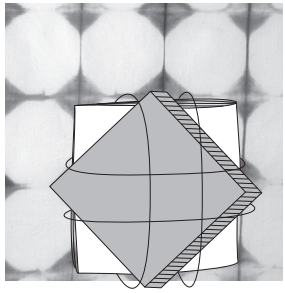


e.) After accordion folding into a strip, fold fabric into triangles as in a flag fold.

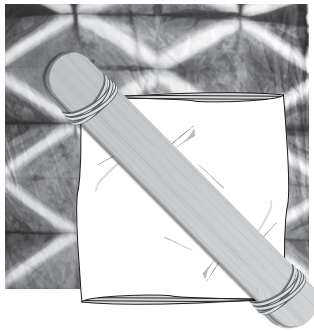


f.) Place your wood blocks or popsicle sticks at different angles to your folded fabric piece. Just a slight variation can give you a completely different pattern.



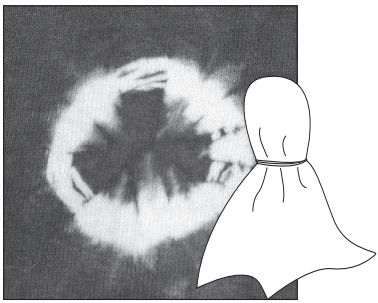


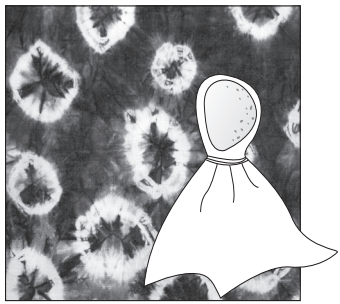
Experiment with other objects to clamp with such as washers, clothespins, or paper clips. Some of these common household items can give you very interesting patterns. You can also fold in one direction, dye, rinse, fold in another direction, and dye again. This will give you layers of pattern and increasingly complex ones.



Circles or Spots:

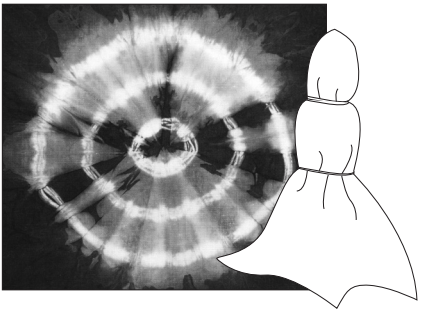
One of the most common pattern motifs is a circle or spot of any size. This is done by simply pulling up the fabric at a point and putting a rubber band around it. This can be done in a variety of ways. A small pebble, bean or popcorn can be placed in the tip of the fabric and the bind placed just under it.

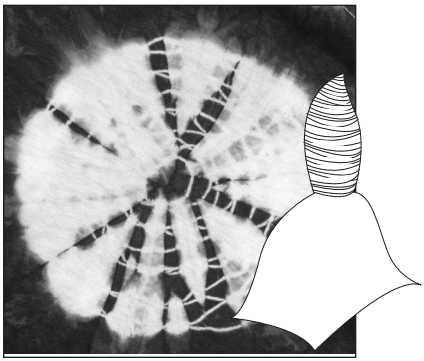


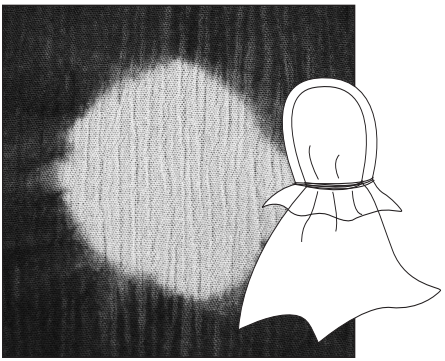


a.) For concentric circles, place more than one rubber band on the pulled up area.

b.) To make a whiter spot or polka dot, cover the area with the binding or use a piece of plastic wrap to cap the tip area.







These are just a few ideas to get you going. As you dye with indigo you will come up with many great ideas of your own. Some other things you might want to try:

- Over dye colored, printed or patterned fabrics.
- Combine more than one pattern on a single piece.
- Tie up some skeins of yarn and dye.
- Tie up parts of a piece and put in a plastic bag to either keep white or save parts that you like. This is a great way to make borders.
- Stitch fabric with a running stitch, pull up and tie to make lines.
- Wrap fabric around a plastic pipe, wrap string around it and scrunch it down.

Resources

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Jacquard Products
Rupert, Gibbon & Spider, Inc.
PO Box 425
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www.jacquardproducts.com

WARNING!! This kit contains dye powder, sodium carbonate and sodium hydrosulfite. May be harmful if misused. Read instructions and cautions on individual containers carefully. Not to be used by children except under adult supervision. Conforms to ASTM D-4236.
KEEP OUT OF REACH OF CHILDREN.