

Indigo vat considerations

The vat is best made up the night before it is to be used. Synthetic vats benefit from this settling time even though some can be ready for use after two hours. The following procedure is for the synthetic hydrosulphite (hydros) vat and natural thiourea dioxide (Spectralite) vat. The quantities for various vat sizes and additional information for these vats can be found in the chart opposite.

Containers

For natural and synthetic chemical vats, plastic bins are ideal. Swing-lid bins are especially good as they are tall and thin, giving the depth needed for cylinders. Using less water than the conventional dustbin, they are more economical for ingredients and can sit inside a larger dustbin if need be. (See caring for your vats, page 153.) Discard the swing lids, which are a nuisance, and cover instead with plastic film or a bag.

Vat size

There are many variables to consider. Shibori pieces can be quite tiny, and there is less material to be dyed than if the fabric was open. On the other hand, the curious shapes formed by shibori resists need room to be turned and moved in the vat. If a cylinder is to be used, it will require the depth of a large container even if it has only a tiny bit of fabric attached. Then of course there is the type of fabric and the depth of shade required. A 9-litre (2-gallon) vat is a good starting point for samples. An 18.25–27.25 litre (4–6-gallon) vat will cope with 2 square metres (6½ square feet) of well resisted mid-weight cotton and some plain dyed pieces.

Water

To make the vats, warm water can be used for 60% indigo grains – the temperature should be comfortable, edging to warm rather than hot. Hot tap water at 50°–65°C (122°–149°F) is needed when making synthetic powder vats and natural indigo vats initially. The temperature for smaller natural chemical vats can be kept warm at around 30°–35°C (86–95°F) with a suspended aquatic heater. See other useful recipes, page 152, for organic vats.

Salt

For synthetic 60% indigo grain vats only. Sprinkle in a little at a time and stir. Leave to stand for a short while (about 10 minutes) stirring occasionally before adding alkali.

Alkali

Test the pH of the water first. With the alkaline solution added it should ideally be around 10–11.5 for cottons and 8–9.5 for silks. The alkalinity can be adjusted by adding either caustic soda or washing soda (which is best dissolved in hot water) or, if you prefer, you can try ammonia at 33% strength (use three times the amount). Be careful with all these products and read the guidelines on the

container. I sprinkle caustic soda directly into the synthetic hydros vat without dissolving it first. Create a gentle vortex by stirring so that the crystals are immediately in motion when sprinkled in and do not settle at the base of the vat. Continue stirring, cutting across the centre now and then. Thiourea natural vats require a lye to be made (see page 152). Lime is used for organic vats. If the pH is too high, the dye seepage can appear greyish.

Reducing agent

Two main reducing agents are available for chemical vats: sodium hydrosulphite (also known as hydros, sodium dithionite) or thiourea dioxide, also known as Spectralite, thiox. Sprinkle this on from close to the surface after the alkali has dissolved and stir with a thick pole such as a broom handle. Leave to rest for between five and ten minutes. Once added, keep the lid on at all times when the vat is not in use. Natural antioxidants are used in organic vats.

Indigo

Add a little at a time and stir each addition in well. Allow hydrated indigo to flow into the vat under the surface. Continue stirring for some minutes after all has been added and then put on the lid. You should stir the vat three or four times every twenty minutes or so. Tap the pole on the base of the vat – you will feel if there are any undissolved particles.

When the indigo has reduced, the liquid should look golden-brown to green-gold. A good indication that the vat is healthy is a bronzing on the surface and some clumps of dark blue-purple bubbles, known as the bloom. Vats can work even if these are not in abundance.

Vat strength

Dye workshops will have several vats on the go at different strengths – those freshly made may well be strong, others that have been used will be weaker and yield paler hues. The strength of the indigo vat depends on the indigo content. The amount of alkali and reducing agent needed is always calculated according to the amount of liquid being used, but the indigo content can vary. Having a few vats makes for a more authentic experience. Evenly dyed pale shades will not be obtained from one dip in a strong or medium-strength fresh vat. Evenly dyed grounds, be they dark or pale, require several dips and for pale grounds it is expedient to make a very weak vat and give more dips to ensure a beautifully dyed colouration. These undertints are very useful when it comes to building designs and patterns with reserved and combination techniques with fresher, stronger vats.

Deoxygenated pre-soak

Soaking large shibori bundles in deoxygenated water prior to the first dip prevents oxygenated water entering the vat. For the soak solution, use the amount of water and ingredients required without the indigo. Soak for between fifteen to thirty minutes.

Indigo recipe charts

Be aware of health and safety guidelines (see page 169).

Wait between each addition for about five to ten minutes.

Water	For 60% indigo grains, fill the container with water at 30–40°C (86–104°F). A retaining temperature of 21–25°C (70–77°F) is sufficient. For natural chemical and synthetic powder vats, fill the container with hot water at 50–55°C (122–131°F).
Salt	Add a little at a time to the liquor for 60% grain vats only and stir in.
Sodium hydroxide (caustic soda)	Can be sprinkled dry onto hydros vats but must be stirred into a vortex. This must be added in solution as a lye to thiourea dioxide natural vats (see page 152). Alkali must always be added before the reducing agent.
Washing soda	For dyeing silk only. Dissolve washing soda chunks first in warm to hot water for both vats.
Reducing agent	Sprinkle a little at a time from close to the surface of the vat after alkali.
60% synthetic indigo grains	Sprinkle in 60% grains in small amounts at a time, onto the vat, stirring gently. Stir three to four times every fifteen minutes, replacing the lid each time. Allow to fully reduce for at least two hours before use.
Synthetic indigo powder	Hydrate the indigo and allow to flow out into the vat from under the surface. Stir as above.
Natural indigo powder	Hydrate the indigo and allow to flow out into the vat from under the surface. Stir as above.

These charts are offered as a guide

Synthetic hydros vat calculated for 60% grains

Water	9l (2 gall)	18l (4 gall)	27l (6 gall)	36l (8 gall)	45l (10 gall)
Sea salt (60% grains only)	150g (5¼oz)	300g (10½oz)	450g (16oz)	600g (21¼oz)	750g (26½oz)
Sodium hydroxide (caustic soda)	10g (⅓oz)	20g (⅔oz)	30g (1oz)	40g (1⅓oz)	50g (1¾oz)
Washing soda (silk only)	40g (1⅓oz)	80g (2¾oz)	120g (4¼oz)	160g (5⅔oz)	200g (7oz)
Hydros	30g (1oz)	60g (2⅓oz)	90g (3oz)	120g (4¼oz)	150g (5¼oz)
Indigo (full strength)	46g (1⅔oz)	92g (3¼oz)	138g (5oz)	184g (6½oz)	230g (8¼oz)
Indigo (medium strength)	18–28g (⅔–1oz)	44–54g (1½–2oz)	65–75g (2⅓–2⅔oz)	90–100g (3–3½oz)	112–125g (4–4½oz)
Indigo (pale)	12g (⅔oz)	24g (⅞oz)	36g (1¼oz)	48g (1¾oz)	62g (2⅓oz)

Measurement conversions

Please note that imperial measurements are given throughout for gallons and fluid ounces. For US equivalents, please see below:

1 imperial gallon → 1.2 US liquid gallon

1 imperial fl oz → 0.96 US fl oz

Natural thiourea vat

Water	9l (2 gall)	18l (4 gall)	27l (6 gall)	36l (8 gall)	45l (10 gall)
Sea salt	-	-	-	-	-
Sodium hydroxide (caustic soda for lye)	10g (⅓oz)	20g (⅔oz)	30g (1oz)	40g (1⅓oz)	50g (1¾oz)
Washing soda (silk only)	40g (1⅓oz)	80g (2¾oz)	120g (4¼oz)	160g (5⅔oz)	200g (7oz)
Thiourea dioxide	12–15g (⅔–½oz)	25–30g (⅞–1oz)	40–45g (1⅓–1⅔oz)	55–60g (2–2⅓oz)	70–75g (2½–2⅔oz)
Indigo (full strength)	56g (2oz)	103g (3⅔oz)	150g (5⅓oz)	195g (6⅞oz)	242g (8½oz)
Indigo (medium strength)	20–30g (⅔–1oz)	50–60g (1¾–2⅓oz)	75–85g (2⅔–3oz)	95–105g (3⅓–3¾oz)	120–130g (4¼–4½oz)
Indigo (pale)	15g (½oz)	30g (1oz)	45g (1⅔oz)	60g (2⅓oz)	75g (2⅔oz)

Option for a tint vat for both natural and synthetic indigo

Make up a 9-litre (2-gallon) vat with the same reducing agent as for the stronger vat but without indigo. Decant into this from the stronger vat. Start with about 300–500ml (10½–17⅔fl oz) and build to the depth of shade required. Dry a fabric test piece in order to make a true assessment of shade. See also stock solutions (page 152).