

# TEXTILE DYES: PIGMENT DYES

## PRINTING WITH PIGMENT DYES

Pigment printing is the most common textile printing method in the world due to its many good qualities such as very good light fastness and wide selection of colours. Pigments can be printed on any fibres and blends and they are affordable compared to other colour methods. Due to a simple printing and fixation process, pigment printing is suitable method also for production of small series in small, simply equipped printing studios. A disadvantage of pigment printing is that the polymer layers that enclose the pigments on the surface of fabric can break easily, and so its rubbing fastness is poor.



## PRINTING PASTE

For printing, pigment is always mixed with printing paste. Pigment printing requires a binder as a fixing agent, which enables the pigments to adhere onto the fabric - the pigments themselves do not have that ability. In addition to binder, pigment printing paste contains always solvent (water) and thickener. The function of thickener is simply to make the paste thicker to enable printing process, and it does not affect any other qualities of the paste. Reducing the amount of thickener gives a runnier printing paste, which is easier to paint with. There might be also additional chemicals in the printing paste to for example soften the print result.






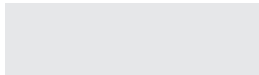
Various types of printing pastes are used for different purposes. As an example, printing with opaque paste covers the base fabric completely, but when printing with transparent paste fabric can be seen through the printing result (e.g. coloured ground fabric and/or other printed colour). Layered prints with transparent print colours create new shades on the overlapping areas. Paste called "Melting base" can be used to attach also other substances, such as folios or glitters, onto the surface of fabric. "Puff paste" will puff up when cured with heat.



Pigment print with transparent paste (brown colour) and opaque paste (white) Helmi Liikanen, Photo: Helmi Liikanen

## COLOUR MIXING

The maximum colour strength of print colour is referred to as the full depth of shade; for example, 20 g/kg, which is the deepest colour a particular dye dispersion can provide, and its dilutions. For example, a print colour's shade depth ratio of 1:1 refers to a colour mixed with one half of full depth of shade colour and the other half of transparent printing paste.

	Full depth of shade	
	1:1	50 g full depth of shade / 50 g transparent printing paste
	1:2	33 g full depth of shade / 66 g transparent printing paste
	1:4	20 g full depth of shade / 80 g transparent printing paste
	1:9	10 g full depth of shade / 90 g transparent printing paste
	1:19	5 g full depth of shade / 95 g transparent printing paste

## **FIXATION PROCESS**

In the fixation process, the printed fabrics are treated with heat of 160 °C. This can be done in heat press or in industrial process, in curing oven. The heat activates the binder to adhere the pigments onto the surface of the fabric. Unlike with dyes such as reactive dyes, fabrics printed with pigments do not require washing after fixations. Therefore, any thickening agent remains on the printed cloth and stiffens the printed areas.

## **ENVIRONMENTAL ASPECTS**

The chemicals used in printing paste, especially the thickeners, but also binders, preservatives and other chemicals should not be released in waste waters. On the other hand, the collecting of the excess paste is relatively easy, and if that is done, no chemicals are released.

## **BASIC PROCESS OF PIGMENT PRINTING**

1. Mix the pigments or full depth with printing paste
2. Print the design on fabric using screen or other suitable method
3. Leave fabric to dry
4. Fix with e.g. a heat press (at 160 °C, two presses for 20 seconds. The pressure of the heat press speeds up the fixing. Protect the heating press with baking paper, from both sides of the fabric)

Please note special printing pastes like Melting base and Puff paste have each their own processes, slightly different from the basic process.

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