

Dyeing Support Fabric in Textile Conservation: Dyeing Method of Silk Crepeline with Huntsman Lanaset Dye

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Introduction

Dyeing in textile conservation is used for colour-matched threads, support fabrics and infills to use in conservation treatments. While dyeing fabric for textile conservation purposes it should be kept in mind that the requirements of the conservator will have a slightly different importance from those of commercial dyer. Important factors to be taken into consideration are as follows:

- High light fastness is very desirable, so that colour-matched conservation work remains unobtrusive over along period of time.
- Wash fastness is desirable but the requirements are far below those of machine washable textiles.
- The dyeing process must not leave any excess chemicals on the fibres that could possibly have a deleterious effect on the conserved textiles.
- A high degree of reproducibility is required, as this saves valuable time.
- It is important that all this can be achieved with equipment that is both relatively inexpensive and easy to use.

With these points in mind, the conservator having chosen the material to be dyed, needs to select, etc. and also the method of application, colour and depth of

shade requirement, any additives that need to be used and of course cost.

I have used Lanacet dye as these meet the above criteria and also give a wide colour range. Lanaset dyes are a range of 1:2 metal complex and reactive dyes made to dye protein fibers i.e. wool and silk by Huntsman. It can also be used for dyeing Nylon net. It's a chromium molecule pre attached to the dye complex making them 'pre-metallized'. It is the modern dye equivalent of the old method of mordant dyeing.

Moreover, in conservation all fabrics require various preparation and calculation before actual dyeing. It requires precision in dye and chemical ratio calculation, measuring weight and solvent quantities and following an exact temperature and time cycle. While stirring the fabric precaution must be taken to avoid any staining and also to maintain the weave structure. It is advisable to make up dye stock solution at least 24 hours before they are required this allows the dyes to fully dissolve prior to dyeing. Finally, when using these materials it is important to remember that these substances are chemicals and as such should be treated with respect. Health and safety requirements should therefore be considered at all times.

Material required

Fabric: Silk Crepeline: A plain weave, silk organdy imported from France, is used as a support material for delicate and fragile materials. It is perfect for covering textiles in a display as it turns out to be almost undetectable. Textile conservators traditionally have chosen various sheer textures as support materials vis-à-vis Nylon net, Tulle, Silk Crepeline, and Polyester Stabiltex (also called Tetex) to secure and support delicate and damaged textile objects from further crumbling while in exhibition and storage. It is widely used in conservation because of its receptivity to dyeing.

Dyes and Additives: Lanaset Huntsman dye, Acetic Acid, Sodium sulphate and Sodium acetate

Tools and equipments: Specific dyeing and drying area, pipette, pipette holder, thermometer, beakers, measuring cylinder, petri dishes, digital timer, weighing balance with three decimal, hot plate with magnetic stirrer, glass stirrer, double boiler with digital temperature indicator to use bain-marie method, strainer, gloves, apron and masks.



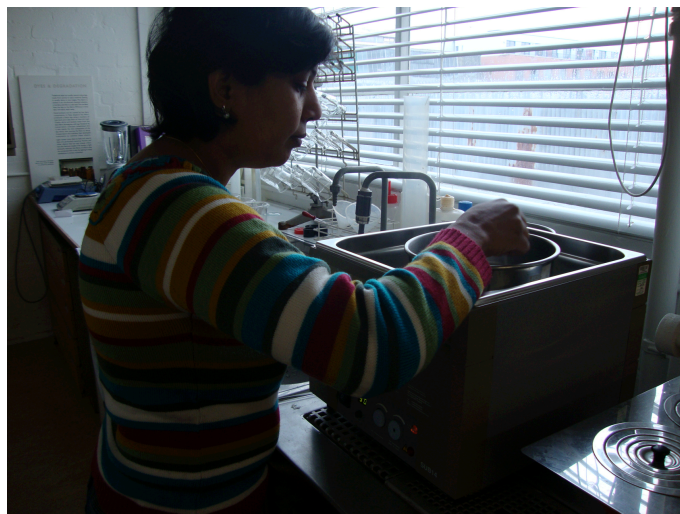
Weighing of fabric and dye powder



Preparation of stock solution



Preparation of stock solution 24 hours before



Dyeing as per the dye cycle i.e. following the temperature curve and time

Documentation for Dyeing

Silk has lower affinity for dyes; therefore it's very difficult to get deep shades on silk. Thus, It is very necessary to document the dye recipe for future reference. This will save time and efforts of the conservator. The dye recipe chart will include date and accession number of object for which dyeing has been done, conservator's name, material, liquor ratio, weight of sample, total depth of shade, quantities of stock solution of various colours and additives, time and temperature curve and notes on variations.

Method of calculation

Calculation of following three materials are based on the weight of fibre (o.w.f.) :

1. Quantities of dye
2. Auxiliary Chemicals
3. Volume of Liquor

- Dyes and chemicals are normally expressed as percentages of the weight of the fibre (o.w.f.)
e.g. a 2% shade means= 2 gms of dyestuff are required for every 100 gms of fibre.

- **Stock dye solution**

Dye stock solutions are usually made up as 0.2% w/v solutions

i.e 0.2 grams in 100 ml of softened water

$C = X \times S / V$ and $X = C \times V / S$

C= Concentration of dye stock solution

X= mass of dye powder

S= Strength of dye powder

V= Volume of solution

Example: To make up a 0.2 % w/v solution of dye powder of 100% strength in 250 ml.

- **Formulae for the dye bath**

$V = W \times P / C$

V= Volume of stock solution required

W=Weight of fibre to be dyed

P= % of dye or chemical required

C= Concentration of the stock solution used

For example: if

V= Volume of stock solution required=??

W=Weight of fibre to be dyed= 5

P= % of dye or chemical required= 3

C= Concentration of the stock solution used= 0.2%

Thus $V = 5 \times 3 / 0.2 = 75$ ml

- **Mass of dye= Concentration x Volume / strength of dye**

Method of dyeing

The stock solutions are prepared, the weight of the sample has been taken and the calculations for stock solution, dye bath and mass of dye has been done. Small samples are dyed initially, to match to the area of the object requiring the support. The whole dye cycle for Lanaset dyes is about 2 hours. In Lanaset dyes lighter colours hit the fibers at lower temperatures and so the dye liquid temperatures is adjusted at various degrees to ensure that all of the dyes reach the fibers. Lanaset requires certain additives to the dye bath in order for the dyeing to be even and to help the progression of the dyes through the fibers, which are, Acetic acid, Sodium acetate and Sodium sulphate. Once the dyed sample is matched properly the larger fabric can be dyed.