

POST TREATMENT PROCESSES

- ▶ Printing is an art. It is one kind of localized dyeing that is dyes or pigments are applied locally or discontinuously to produce various design on the fabric with a motif or motives in one or more colors. After printing of fabric, aftertreatment is very essential for fixation of dyestuff on fabric

Heat Setting

- ▶ Heat-setting is a heat treatment by which shape retention, crease resistance, resilience and elasticity are imparted to the fibres. It also brings changes in strength, stretchability, softness, dyeability and sometimes on the colour of the material. All these changes are connected with the structural and chemical modifications occurring in the fibre.
- ▶ Heat setting is carried out on gray fabrics (scarcely applied), on scoured fabrics (frequently applied) and on dyed fabrics (scarcely applied). The process grants excellent dimensional stability and good crease-proof properties. As far as operating conditions are concerned, the fabric must be treated in accurately controlled moisture and temperature conditions.

Heat setting of Some Fibers

Fibre	Min T. °C	Max. T. °C	Time in sec
Polyester (PE)	170	210	15-50
Polyamide PA 6.6	170	210	15-40
Polyamide PA 6	160	180	15-40
Triacetate	160	180	15-40
Acrylic (PAC)	160	180-200	15-40
Elastomers	170	180-200	15-40

Stages of Heat Setting

- ▶ Heat-setting can be carried out at three different stages in a processing sequence i.e.
- ▶ in grey condition;
- ▶ after scouring;
- ▶ after dyeing.

The stage of heat-setting depends on extent of contaminations and types of fibres or yarns present in the fabric. Heat setting after dyeing could lead to the sublimation of disperse dyes (if not accurately selected).

STEAMING

- ▶ Printed dyes are usually fixed by steaming processes, the steam providing the moisture and rapid heating that brings about the transfer of dye molecules from the thickener film to the fibre within a reasonable time.
- ▶ Historically, the process of developing printed mordants was known as 'ageing' and took a long time, as the term implies.
- ▶ Printed fabric was draped over poles and left in a room with a warm and humid atmosphere for some days, allowing the processes of diffusion and chemical reaction to occur.
- ▶ The term has been retained in use for steaming treatments, especially for short processes and machines; it has given rise to the descriptive, and euphonious, terms 'rapid ager' and 'flash ageing'.

- ▶ The time and conditions for fixation in steam vary with the properties of the dyes and fibres used, ranging from 10 s to 60 min in steam at 200 to 100 °C.
- ▶ Technical and economic factors have encouraged the use of higher temperatures and shorter times, and the change from batchwise to continuous processes.
- ▶ A constant feature in the design of all printing steamers, as distinct from steamers for other textile processes, is the need to prevent the marking-off of printed colour on to pale-coloured areas.

Washing in Textile

- ▶ Rinsing and washing are the operations carried out most frequently during a complete textile finishing cycle.
- ▶ They are almost always connected to key treatments and aimed at removing from the fabric insoluble matters, matters already in solution or an emulsion of other impurities.
- ▶ During the fabric preparation process, for example, washing is carried out after desizing, boiling and other bleaching and mercerising processes; in dyeing, the washing stage is necessary to complete the dyeing process itself or to eliminate the dyestuff which has not been fixed; during the printing stage, washing performs a finishing action.

The sequence of the various washing steps is the following:

- a. Formation of the detergent liquor (transfer of matter + energy by mixing).
- b. Reaching of the process temperature and wetting (transfer of the liquor to the material).
- c. Separation of impurities and emulsification (transfer of matter from one step to the other).
- d. Removal of the liquor from the fibre (transfer of macroscopic matter).
- e. Drying (interstage transfer of heat and matter).

Types of Washing:

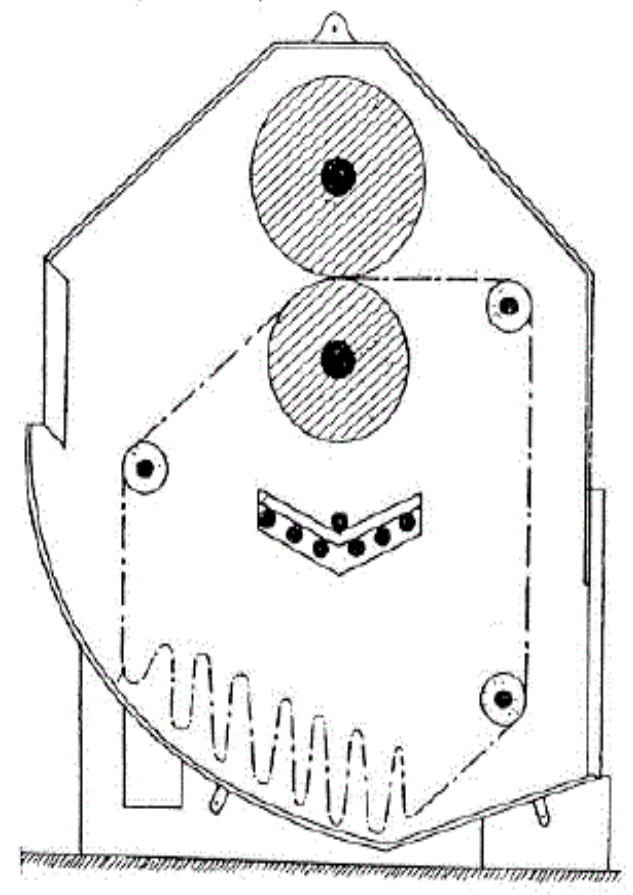
Washing can be performed on fabrics either in

- ▶ open-width or
- ▶ In rope form.

Rope washing is more effective than open-width washing thanks to a stronger mechanic action, which favors the cleansing, and the relaxation of the fabric structure; for delicate fabrics an open-width washing must be preferred to avoid marks and creases. Open-width washing is also the best choice for processing huge lots.

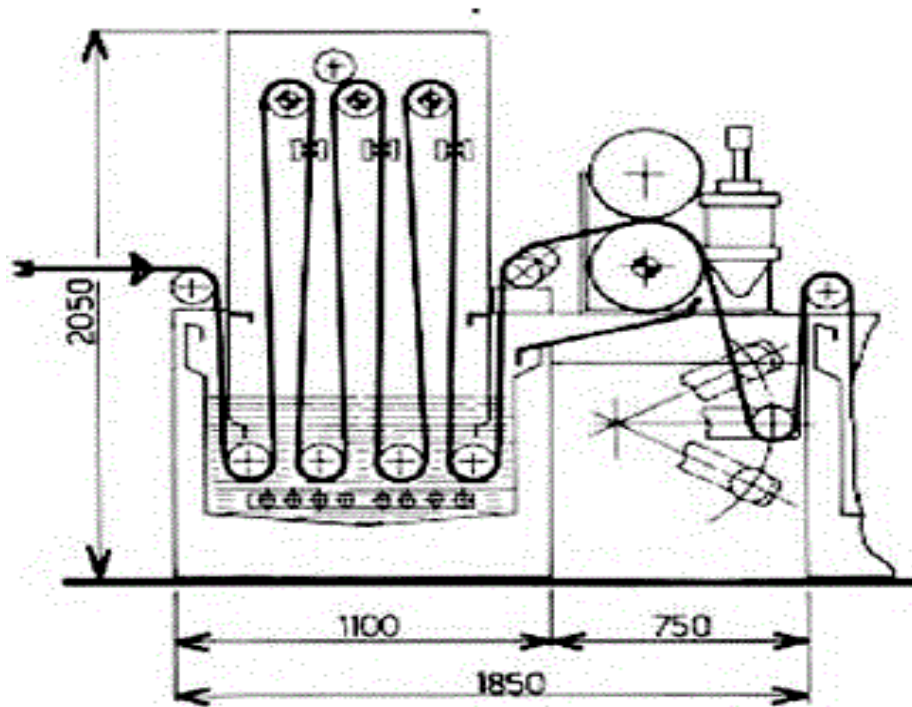
Rope Washing

- ▶ Batch piece washing machines are made up of a couple of squeezing cylinders, which make the fabric swell (the fabric is previously sewn on top and bottom and takes the shape of a continuous ring); these cylinders are assembled inside a vessel, whose lower part contains the detergent liquor. It is possible to wash a fabric inside this vessel, by feeding it into restricted area without laying it stretched out.
- ▶ The efficiency of this operation is enhanced by the mechanic action, which facilitates both detergency and tension relaxation. This operation is highly cost-efficient because open-width washing allows only one working position and therefore only limited loads can be processed (max. 180 kg) while a rope washing machine can include from one to eight ropes, with an overall weight exceeding 600 kg. Furthermore rope washing machines grant reduced operating times thanks to a more effective mechanic action



Open-width Washing

- ▶ An open-width washing machine is usually a system featuring a vertical path washing with driven cycle of multiple action baths, with a resulting 30/40% water and steam saving.
- ▶ This operating unit is manufactured in several versions (10-15-30 meters) and can be used for every kind of preparation and finishing treatment.



Four different washing actions alternate inside this machine:

- 1) Washing on rising paths.
- 2) Washing on sloping-down paths, carried out by means of spray nozzles, which atomise on both face and back of fabrics, performing a strong penetration action.
- 3) "Vibraplus" effect washing, which removes from the fabric the threadlike elements (fibrils) that do not dissolve in water.
- 4) Extraction washing by means of vessel intermediate squeezing. The longitudinal tension of the fabric remains perfectly unchanged on the whole path; it can be adjusted between 5 and 20 kg by means of upper cylinders equipped with self-adjusting control system which generates a sliding motion crease-and-fold proof also on extremely delicate fabrics. Plush fibrils are removed from the vessel with no need for brushes or liquor dilutions.

THANK YOU

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the right side of the image, creating a modern, dynamic feel. The rest of the background is a solid, very light blue.