

DEVELOPMENTS IN RESIN FINISHING – PART I

REF: TT/ OCTOBER 2020 / WK 1

Introduction to Resin

Resin is an organic compound consisting of a non-crystalline or viscous liquid substance. Resins are available both naturally as well as synthetic. Natural resins are secretion of many plants, mainly coniferous trees. These resins are fusible and flammable organic substances. They are transparent or translucent and are yellowish to brown in color. Natural resins are insoluble in water but soluble in various organic liquids. It is used in varnishes and adhesives. They are also used as raw materials for the synthesis of incense and perfume. Synthetic resins are chemically produced resins. These are viscous substances that convert into rigid polymers by the process of curing. Resins contain reactive end groups such as acrylates or epoxides. The most commonly used type of synthetic resin is epoxy resin.

Role of Resin in textiles

Though resins are mainly used in plastic and paint industry, they are also used on textile substrates. The cellulosic fibers like cotton, linen, hemp etc. which are polymers consisting of numbers of glucose molecules joined together to form linear chains. Each glucose subunit can bind to neighboring cellulose molecules via hydrogen bonds. The molecules within the fiber are usually held in place by hydrogen bonding. These hydrogen bonds are very weak and forever breaking and then rapidly reforming. When cellulose fibers are bent, the hydrogen bonds are broken, and new ones form, causing creases or wrinkles that do not hang out. This is why all products made from cellulose fibers have the same tendency to crease.

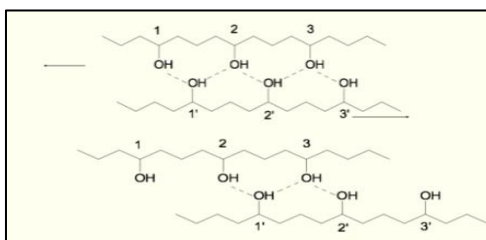
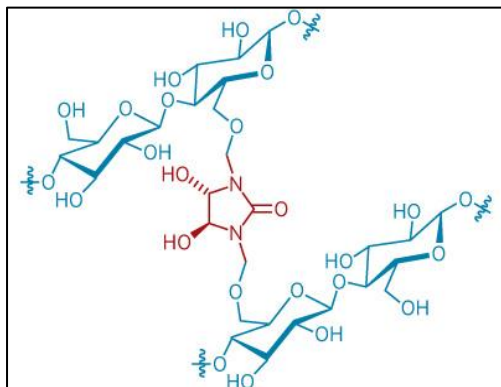


Fig 1.1 Mechanism of crease formation on cellulose

Ref: quizlet.com



Resin finishing is done on the textile substrates to impart crease resisting property. Resins cross link inside the amorphous region and block the free hydroxyl groups to prevent the formation of Hydrogen bond, thus resists crease formation. It is a permanent chemical finishing. The principle is based on the formation of infinite networks and the quantitative characterization of network structure with cross linking of homogeneous polymers.



History of Resin Finishing

- In 1929, first wrinkle free cotton fabric was produced by treating with solution of urea and formaldehyde.

- In 1940s, derivatives of urea-formaldehyde were developed.

- In 1953, Brooks Brothers developed wash and wear shirts.

- In 1960-70s DMDHEU were developed leading to the production of durable pressed finishes.

Fig 1.2 Wrinkle free finish on cotton

Ref: cen.acs.com

During washing, when water molecules insert between the cellulose molecules, they break up the hydrogen bonds and act as a lubricant. This allows the cellulose molecules to slide over one another. When the fabric dries, the cotton takes wrinkled shape. A fabric or garment that has been treated with the finishing agent retains its shape, creases, and smooth appearance after laundering. In such garments, little or no ironing is required.

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
DROHYGEN
SINSER
RINKLEW
MAFORHYDEDEL

Last week`s Answers: 1) INSULATING 2) CONVEYOR 3) TECHNOLOGY 4) NYLON

Wishing you a great week ahead!

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