TECHNICAL TUESDAYS

RESIN FINISH – CONCLUDING PART

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Mechanisms of Resin finish (Easy-Care finishes)

Formaldehyde based resins behave as a bi-functional reagent and forms covalent cross-linkage with cellulose. These are efficient and cheap but impart negative effect on fabric strength and environment.

The cyclic urea of two methyl groups have been developed to impart a high degree of resistance to dry and wet creasing, good chlorine fastness, and good stability towards. The simplest one of this group is 1, 3-dimethylol-2-imidazolidone, commonly known as dimethylolethyleneurea (DMEU). This bi-functional product is water soluble and forms cross links with the hydroxyl groups of cellulose through N-Methylol groups. 1, 3-dimethylo-4, 5-hydroxy-2-imidazolidone, is another product, commonly known as dimethylol dihydroxyethyleneurea (DMDHEU) was introduced for cotton fabric. The product cross-links cellulose in the presence of an acid catalyst

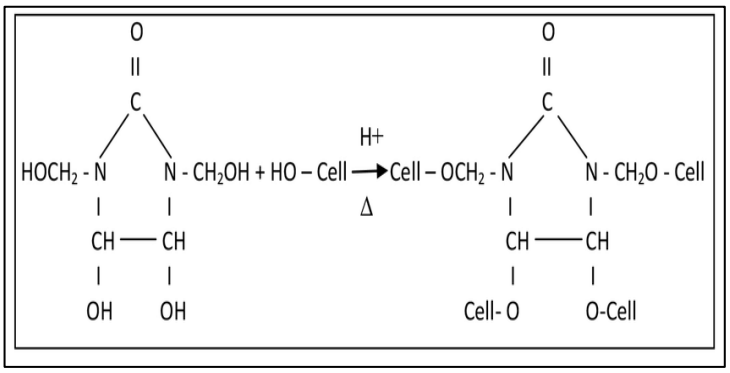

Fig 1.1 – Cellulose and DMDHEU Reaction

DMDHEU has no effect on light fastness of reactive dyed fabric and there is less chance of shade loss of fabric dyed with reactive dyes. The catalysts used for DMDHEU systems, such as magnesium chloride, cause degradation of cellulose, thus reducing the tensile and tear strength of cotton fabric. The selection of the catalyst system and its concentration is crucial for optimizing the tensile strength retention of the finished fabrics.

Formaldehyde in fabrics

Free Formaldehyde is defined as the uncombined monomeric formaldehyde that exists in finish solution. And Formaldehyde release is the amount of formaldehyde that escapes from a fabric into the atmosphere. Cellulose readily picks-up formaldehyde from the atmosphere. This will give positive reading during testing. Sources of gaseous formaldehyde are uncured resin. It is necessary to cure the resin finished fabric properly and make sure there are no pendant N-methylol groups left. The third source of released formaldehyde is the crosslink itself.

The finish will decompose under certain test conditions and liberate formaldehyde. Formaldehyde is a toxic chemical, a severe eye and skin irritant and toxic if ingested. In easy care finished fabrics there are several sources capable of releasing formaldehyde. The cellulose substrate may retain some free formaldehyde reactant during the finishing process. This formaldehyde will be released during storage of the finished fabrics especially under warm and humid conditions. This may cause formaldehyde odour problem during the garment processing of finished fabrics which have been stored for a period of time. In addition formaldehyde may be formed via the hydrolysis of the N-hydroxymethyl groups from untreated cross linking agent.

Hence, it becomes essential to select proper resin and follow the standard recipe.

Testing of crease resistance (Crease Recovery)

Crease recovery is a measure of creases resistance in terms of crease recovery angle. To measure this, the popular instrument is Shirley crease recovery tester. Crease recovery is determined depending upon this recovery angle. If the angle is 0o then recovery is zero and if the angle is 180o then recovery is full.

Fig 1.2 – Shirley Crease recovery tester

Crease recovery depends on the construction, twist of yarn, pressure, time etc. Usually crease recovery is more in warp way than in weft way. This is because warp yarns are well in quality, strength, treated with sizing, kept in more tension during weaving etc.

Wishing you a great week ahead!

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