

DEVELOPMENTS IN RESIN FINISHING – PART II

REF: TT/ OCTOBER 2020 / WK 2

Different types of Resins

Different types of resins used for wrinkle free or resin finishing are:

- a) **Deposition types of Resins** – These resins are deposited on to the fabric surface. They do not react with the fiber. Examples: Phenol-Formaldehyde Resin, Urea formaldehyde Resin, Ketone Resins etc.

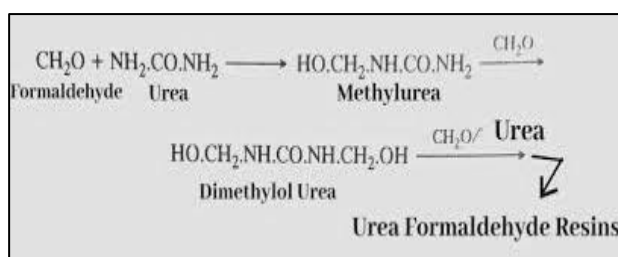


Fig 1.1 Synthesis of Urea-Formaldehyde Resin
Ref: chemistrypage.in

- b) **Cross linking types of Resins** - These types of resins react with the fiber and crosslink the fiber molecules. Some of the cross linking agents are Di Methylol Urea (DMU), Di Methylol Ethylene Urea (DMEU), Di Methylol Di hydroxy Ethylene Urea (DMDHEU), Tri Methylol melamine or Melamine formaldehyde. DMDHEU is the most commonly used cross linking agent.

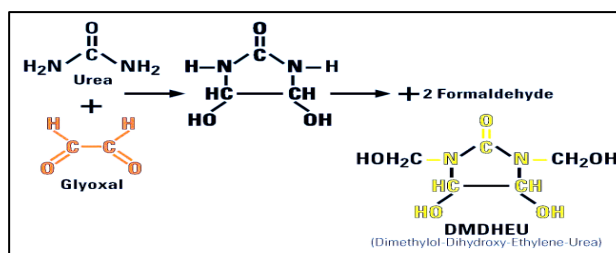


Fig 1.2 Synthesis of DMDHEU
Ref: researchgate.in

The reactive functional groups in the resins are multiple N-methylol groups which undergo acid catalyzed reaction with hydroxyl groups in cellulose molecular chains to form bridging crosslinks.



c) **Low formaldehyde or Non-formaldehyde Resin** - Resin finishing was initially carried out using products based on phenol-formaldehyde condensates, methylol melamine or dimethylol urea. These products led to high formaldehyde emissions. The chemically bonded formaldehyde in the finishing agent, in the finishing bath and on the finished fabric can be present with different types of bonding. The methyl compounds, as well as some free formaldehyde, are transferred to the fabric during impregnation. During drying and curing, cross-linking takes place with the hydroxyl groups of cellulose and there is further release of formaldehyde. Some free formaldehyde is removed with the exhaust gas during drying and curing, some reacts with the hydroxyl groups of cellulose and the rest remains on the fabric.

Formaldehyde being carcinogenic, its emission is undesirable. Hence, cross-linking agents which emit less or zero formaldehyde were produced. These resins are based on N-hydroxy methyl derivatives of urea, carboxylic acid amides etc.

Advantages and disadvantages of Resin finishing

The main advantages of resin finishes are:

- Resin finishing improves the crease resistance and crease recovery property of the fabrics.
- Reduces the shrinkage of the fabric during washing.
- It imparts a smooth and quick drying property on the fabric.
- Improves the dimensional stability of fabric and garment.
- Prevents the Inter molecular slippage in the fiber core.
- This finishing contributes towards water proof properties.

Some of the disadvantages of resin finishes are:

- Resin finishing decreases the tensile strength and tear strength of fibers.
- It decreases the abrasion resistance of the fabric.
- Gives harsh and stiff feel to the fabric.

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

UNSCRAMBLE THE JUMBLE WORDS
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FFIST

Last week`s Answers: 1) HYDROGEN 2) RESINS 3) WRINKLE 4) FORMALDEHYDE

Wishing you a great week ahead!

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