PRINTING – PART VII

REF: TT/ JUNE 2021/ WK 4

Chemistry and working of Binders - The binder used in the pigment printing process is generally based on styrene butadiene, styrene acrylate or vinyl acetate-acrylate co-polymer.

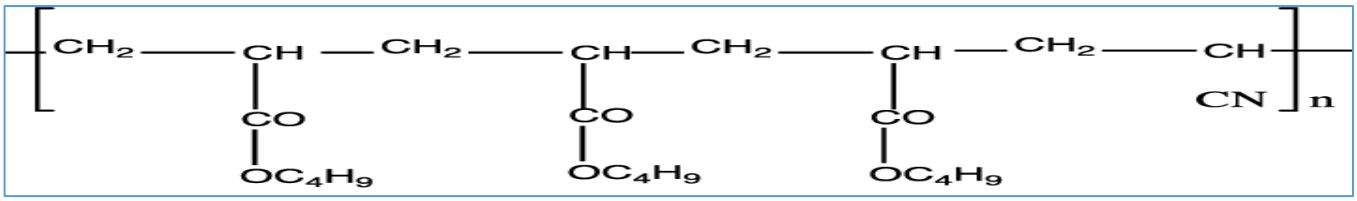

Fig 1.1 General structure of acrylate based binder

Ref: semantic scholar

The binder is a film-forming sub-stance made up of long chain macromolecules, which when applied to the textile together with the pigment, produces a three-dimensionally network. The links are formed during fixing process. While the prints are being dried, a film is formed from the dispersed binder. Its formation takes place in two steps.

Step 1: During this step, water and surfactants are removed from the binder by absorption and evaporation. The dispersed solids coagulate to form a gel-like layer.

Step 2: During the second step, the gel particles flow together to form a continuous film.

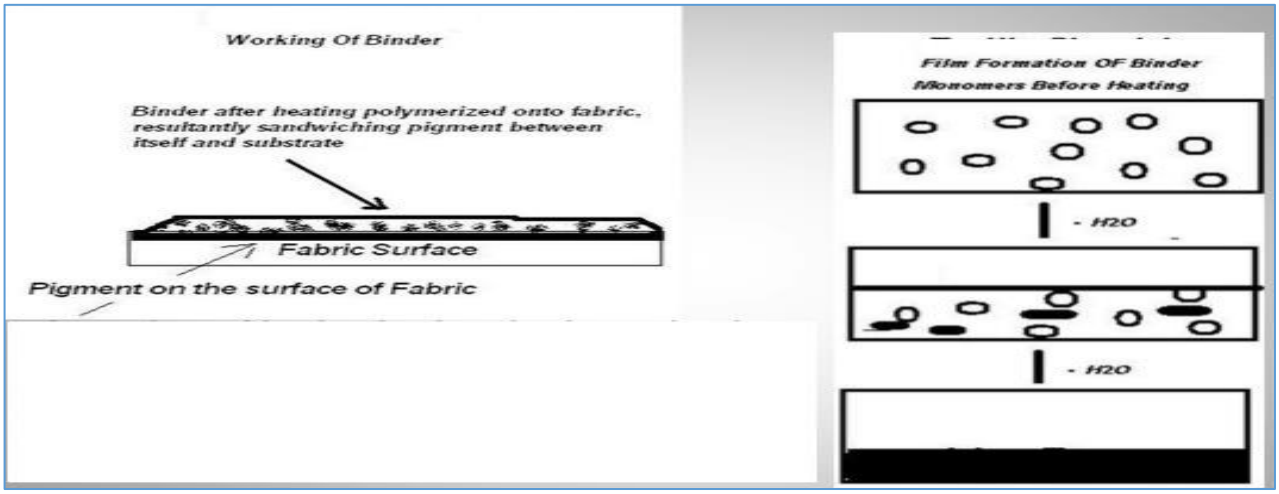

Fig 1.2 Working of binder

Ref: slideshare.net

Almost all the binders used in textile pigment printing are the addition polymerization products. The cross-linking reaction produce covalent bonds, these reactions are activated by dry hot air during curing process.

The reaction between the binders and the cellulose:

Binder-CH-OR + HO-Cellulose → Binder-CH-O-Cellulose + ROH Where R = CH3 or H.

Acrylate copolymers have high binding power and are used in almost all pigment printing operations. The amount of binder used depends on the amount of pigment and textile substrates. The surfactants required to produce a stable dispersion are responsible for the compatibility of the binder with the other components of the print paste.
Binder films based on butadiene can become yellow, and their fastness properties can deteriorate. Hence, Butadiene binders are not recommended for pigment printed textiles that are continuously exposed to light.
Acrylic binders, butadiene based binders and their mixture combinations have been also used. Butadiene based provides a softer handle, but they are susceptible to yellowing. Acrylonitrile-based polymers are recently developed one.

3) **Thickeners** – Thickeners used in pigment printing should be such that it does not interact with binder resulting into reduction into its interaction with fibers. As the interaction between binder and thickeners affect fastness property of the print.

References:

1. https://fiberseal.com/
2. https://www.indiantextilemagazine.in/
3. https://www.hilarispublisher.com/
4. https://www.thoughtco.com/

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

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Last week`s Answers: 1) INTRINSIC 2) BINDER 3) ADHESIVE 4) WAVELENGTH

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