TECHNICAL TUESDAYS

YELLOWING OF DENIMS BY OZONE – CONCLUDING PART

REF: TT/ MARCH 2020 / WK 1

Factors affecting yellowing

- **Unfixed dyes** - The yellowing of Indigo dyes depends on the unfixed dye particles present on the surface of the yarn. The ozone molecules present in the surface of the earth interact with these unfixed dyes causing yellowing.
- **Humidity**- Yellowing of denim depends on the humidity. Higher humidity and higher temperature are known to accelerate yellowing. Water film is formed at the surface of the fibers and causes swelling. The swelled fibers absorb ozone easily and results in yellowing.
- **Intensity of UV & NOx -** Higher UV intensity and higher concentrations of NOx in the atmosphere lead to higher concentration of ozone, which in turn results into more yellowing.
- **Duration of Exposure to UV and NOx** - The longer the exposure, the greater the yellowing.

Precautions to prevent yellowing

- Remove unfixed dyes at the end of the dyeing process.
- Avoid denims from storing in humid condition to protect it from yellowing.
- It is recommended that denims should not be left in wet condition for longer period.
- Use of Anti - ozone softeners - Anti -ozone softeners are amine based softeners which protect indigo dyestuff against ozone. Thus, prevents yellowing caused by ozone. The anti - ozone softener forms a film over fabric surface thus preventing the Indigo dye from reaction with atmospheric ozone. The film will react with atmospheric pollutants and undergoes self-degradation process and breakdown in to its colorless compounds. Thus the anti-ozone softener undergoes self-sacrification process in the prevention of indigo dyes from the oxidation. Primary oxidation takes place at the free amine group in the softener, whereas secondary oxidation takes place in the main structure, which will vary depending upon the chemistry of softener. However, the softener can slow down degradation of indigo but cannot prevent it completely.

Wishing you a great week ahead!

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