

PRE-TREATMENT OF DIFFERENT FIBERS – PART V

REF: TT/ DECEMBER 2020/ WK 4

2) Wool Carbonizing

Carbonizing is the chemical process that is used to remove vegetable matters from wool fibers. The vegetable matters can be seeds, twigs, burr, grass etc. The carbonization of wool depends on the quantity and the types of vegetable matter present. Certain types of vegetable matters are easily removed in carding, like burr, whereas others, such as seeds, are removed not so easily. In some cases, the vegetable matters are of types which can be easily removed but the quantity of it present is too high. Hence, those may not be able to remove mechanically in carding.

Most of the vegetable matters contained in wool are cellulosic in nature. The cellulose is broken down into carbon, by firstly immersing in a strong solution of Sulphuric acid. It is followed by drying at recommended temperature. After the vegetable matter is turned into carbon the wool is passed through a series of heavy metal fluted rollers which crush the carbonized matters into dust. The wool is then passed through a de-dusting unit where the dust is separated from the wool by mechanical action. The wool at this stage is acidic due to the action of being immersed in Sulphuric acid. It is then neutralized by passing it into a solution of alkali containing Sodium Carbonate.

3) Bleaching of wool

Naturally, raw wool is yellow in colour; additionally due to other factors as well like exposure to light, microbial degradation etc. wool turns yellow. Hence, wool is bleached to achieve level dyeing, good yield of colour and also to produce pure white wool.

Bleaching of wool is carried out by oxidative or reductive or combined oxidative/reductive method.

Oxidative bleaching is done with hydrogen peroxide in an alkaline medium. Alkali acts as an activator which increases the rate of bleaching. Under alkaline conditions, the active bleaching agent is the Per hydroxy anion (OOH^-), the formation of which is increased by higher pH. In the bleaching solution, a stabilizer is also used to prevent rapid decomposition of hydrogen peroxide. The most common stabilizers for alkaline wool bleaching are phosphates.

However, due to environmental related issues with phosphates alternative stabilizers based on silicates are being developed.



Peroxide bleaching of wool can also be carried out under mild acidic conditions using a peracid activator or citric acid. Alkali sometimes damages the wool; this acidic method is useful for bleaching delicate fabrics. Wool cannot be bleached with sodium hypochlorite solutions, as for cotton, since it is extensively damaged to the point at which it even dissolves in the solution.

Reductive bleaching is done sodium dithionite and thiourea dioxide. Oxidative method of bleaching gives superior whiteness over reductive methods. Also reductive bleaching method gives harsh hand feel to the fiber.

For pure white wool or full bleaching of wool, oxidative/reductive combined method is followed. In this method, first wool is bleached by oxidative method then followed by reductive system.

References:

1. woolwise.com
2. woolmark.com
3. dyeingworld1.blogspot.com

Carding of Wool

It is a mechanical process. This process cleans, disentangles and inter-mixes the woolen fibers. By this process, continuous fibers which are called sliver are produced. These slivers are then used for subsequent processing like spinning etc.

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

UNSCRAMBLE THE JUMBLE WORDS
TABLEVEGE
INGCARD
TIVEOXIDA
HATEPHOSP

Last week`s Answers: 1) DETERGENT 2) ALKALINE 3) MASS CONDITIONED 4) YIELD

Wishing you a great week ahead!

Technical Tuesdays is a knowledge sharing initiative by Resil Chemicals Private Limited
arc@resil.com | www.resil.com.