

## Applications of Sodium CarboxyMethyl Cellulose in the Paper Industry

### 1.1 Applications in Preparation of Coatings for Coated Paper

Sodium CarboxyMethyl Cellulose can improve the water retention value of coatings and prevent the water-soluble adhesive migrating into the paper, thereby improving the leveling property of coatings and improve the quality of the coating. And it is still a very good adhesive, with excellent adhesive force, 1 share of Sodium CarboxyMethyl Cellulose equivalent to 3-4 shares of modified starch or 2-3 shares of starch derivative compounds, reduces the amount of latex, and helps increase the solid content of coatings. When coating, it can function as a lubricant and is conducive to membrane separation, making the coating with good glossiness and avoiding the “orange peel” phenomenon.



We mentioned earlier in the chemical properties of Sodium CarboxyMethyl Cellulose that it has pseudoplastic property. This feature of it can give coatings “pseudoplastic property”, and under high shear-50, make coatings thinned, particularly suitable for coatings with high solid contents and speed coating. Since the aqueous solution of Sodium CarboxyMethyl Cellulose has anti-enzymatic performance and inert metabolism, it can give coatings very good stability, such as maintaining the uniformity of coatings and making coatings non-perishable in the storage period.

### 1.2 Applications in Surface Sizing of Paper

With finishing by surface sizing, the paper can increase stiffness and smoothness, improve the surface strength and air permeability, control curl and obtain good printability. Adding a certain proportion of Sodium CarboxyMethyl Cellulose in the surface sizing can make the surface get very good closed nature and ink receptivity, so that color printing is clear and bright, saving ink. As we said earlier, the aqueous solution of Sodium CarboxyMethyl Cellulose has very good film-forming property, so adding Sodium CarboxyMethyl Cellulose into the surface sizing agent contributes to the film formation of sizing agent on the surface of paper, thereby improving the effect of surface sizing. However, due to the higher price of Sodium CarboxyMethyl Cellulose, it is usually only used for paper of special requirements, such as bond paper, banknote paper, release base paper, decorative paper, and advanced offset paper, and if necessary, can be used in conjunction with modified melamine formaldehyde resin.

### 1.3 Applications in Adding in the Wet End of Paper Machine

Earlier Sodium CarboxyMethyl Cellulose was mainly used for such aspects as paper coating and surface sizing in the paper industry. However, in recent years there have been a lot of paper manufacturers at home and abroad improving the quality of product by adding Sodium CarboxyMethyl Cellulose in the wet end and achieving very good results. It is now widely recognized that adding Sodium CarboxyMethyl Cellulose in the wet end of paper machine can produce the following four functions.



#### 1.3.1 Improving the Evenness of Paper

Sodium CarboxyMethyl Cellulose is a very good dispersant, and after the Sodium CarboxyMethyl Cellulose that has been dissolved into the colloidal solution is added into the paper stock suspension, it is very easy to have affinity with pulp fibers and filler particles. At the same time we know that the aqueous solution of Sodium CarboxyMethyl Cellulose is negatively charged. In this way, the electronegativity of already negatively charged pulp fibers and filler particles gets increased; the particles with the same charge will be mutually exclusive; and the fibers and fillers in the pulp suspension can obtain more uniform dispersion, conducive to the formation of paper sheet, thereby improving the evenness of paper.

#### 1.3.3 Improving the Physical Strength of Paper

Improving the evenness of the paper helps to improve the physical strength of paper (such as surface strength, tearing strength, breaking length, folding endurance, bursting strength, etc.), so Sodium CarboxyMethyl Cellulose has also improved the physical strength of paper while improving the evenness of paper. In addition, the carboxymethyl group contained in the structure of Sodium CarboxyMethyl Cellulose can produce chemical hydration with the hydroxyl group on fibers, enhancing the bonding force between the fibers, and then physically processed by each subsequent process of paper machine, the binding force between fibers will get substantially enhanced. The effect reflected in the paper sheet is that almost all the indicators of physical strength have been improved.

#### 1.3.3 Having the Function of Sizing In Pulp

First, Sodium CarboxyMethyl Cellulose can bring a certain degree of sizing to the paper sheet; second, it can protect such sizing agents as rosin gum and AKD, can promote them to be dispersed into tiny particles and evenly distributed onto the fibers, also can delay the hydrolysis

rate of AKD, and reduce the possibility of hydrolyzed garbage to pollute the system.

#### 1.3.4 Improving the Retention Property of System

Since Sodium Carboxymethyl Cellulose is very easy to have affinity with fine fibers and filler particles affinity, if the appropriate cationic additives can be selected and used in conjunction with it, an significant synergistic effect will be obtained. It can not only improve the single pass retention rate of paper machine, but also promote to improve the retention rate of the additives themselves, making the efficacy of additives more significant.

Theoretically, all the paper that exists defects in the evenness and physical strength can be improved by adding Sodium Carboxymethyl Cellulose in the wet end. When the single pass retention rate of paper machine is low, or when you want to improve the retention rate of some expensive cationic additives, both can be improved by adding Sodium Carboxymethyl Cellulose in the wet end of paper machine. Currently it is mainly applied in some specialty paper and paperboard, such as tipping paper, cigarette paper, decorative paper, map paper, bond paper, cardboard for shoes, filter paperboard. Because the price of Sodium Carboxymethyl Cellulose is relatively higher in papermaking chemicals, and the added value of specialty paper and paperboard is higher, it is very worthwhile to use a small amount of Sodium Carboxymethyl Cellulose to improve product quality. Certainly, there are also successful applications in the newsprint and offset paper.