Application n° 2
Screening of CMC

Carboxymethyl cellulose (CMC) or cellulose gum is a cellulose derivative with carboxymethyl groups (-CH2-COOH) bound to some of the hydroxyl groups of the glucopyranose monomers that make up the cellulose backbone. It is often used as its sodium salt, sodium **carboxymethyl cellulose**.

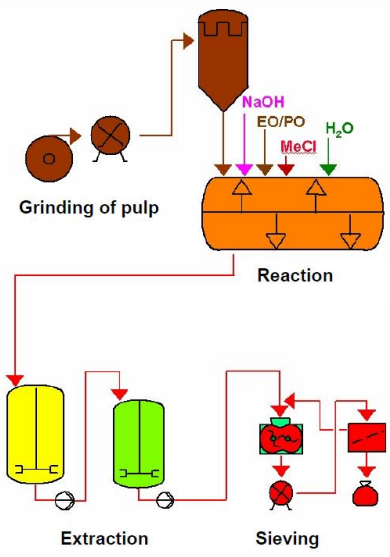
CMC is used in food science as a viscosity modifier or thickener, and to stabilize emulsions in various products including ice cream. As a food additive, it has E number E466. It is also a constituent of many non-food products, such as K-Y Jelly, toothpaste, laxatives, diet pills, water-based paints, detergents, textile sizing and various paper products. It is used primarily because it has high viscosity, is non-toxic, and is non-allergenic. In laundry detergents it is used as a soil suspension polymer designed to deposit onto cotton and other cellulosic fabrics creating a negatively charged barrier to soils in the wash solution. **CMC** is used as a lubricant in non-volatile eye drops (artificial tears).

Following the initial reaction the resultant mixture produces approximately 60% **CMC** plus 40% salts (sodium chloride and sodium glycolate). This product is the so-called Technical **CMC** which is used in detergents. A further purification process is used to remove these salts to produce pure **CMC** which is used for food, pharmaceutical and dentifrice (toothpaste) applications. An intermediate "semi-purified" grade is also produced, typically used in paper applications.

CMC is also used in the oil drilling industry as an ingredient of drilling mud, where it acts as a viscosity modifier and water retention agent. Poly-anionic cellulose or PAC is derived from **CMC** and is also used in oilfield practice. **CMC** is also used in ice packs to form a eutectic mixture resulting in a lower freezing point and therefore more cooling capacity than ice.

The manufacture of CMC is a complex process. The raw material used for the production of cellulose ethers is high-purity cellulose, which is obtained from cotton linters or wood and is water-insoluble. To make it accessible to a chemical reaction, the cellulose is first finely ground (pulp grinding) and then reacted with sodium hydroxide solution to form the so-called alkali cellulose. Depending on the required type of cellulose ether, the swollen alkali cellulose is etherified with different agents, thus creating water-soluble cellulose ethers.

During the reaction of alkali cellulose with etherification agents and during the subsequent processing stages, sodium chloride as well as further by-products are formed, which are removed in a series of complex extraction steps. During the entire process, the cellulose ether is in the form of a suspended solid state material (and thus not in solution). This is achieved by the choice of appropriate solvents as well as by an optimized temperature control during the whole process. The dried cellulose ethers are ground to granulate or powder grade materials and, depending on the application, can be finally modified with different additives.



GKM Siebtechnik GmbH - Felix Wankel Str. 11- DE-74915 Waibstadt
Tel. +49-7263-40972-20 / Fax. +49-7263-40972-29 / Mobil +49-173-9006472
Email: f.tallner@gkm-net.de www.gkm-net.de

Application n° 2
Screening of CMC

For **control screening** purposes, the GKM Vibratory Screening Machine Type KTS-V2 is used. The mostly vertical oscillation of the machine is generated by two counter current rotating vibratory motors. This motion leads into high capacities. The machine is equipped with a central in- and outlet, which allows easy installation into existing pipes. Capacities of 30m³/h are achieved for 5mm mesh opening for a diameter 1200mm.

For **fractionating** of **CMC** the GKM Tumbler Screening Machines are used. This, machine simulates by means of an eccentric belt drive system a person's typical hand screening motion, resulting in the meeting of the stringent separation requirements. Typical mesh sizes are 0,15 and 1,25mm, where a third screen at 0,7mm is used to serve as a relief deck. For undersize values < 5% (particles < 0,15mm in the fraction 0,15-1,25mm) the GKM KTS Double Screening Machines with one (+1) or two (+2) prescreens is used. The oversize of the first 0,15mm screen is discharged through a lateral passage to the lower 0,15mm screen, where it is re-screened to yield the highest efficiency possible. This simulates two screening machines in line within one machine. Rubber balls, which bounce underneath the screen, avoid clogging of the meshes. Capacities of more than 1.000 kg/h can be reached on a KTS 2000.

Following are some customers that successfully use the GKM Screening System for their CMC:

Dow Wolff Celluloses
AkzoNobel
ShinEtsu / SE Tylose

GKM Siebtechnik GmbH - Felix Wankel Str. 11- DE-74915 Waibstadt
Tel. +49-7263-40972-20 / Fax. +49-7263-40972-29 / Mobil +49-173-9006472
Email: f.tallner@gkm-net.de www.gkm-net.de