

TECHNICAL BULLETIN



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CMC

CMC AND SODIUM CMC

MATERIAL & FUNCTION

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 most often used as its sodium salt, sodium carboxymethyl cellulose (Sodium CMC).

The chemical formula can be described as C₆H₇O₂(OH)_{3-x}(OCH₂COONa)_x and the CAS number is 9004-32-4

PROPERTIES

Typical detergent grade Properties:

Appearance: White to cream free flowing powder, free from grit and visible impurities

Purity, % 70 min

Moisture, % 10 typical

NaCl, % 8 typical

Fe, ppm 150 max

Ni, Cr, Co; ppm 5 max

Degree of Substitution: 0.45-0.6

Viscosity, mPas: 4%:730

pH (1% soln): 6.5.5-11.5 (8.5 typical)

Reflectance, %: 70 min

Particle size % thru 80#: 95 min

Boiling Point (°C): n/a

Melting Point (°C): n/a

Auto-ignition Temp, °C: 340

SG: 1.6

Thermal decomposition Temperature: 240°C

APPLICATIONS

It 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.

Insoluble microgranular carboxymethyl cellulose is used as a cation-exchange resin in ion-exchange chromatography for purification of proteins.

SYNTHESIS

The functional properties of CMC depend on the degree of substitution of the cellulose structure (i.e., how many of the hydroxyl groups have taken part in the substitution reaction), as well as the chain length of the cellulose backbone structure and the degree of clustering of the carboxymethyl substituents. As a result of these changes, a wide variation in properties solubility and viscosity is possible.

THICKENING POLAR SOLVENTS: Sometimes it is methyl cellulose (MC) which is produced in the substitution reaction, and its non-polar methyl groups (-CH₃) add to the solubility in Polar solvents (like alcohol)

DETERGENT GRADE CMC: 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.

FOOD GRADE CMC: 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

CAUTION

Avoid contact with eyes and avoid breathing dust.

PACKAGING

20 kg bags

IMPORTANT NOTICE TO CUSTOMER

*Since the use of this product is beyond the control of either seller or manufacturer, their only obligation shall be to replace any quantity of product which is proven defective. They cannot assume any risk or liability in excess of the purchase price of the product itself, which does not include labour or any consequential damages resulting from the use of this product. Determining the suitability of this product for any intended use shall be solely the responsibility of the user. **ALWAYS TEST FIRST.***

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