



Product Data Sheet

Product Name: METHOCEL K3 PREMIUM LV HPMC

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The following specifications apply to sealed, unopened containers stored under the recommended conditions for the duration of the shelf life.

MATERIAL DATA, PHS

MATERIAL NUMBER	93970
MATERIAL DESCRIPTION	MCK3 PRM LV DF25KG 12/P
SPECIFICATION NAME	METHOCEL(TM) K3 Premium LV Hydroxypropyl Methylcellulose
SPECIFICATION TYPE	SALES SPECIFICATION
SPECIFICATION EFFECTIVE DATE	August 4, 2022
SPECIFICATION SUPERSEDES DATE	July 24, 2019

GOVERNMENT AND INDUSTRY STANDARDS:

Current E464 - European Parliament and Council Directive

Current EP - European Pharmacopoeia

Current JP - Japanese Pharmacopoeia

Current USP - United States Pharmacopeia

U.S. FDA 21 CFR 172.874

U.S. FDA GRAS Notification GRN 000213

VISUAL PROPERTIES, PHS

OPALESCE	PASS	<i>CURRENT EP OPALESCE</i>
COLOR EVALUATION	PASS	<i>CURRENT EP SOLUTION COLOR</i>

PHYSICAL PROPERTIES, PHS

PH (2%)	5.5 - 8.0	<i>CURRENT USP/EP/JP</i>
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EVALUATIONS, PHS

IDENTIFICATION [AB]	PASS	<i>CURRENT USP/EP/JP</i>
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Document ID 1996209
Profile 6273

All the information provided herein is true and accurate at the date of issue and is based on our current knowledge of the composition of our products and of the composition of individual ingredients contained therein, based on internal measurements, data obtained from our vendors, or literature data. Customer shall be solely responsible for determining the appropriateness of our products for their intended use, and for ensuring that any claims, promotions, marketing and sales decisions that they may make with respect to their products shall be in compliance with all applicable laws and regulations.



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EVALUATIONS, PHS

RESIDUAL SOLVENTS [AB]	PASS	<i>CURRENT USP/EP/JP</i>
SULFATED ASH	<= 1.5 %	<i>CURRENT USP/EP/JP</i>
MOISTURE (LOSS ON DRYING)	<= 5.0 %	<i>CURRENT USP/EP/JP</i>
RESIDUE ON IGNITION (%)	<= 1.5 %	<i>CURRENT USP/JP</i>

VISCOSITY, PHS

APPARENT VISCOSITY	2.4 - 3.6 mPa.s	<i>CURRENT USP/EP/JP 2% IN WATER, @ 20DEGC</i>
APPARENT VISCOSITY (TARGET)	3.0 mPa.s	

MICROBIAL, PHS

E.COLI ABSENT PER G [AB]	PASS	<i>CURRENT USP NEGATIVE</i>
PSEUDO. AERUG. ABS IN 1G [AB]	PASS	<i>CURRENT USP NEGATIVE</i>
SALMONELLA ABS PER 10G [AB]	PASS	<i>CURRENT USP NEGATIVE</i>
STAPH. AUR. ABS IN 1G [AB]	PASS	<i>CURRENT USP NEGATIVE</i>
YEASTS AND MOLDS PER G [AB]	<= 100 /g	<i>CURRENT USP TOTAL COUNT</i>
TOTAL PLATE COUNT PER G [AB]	<= 100 /g	<i>CURRENT USP TOTAL AEROBIC</i>

COMPOSITION, PHS

HYDROXYPROPOXYL CONTENT	7.0 - 12.0 %	<i>CURRENT USP/EP/JP</i>
METHOXYL CONTENT	19.0 - 24.0 %	<i>CURRENT USP/EP/JP</i>

METALS, PHS

HEAVY METALS (AS PB) [AB]	<= 20 mg/kg
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METALS, PHS

CURRENT USP/EP/JP

Identification Tests A-E specified in the USP and EP monographs are identical to tests 1-5 specified in the JP monograph.

Based on knowledge of the manufacturing process and controlled handling and storage, this product complies with ICH Q3C Residual Solvents Guidance requirements. The solvents listed as Class 1, 2 and by the USP/NF are not used in the manufacturing process.

Tests tagged or noted as "Audit Basis" [AB] are conducted on a frequency that is established for each test.

Audit testing is justified by knowledge of the manufacturing process, process control, use of dedicated equipment and raw material specifications.

For tests conducted on an audit basis, individual batch test results are not provided on the Certificate of Analysis (COA). Instead, a statement of typical properties is given.

Tests tagged or noted as "Microbiological Tests" [MT] are conducted on a audit-based frequency that is established for each test.

Specification limits apply to the material as packaged in the original containers. They do not apply if the material has been repackaged, improperly stored, or if the package has been opened in an uncontrolled environment.

Samples returned for analysis must have been obtained under conditions which prohibit the introduction of microbial contamination. Sterile containers and sampling equipment must be used.

This product meets all requirements of substitution type 2208 in the current USP, EP and JP monographs for Hypromellose.

This product meets the specific purity criteria for the food additive Hydroxypropyl Methyl Cellulose (E 464) listed within the Official Journal of the European Union.

This product is certified Kosher for Passover and Pareve.

This product is certified to contain not more than 0.1% of each of the following components: Propylene glycol, Dipropylene glycol, Tripropylene glycol, Dipropylene glycol monomethyl ether and Tripropylene glycol monomethyl ether.

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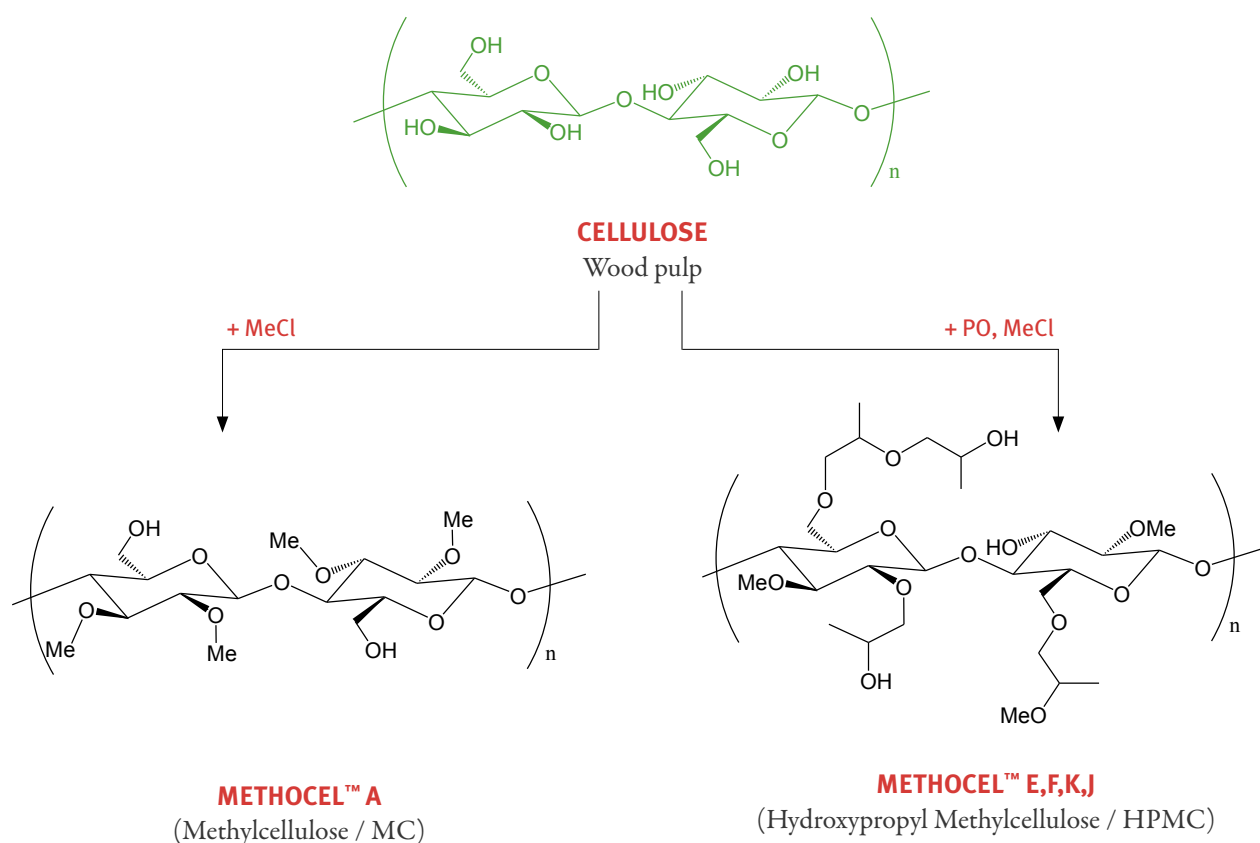


METHOCEL™

Water-Soluble Cellulosic Polymers for Industrial Applications

WHAT ARE METHOCEL™ WATER-SOLUBLE POLYMERS?

METHOCEL™ Methylcellulose (MC) and Hydroxypropyl Methylcellulose (HPMC) Water-Soluble Polymers are cellulose ethers that are derived from cellulosic materials such as natural wood or cotton linters. To obtain METHOCEL™ Water-Soluble Polymers, wood pulp is treated with sodium hydroxide to form alkali cellulose. Alkali cellulose is then treated with either methyl chloride or a combination of methyl chloride and propylene oxide to obtain, respectively, methylcellulose or hydroxypropyl methylcellulose.



DUPONT IS THE WORLD LEADER IN CELLULOSIC DERIVATIVES

METHOCEL™ Water-Soluble Polymers offer an exceptional range of properties that can be fine-tuned to create custom solutions. A key component of many consumer products, industrial products and intermediates, METHOCEL™ Water-Soluble Polymers are backed by a world-class Research & Development team, regional Technical Application teams and regional laboratories.

METHOCEL™ Water-Soluble Polymers are widely used in pharmaceutical, medical, food ingredients, nutritional supplements, home and personal care, automotive, electronics, agriculture, paper and many other industries.



A RANGE OF FUNCTIONAL PROPERTIES

METHOCEL™ is a single product that combines a variety of functional properties such as:

- Lubricity
- Binding
- Water retention
- Thickening and rheology modification
- Film formation

METHOCEL™ Water-Soluble Polymers are versatile, and their many synergistic properties make them a cost-effective formulation component. Benefits include:

- Water solubility (all grades)
- Solvent solubility (specific grades)
- Wide range of viscosities (3 to 200,000 mPas in 2% solution)
- Rheology modification, from pseudoplastic/shear thinning to Newtonian behavior
- Gelation, reversible gel formation upon heating
- Water-binding
- Lubricant
- Film-forming (e.g., for coatings)
- Thermoplasticity (specific grades)
- Approved for food contact
- “Surface active,” emulsion stabilizer
- No ionic charge
- Enzyme resistant or biodegradable dependent on substitution level
- pH stable in range 2.0–12.0

UNIQUE PROPERTIES DEVELOPED FOR YOUR APPLICATION NEEDS

METHOCEL™ has a well-established history in a variety of industries and is used across a wide range of applications. The use of METHOCEL™ continues to expand due to these key factors:

- Combines many desirable and unique properties into one form
- Manufactured globally at four production sites, increasing business continuity planning
- Cost-effective compared to many functional alternatives
- Backed by DuPont’s Technical Service, Quality, Regulatory and Research & Development teams

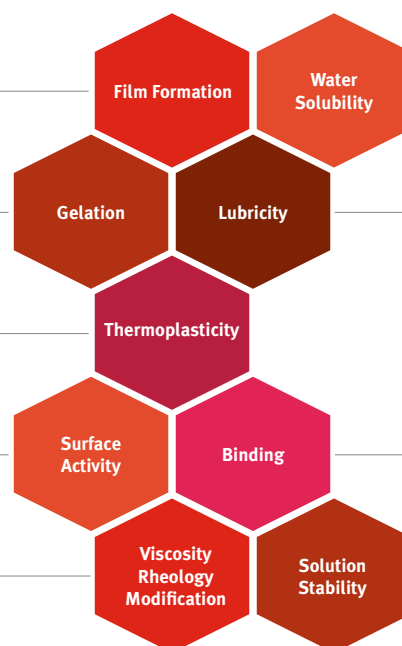
Ideal for coatings, primers, paint removers and inks. Improves properties such as adhesion, spreadability, homogeneity, etc.

Can produce viscous solutions as well as gels (elastic to brittle). Gelation is reversible upon heating.

Some grades exert thermoplastic behavior for extrusion applications.

Acts as a medium-strength surfactant.

Enables customization of rheology modification properties. Cost-effective option when basic thickening is required.



Primary property. More information on page 5

Water-binding properties and pseudoplasticity help prevent friction.

Superior binding capabilities. Used in ceramics and many other applications.

Stable over a broad range of pH. Nonionic polymer, tolerates low salt levels.

METHOCEL™ APPLICATIONS

METHOCEL™ Water-Soluble Polymers are versatile polymers, soluble in not just water but many other organic solvents. Though they are used in a wide variety of applications, a selected list is provided below.



Industry-leading extrusion binder for auto honeycombs; ideal for many other ceramic extrusion applications such as electronics, medical and consumer products.

Ideal for paint removal because of solubility in organic solvent and water.



Brings modification and stabilization to water-based coatings and inks formulations because of rheology properties; used as a thickener, protective colloid and pigment suspension aid; used in textile printing inks because of binding properties.



Widely used as adhesives and in adhesive products to control viscosity, migration and other essential performance characteristics; used for adhesive properties in specialty paper, wallpaper, consumer and tobacco products.



Primary choice for drift control protection in crop treatment; Widely used as a stabilizer and rheology modifier; excellent coating polymer; ideal choice for seed coatings applications; considered inert adjuvant by the EPA and allowed in crop protection products.

Widely used in consumer and industrial cleaning products such as multi-purpose detergents, shower and toilet cleaners, mildew and lime removal products, etc.



Used in PVC polymerization applications as primary and secondary suspension agent; provides excellent particle size control, improved plasticizer absorption, low reactor scaling and high-bulk densities.

FIND THE PRODUCT THAT BEST MEETS YOUR APPLICATION REQUIREMENTS

Several factors affect your choice of METHOCEL™.

- What purity level do you require?
- What chemistry is most appropriate?
- What viscosity and molecular weight will optimize your product and process performance?



Purity is driven by market requirements, regulations and application requirements. DuPont offers a wide range of METHOCEL™ for pharmaceutical, food and industrial applications.



METHOCEL™ is available in a wide range of viscosities (3 – 200,000 mPas in 2% solution).

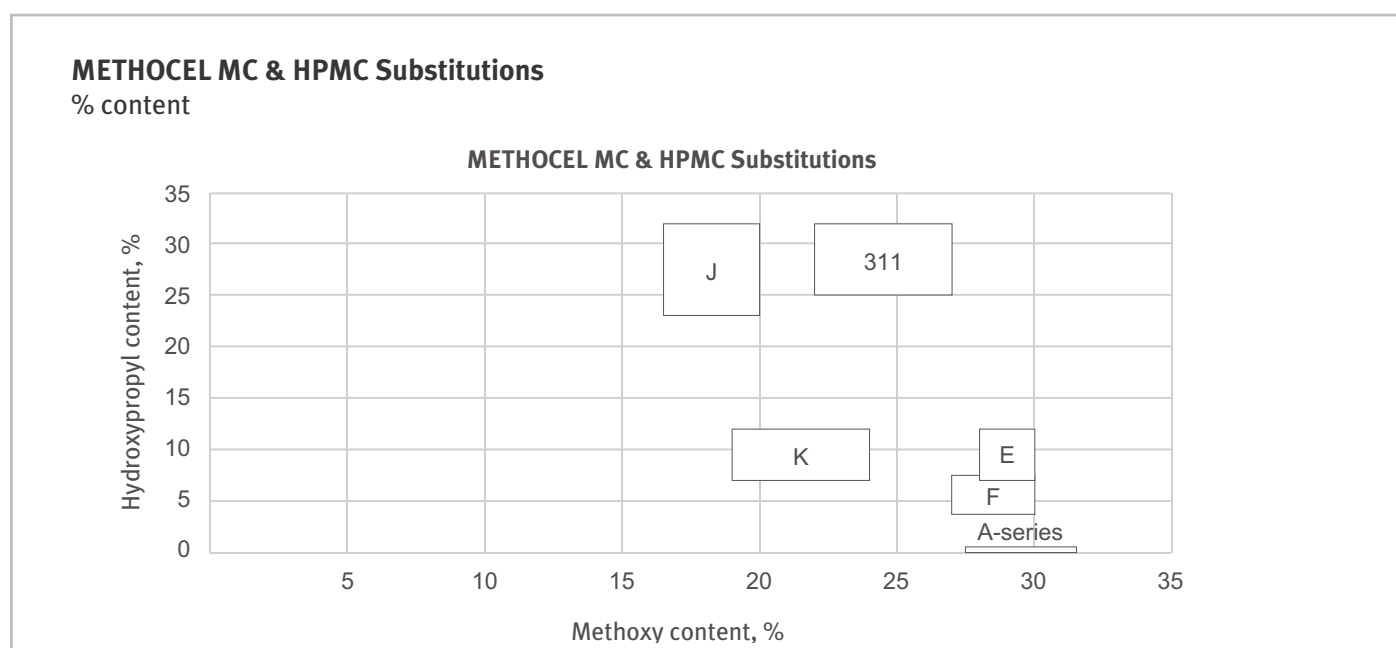


Six chemistries are available in the METHOCEL™ portfolio. The substitution level influences the performance attributes in the customer application.

Segment	Methocel™ HPMC
Adhesives	●
Ceramic extrusion	●
Ceramic glazes	●
Coatings, inks	●
Paint removers	●
PVC	●
Agriculture, crop protection	●
Pulp and paper	●
Mining	●
Water drilling	●
Other industrial app.	●

● Occasionally used ● Often used - Reference material

OUR LARGE PRODUCT LINE OPTIMIZES YOUR APPLICATION PERFORMANCE



COMMON METHOCEL™ PRODUCTS

METHOCEL™	Chemistry	Viscosity in 2% solution	Primary applications
311	Special grade	7,500 (1%)	Paint removers, gelled fuels
A15LV	A	15	General purpose
A4C	A	400	General purpose
A15C	A	1,500	General purpose
A4M	A	4,000	Ceramic extrusion
E5	E	5	General purpose
E50	E	50	PVC
F50	F	50	PVC
F4M	F	4,000	Ceramic extrusion
F4M PRG	F	4,000	General purpose
228	F	5,000	General purpose
240	F	40,000	Ceramic extrusion
240S	F	40,000	General purpose
J12MS	J	12,000	General purpose
J75MS	J	75,000	General purpose
K100LV	K	100	PVC
K4M	K	4,000	Ceramic extrusion
K4MS	K	4,000	General purpose
K15M	K	15,000	Ceramic extrusion
K15MS	K	15,000	General purpose

PROCESSING RECOMMENDATIONS FOR METHOCEL™

Basic processing recommendations can be found below. A more detailed technical brochure is also available. Please connect with our sales and technical service teams for customized recommendations.



HOW TO PREPARE AQUEOUS SOLUTIONS OF METHOCEL™

In cold water, METHOCEL™ particles swell and hydrate to solubilize. Depending on the grade, concentrations in water can reach 2-3% (high viscosity grades) to 10-15% (low viscosity grades). To obtain a METHOCEL™ solution, use the correct concentration, rate of addition and shear.

It is preferable to disperse METHOCEL™ in a small amount of hot water (>90°C). Once METHOCEL™ is dispersed in hot water, add the remaining volume of cold water to fully dissolve. For details, please see our technical handbook.

HOW TO PREPARE METHOCEL™ SOLUTIONS IN NON-AQUEOUS SOLVENT OR MEDIA

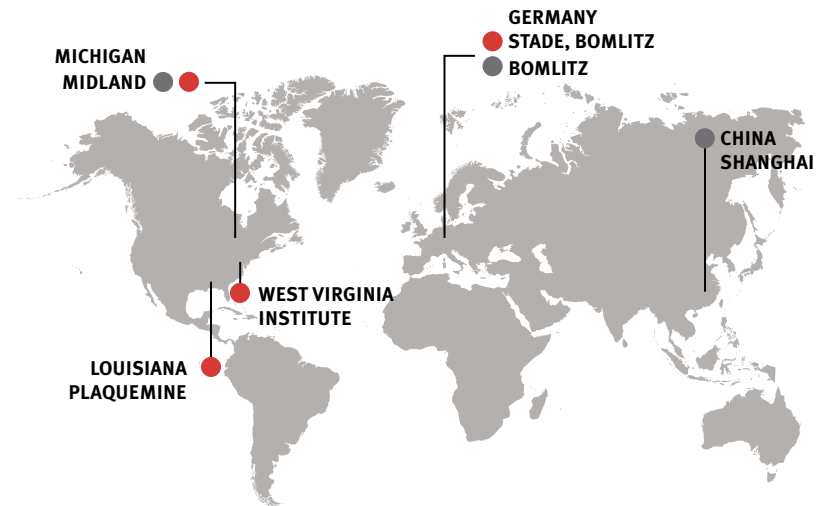
It is possible to use METHOCEL™ in non-aqueous media by pre-dispersing METHOCEL™ with other formulation components prior to the addition of water. Please consult our technical handbook or contact a DuPont representative for details.

DUPONT GLOBAL SPECIALTY SOLUTIONS

- Global manufacturing and technology footprint
- Robust business continuity planning procedures and standards
- Sales and technical support network for local customer support
- Three technical support and development (TS&D) facilities
 - » Bomlitz, Germany
 - » Midland, MI, U.S.A.
 - » Shanghai, China

GLOBAL SPECIALTY SOLUTIONS MANUFACTURING & RESEARCH SITES

5 production sites, 3 R&D/Technical Support and Development (TS&D) centers



WHAT WE DO

METHOCEL™ Water Soluble Polymers for industrial applications, are available only from DuPont Global Specialty Solutions and its distributors. Global Specialty Solutions, a business unit of DuPont Nutrition & Health (N&H), manufactures cellulosic polymers alongside other N&H portfolio products. The dedicated Global Specialty Solutions team commercializes DuPont products into various global markets.

OUR CORE VALUES

More than just goals, our core values reflect the way we work every day with our customers and partners in communities around the globe:

- Safety & Health
- Environmental Stewardship
- Respect for People
- Highest Ethical Behavior

WHO WE ARE

We are innovative problem solvers, drawing on deep application understanding and market insight to help our customers turn challenges into high-value business opportunities.

[Learn more at dupontspecialtysolutions.com](http://dupontspecialtysolutions.com)



CONTACT OUR KEY OFFICES

Connect with DuPont sales and application experts to further explore integrating METHOCEL™ in your application.

dupontspecialtysolutions.com



PRODUCT SAFETY

When considering the use of any DuPont products in a particular application, please review our latest Material Safety Data Sheets first to ensure that your intended use can be accomplished safely. For Material Safety Data Sheets and other product safety information, contact our DuPont experts. Before handling any other products mentioned in the text, obtain available product safety information and take necessary steps to ensure safety of use.

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