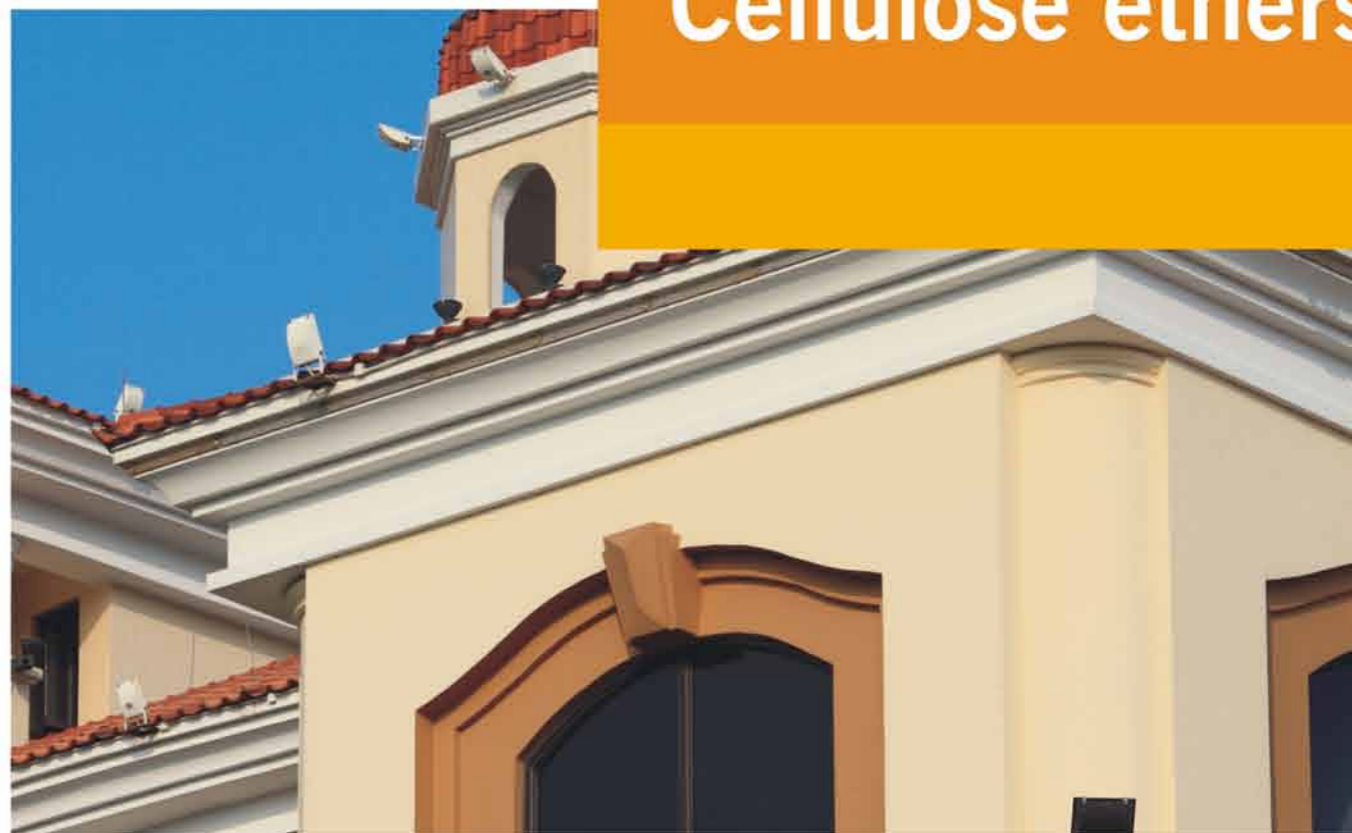


# Cellulose ethers





## Company

**Kimix Chemical Co.,Ltd.**, is one member of Vink Chemicals GmbH &Co.KG, running as a sales house for the products Vink Chemicals invested in China. Cellulose ether is one of our major products, branded with the trade mark Kimicell.

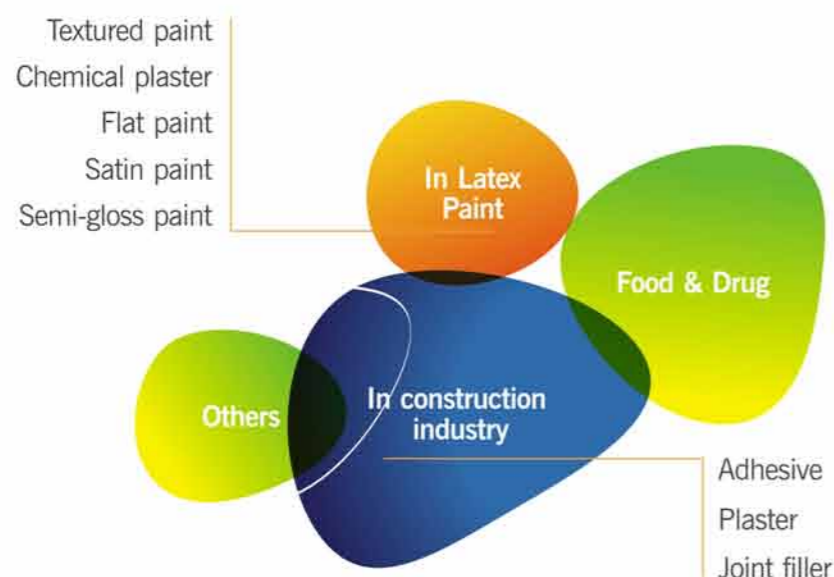
**Kimicell** serials cover cellulose ethers HEC, HPMC, MHEC, EHEC, EMHEC and CMC with a wide range of viscosity.

Kimicell cellulose ethers offer an excellent performance on thickening, film forming, water retention, and lubricity. With such an abundant functions, Kimicell cellulose ethers are widely used in paints, construction, ceramics, personal care products, and food industry.



## Kimicell® Cellulose ethers

Kimicell® Cellulose ethers are widely used in paints, construction, ceramics, personal care products, and food industry. Aside from these applications, we got solutions to the specific needs for our customers.



## Kimicell® products series

### Kimicell® KEC

-Hydroxyethyl cellulose ethers (HEC)

### Kimicell® KEH

-Ethyl Hydroxyethyl cellulose ethers (EHEC)

### Kimicell® KEHM

-Ethyl Methyl Hydroxyethyl cellulose ethers (MEHEC)

### Kimicell® KMP

-Hydroxypropyl Methyl cellulose ethers (HPMC)

### Kimicell® KEM

-Hydroxyethyl Methyl Cellulose ethers (MHEC)

### Kimicell® KCM

-Sodium Carboxymethyl Cellulose ethers (CMC)

Types	Recommended Applications	Performance
Kimicell® KEC	Paint & coating	excellent color acceptance excellent solubility
Kimicell® KEH	Paint & coating	Balance of color acceptance and thickening
Kimicell® KEHM	Paint & Coating	Balance of color acceptance and thickening
Kimicell® KMP	Cement & Gypsum-based products	Water retention and thixotropic property
Kimicell® KEM	Cement & Gypsum-based products	Water retention and thixotropic property
Kimicell® KCM	Food & Personal care & Oil field	Thickening, water retention rheology and lubricity

## Functions & Applications

### Thickening efficiency

Kimicell increases viscosity of liquids and enhances the stability of suspension and emulsion systems.

### Water retention

Kimicell is able to delay the rapid escape of water into nearby absorbent substrates, which called water retention. This property can improve the open time of construction materials.

### Rheological properties

Kimicell has excellent rheological properties. These properties improve the **consistency**, **workability** and **stability** of cement and gypsum-based mortars, emulsion paints as well.

### Surface activities

Kimicell can contribute to the dispersion of pigments by improving the flow during grinding.

### Film formation

Kimicell forms clear, tough and flexible film. These properties can be applied in Pharmacy, agriculture.



Kimicell® applications					
Applications	KEC	KEH/KEHM	KEM	KMP	KCM
Latex paint	XXX	XXX	X	X	XX
Construction	X	X	XXX	XXX	-
Detergent industry	XX	-	-	XX	XX
Pharmacy industry	-	-	-	XXX	-
Food grade	-	-	-	XX	XXX
Oil field	XX	-	-	-	XXX

XXX Suitable and recommended  
 XX Suitable  
 X Suitable, but not recommended  
 - No suitable product

## Kimicell applied in latex paints

Kimicell HEC, EHEC, MEHEC are used as a thickener, stabilizer and water-retaining agent for water-based decorative paints. They control consistency and water retention, reduce sedimentation of the pigments and fillers. It also can contribute to the dispersion of pigments by improving the flow during grinding, help us to stabilize the pigments from flocculation.



### Kimicell® KEC

-Hydroxyethyl Celluloses.

### Kimicell® KEH

-Ethyl hydroxyethyl Celluloses.

### Kimicell® KEHM

-Methyl ethyl hydroxyethyl Celluloses.

Kimicell® in paints application			
Performance	KEC	KEH	KEHM
Bio-stability	+++	+++	+++
Color acceptance	+++	++	++
Anti-spatter	+++	++	++

How to choose a Kimicell for latex paints				
Kimicell Viscosity Grades				
Paint characteristic	Influenced by	Low viscosity	Medium viscosity	High viscosity
Structure, body	Thickening viscosity		X	XX
Hiding power	Application viscosity	XX	X	
leveling	Paint viscosity at low shear rate	X	X	
Spatter resistance	Thickener viscosity	XX	X	
Open time	Thickener concentration	XX	X	X
Water retention	Thickener concentration		X	XX
Cost	Thickener concentration		X	XX

X Suitable  
XX Recommended

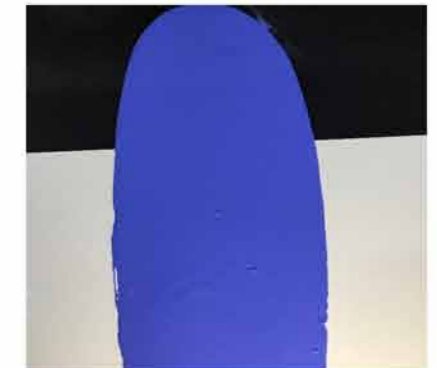
## Viscosity stability

Cellulose ethers can be attacked by micro-organisms or enzyme, which causes a viscosity drop with the polymerization decrease. To have a more stable viscosity, we have Kimicell bio-stable cellulose ethers, which is significantly more resistant to enzymatic attack than most other water soluble gums and polymeric materials. This increased resistance is an important factor when used in Latex paints.



## Color acceptance

Kimicell makes to pigment and filler well dispersed, enhance the anti color flocculation and good color acceptance in waterborne paint.



## Spatter resistance

Spatter resistance, also a high shear application property, does not depend on thickener viscosity, but on the elasticity of the aqueous phase. Paint made from lower molecular weight grades of Kimicell is more resistant to spatter during roller application.



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## Kimicell HEC

Kimicell KEC is classified into regular, Bio-stable and modified grades. All grades are surface treated, and able to be added directly with powder or added after solution prepared. When directly added with powder, the water system should be neutral or slightly acid. **B grade** are Bio-stable types, which provides better viscosity stability.



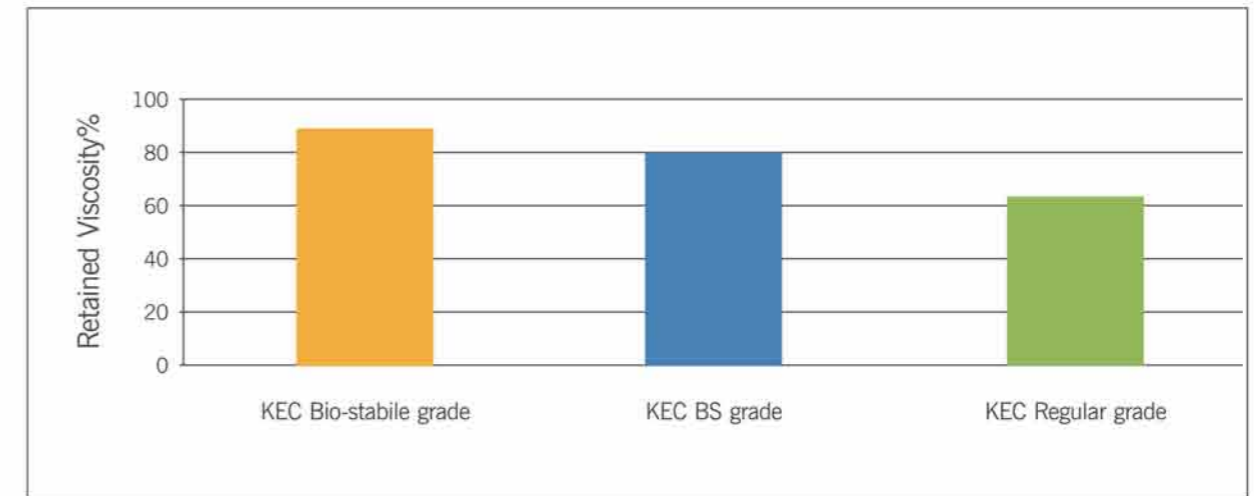
eg: Kimicell KEC 100,000B, Hydroxyethyl Celluloses/HEC, Bio-stable grade, NDJ Viscosity 100.000mPa.s

### HEC popular types for Paints application

B grade	BS grade	Regular grade	Viscosity (Brookfield, mPa.s, 2%)	Viscometer setting
KEC 3000B	KEC 3000BS	KEC 3000	2800-3500mPa.s	RV. 20rpm Sp.4
KEC 6000B	KEC 6000BS	KEC 6000	4500-6000mPa.s	RV.20rpm Sp.4
KEC 30000B	KEC 30000BS	KEC 30000	15000-20000mPa.s	RV.20rpm Sp.6
KEC 60000B	KEC 60000BS	KEC 60000	25000-33000mPa.s	RV.20rpm Sp.6
KEC 100000B	KEC 100000BS	KEC 100000	40000-52000mPa.s	RV.20rpm Sp.6
KEC 150000B	KEC 150000BS	KEC 150000	60000-70000mPa.s	RV.12rpm Sp.6

## Kimicell HEC- biostabile grade

Cellulose ethers can be attacked by micro-organisms or enzymes, which causes a viscosity drop with the polymerization decrease. To have a more stable viscosity, we have bio-stable HEC, which is significantly more resistant to enzymatic attack than most other water soluble gums and polymeric materials. This increased resistance is an important factor when used in Latex paints.



Enzyme resistance at 20°C.  
Viscosimetric determination of the resistance to enzymatic degradation of cellulose derivatives, at 20°C. Kimicell B grade has excellent enzymatic resistance.

## Kimicell HEC-BS grade

Kimicell HEC BS grade is a hydrophobic modified HEC which has a high substitution and good viscosity stability, more recommended in high PVC Paints.

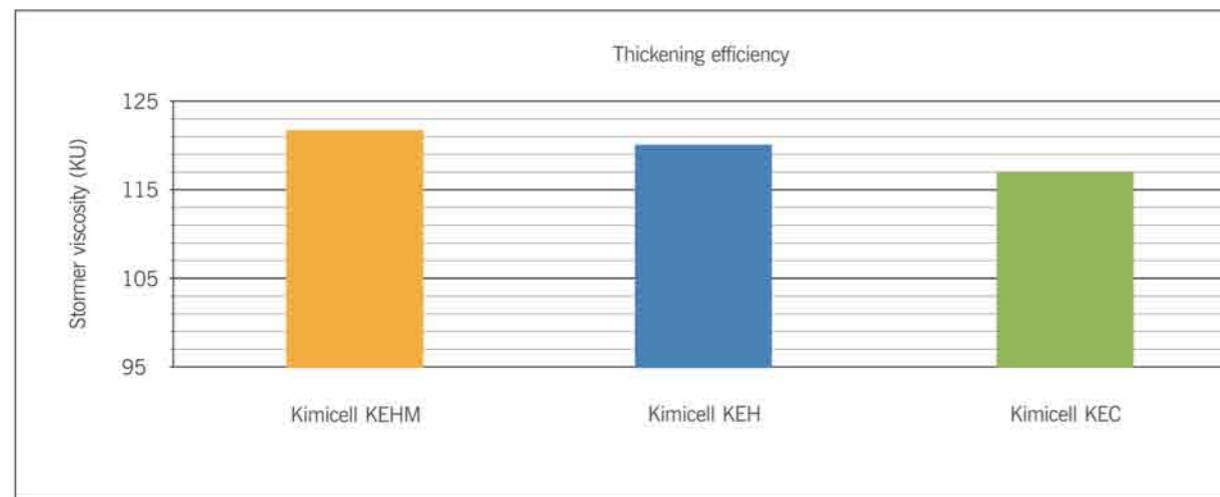
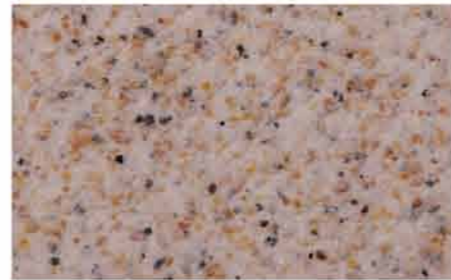


### Formulations

Mill base	Let down
Water	Latex
Surfactant	Coalescing agent
Kimicell KEC	Defoamer
Defoamer Wet agent	Fungicide Rheology modifier
Pigment dispersant	Water
Preservative	Colorant
Ph-controller	
Pigment	
Filler	

## Kimicell EHEC & MEHEC

**Kimicell EHEC & MEHEC** is nonionic, water soluble cellulose ether. It shows a distinguishing thickening efficiency in paints compared to other cellulosic thickeners in the market. With the same amount of HEC dosage, higher viscosity can be achieved in the same latex formulation.



### Popular types for paints application

KEH grades	KEHM grades	Viscosity (Brookfield, mPa.s, 2%)	Viscometer setting
KEH 6000	KEHM 6000	4500-5500mPa.s	RV.20rpm Sp.5
KEH 30000	KEHM 30000	15000-20000mPa.s	RV.20rpm Sp.6
KEH 60000	KEHM 60000	25000-35000mPa.s	RV.20rpm Sp.6
KEH 100000	KEHM 100000	45000-55000mPa.s	RV.20rpm Sp.6
KEH 150000	KEHM 150000	60000-70000mPa.s	RV.12rpm Sp.6
KEH 200000	KEHM 200000	70000-80000mPa.s	RV.12rpm Sp.6

**Kimicell EHEC & MEHEC** is available for variety of waterborne paints in order to achieve highly efficient water retention and thickening properties. When used in paints, it has the advantages:

- High substitution and good viscosity stability
- Suitable for high PVC system
- Good pigment compatibility

Formulation for stone-like paints	
Stone-like paints	
Water	53.5
Kimicell KEH/KEMH	1.5
Defoamer	1
Ethylene glycol	5
Coalescing agent	6
Emulsion	130
Modified Bentonite ( 6% )	50
Color sand 1 (80-120 mesh)	350
Color sand 2 (40-80 mesh)	350
Color sand 3 (40-80 mesh)	50
Defoamer	1
Biocide	2
Total	1000



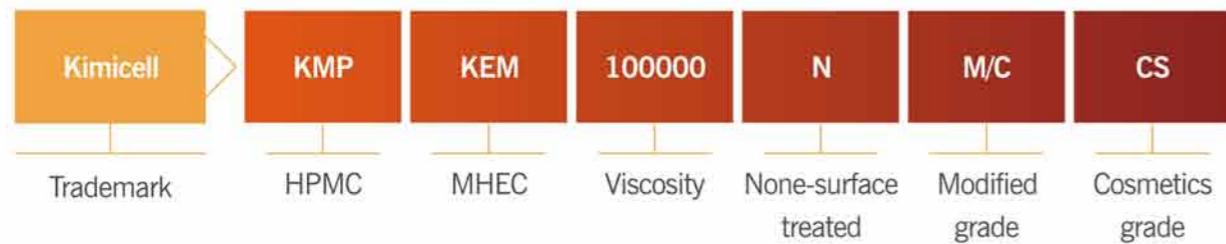
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## Kimicell<sup>®</sup> applied for building materials

Kimicell HPMC and MHEC are recommended for building materials. When used in mortars, it improves the workability by enhancing adhesion, water retention, lubricity, shrink and crack resistance.

### Applications

- |                       |                       |                         |
|-----------------------|-----------------------|-------------------------|
| ▶ <b>Gypsum-based</b> | ▶ <b>Cement-based</b> | ▶ <b>Latex-based</b>    |
| ● Glue                | ● Masonry cement      | ● Aerated concrete glue |
| ● Joint filler        | ● EIFS                | ● Grout                 |
| ● Satin plaster       | ● Extrusion mortar    | ● Tile adhesive         |
| ● Hand plaster        | ● Floor screed        | ● Skim coat             |
| ● Projection plaster  | ● Brick mortar        | ● Projection plaster    |
|                       |                       | ● Textured coating      |
|                       |                       | ● Sand paint            |
|                       |                       | ● Joint filler          |
|                       |                       | ● Tile adhesive         |



eg: KMP150000, HPMC, NDJ Viscosity 150000mPa.s, surface treated, delay solubility  
 KEM150000N, MHEC, NDJ viscosity 150000mPa.s, none-surface treated grade

### Water retention

Water retention is one of the most important properties for Kimicell products, which provides a good workability, extending open time, and enhancing adhesion. Generally, higher viscosity and modified types have better water retention. While, many other factors including the surrounding temperature and particle size have an effect on water retention of Kimicell products.



## Kimicell<sup>®</sup> HPMC & MHEC

### Surface treated grade

When cellulose ethers is used in a water system directly, there will be a risk of lump formation as it dissolves too fast. For these applications, a surface treated grade is recommended.

### None-surface treated grade

In most of mortars, cellulose ethers are mixed as a dry powder. In such a dry-mixing application, lumping is not a concern since each particle of Kimicell KMP/KEM is distributed throughout the final product evenly.



Surface treated type: Delayed solution  
 None-surface treated type: Fast solution and get lump  
 Liquid after solution

### Modified grades

Kimicell KMP/KEM is a fine powder. We use physical or chemical method to modify them to gain better properties like anti-sagging, workability, open time and adhesion, that meets the variety of demands.

Modified Kimicell KMP/KEM grades, like KMP 15000M, KEM 100000M2, absorb more water when used, which improves workability, cohesion, extends open time and reduces sagging of the wet mortars.



● Modified types: 264g water/KG  
 ● Regular types: 254g water/KG

## Kimicell® HPMC & MHEC

In most of applications, Kimicell HPMC and MHEC have similar performance. Relatively, MHEC has more hydrophily and higher gelation temperature, more recommended in latex base applications and that under high temperature condition for building materials like gypsum based wall putty.

## Kimicell HPMC/MHEC applied in tile adhesive

The binder in tile adhesive is cement or latex mostly. The amount of binder in cement-based tile adhesive is around 20–40% and approx.10% in a latex-based tile adhesive. Combinations of cement and a small amount (0.5–5%) of re-dispersible powder polymer will increase the flexibility of cement-based tile adhesive.



To formulate high-quality tile adhesives we suggest highly modified low or medium viscosity Kimicell HPMC/MHEC.

Tile adhesives are classified in categories depending on how well they meet the requirements of the standard. The table shows the codes of mortars in terms of reduced slip, open time and tensile strength. More details about the classification of a mortar can be found in ISO 13007, EN 12002 and EN 12004.

### Popular types

Popular Types MHEC	Popular Types HPMC	Viscosity (2% solution, Brookfield, mPa.s)	Recommended applications	Performance
KEM 6000	KMP 6000	4500-5500	-Emulsion base application -Lump free application -Non-dry mixed application	-Delayed-solution - Long open-time -Good tensile strength - Good workability
KEM 30000	KMP 30000	15000-20000		
KEM 60000	KMP 60000	30000-35000		
KEM 100000	KMP 100000	45000-55000		
KEM 150000	KMP 150000	60000-70000		
KEM 400N	KMP400N	300-400	Self leveling	- Fast solution - Good water retention - Good tensile strength - Good workability
KEM 15000N	KMP15000N	9000-12000	-Joint filler	
KEM 75000N	KMP 75000N	35000-45000	-Hand plaster	
KEM 100000N	KMP 100000N	45000-55000	-Wall putty/Skim coat	
KEM 150000N	KMP 150000N	60000-70000	-Grout mortar	
KEM 200000N	KMP 200000N	70000-80000	-Brick mortar	- Medium solution - Longer open-time - Good water retention - Resist sagging
KEM 15000M	KMP 15000M	9000-12000	-Tile adhesive	
KEM 40000M2	KMP40000M2	20000-25000	-EIFS	
KEM75000M	KMP75000M	35000-45000	-Project Plaster	
KEM 100000M	KMP100000M	45000-55000	-Wall putty	
KEM 100000MG	KMP100000C		-Skim coat	
KEM 150000M2	KMP 150000M2	60000-70000		
KEM 150000MG	KMP 150000C			
KEM200000M	KMP200000M	70000-80000		

### Three typical tile adhesive formulations

Type Parts by weight	Kimicell HPMC/MHEC	Cement	Quartz sand (0-0.5 mm)	Quartz sand (0-0.3 mm)	Re-dispersible powder polymer
Base	2.5	300	700	-	-
Midium(C1T)	4.0	300	350	350	6
Flexible(C2T,C2TE)	5.0	320	350	340	40

#### Code Explanation

- C: Cementitious adhesives
- 1: Normal adhesive
- 2: Improved adhesive
- T: Adhesive with reduced slip
- E: Adhesive with extended open time
- S1\* Transverse deformation ≥ 2.5 – < 5 mm
- S2\* Transverse deformation ≥ 5 mm

\*Acc. to EN 12002



## Kimicell HPMC/MHEC applied in joint filler provide

### When used in joint filler Kimicell provides

- Good water retention
- Easy leveling
- Smooth creamy consistency
- Control over setting time
- No shrinking
- Excellent tape adhesion
- Easy mixing
- Good workability
- Sag resistance
- Good adhesion to substrate



### Kimicell in gypsum-based joint filler

For gypsum-based systems, the choice of Kimicell types depend on the quality of the gypsum, purity, particle size, water demand and the character of the surface structure

### Kimicell in Latex-based joint filler

Different grades of Kimicell provides different characteristics. Generally, they give excellent wet mixing and application properties. When choosing a non modified Kimicell types, the use of a pre-thickener such as attagel or bentonite should be requested.

Formulation for joint filler	
Cement 42.5	350
Heavy CaCO3	100
Silica powder (60-120mesh)	450
Silica powder (200mesh)	100
Kimicell KMP30000N	0.5
Water reducer	2
Water repellent	1
Other additives	1
Kaolin	20

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## Kimicell HPMC/MHEC applied in plasters

### Projection plaster

Projection plaster is generally applied with a plaster machine where the dry mix and the water are mixed instantaneously and the plaster is sprayed on the wall. Since the time between mixing and application is very short, approx. 30 sec., the cellulose ether must have an extremely fast dissolving time.

Kimicell none surface treated grade "N" types like KMP60000N or modified grade "M" types like KMP60000M are recommended. The surface treated grade is not suitable.



### Hand plaster

Since hand plaster is mixed in batches, dissolution speed is not so important as that in the case of projection plaster. While, normally, a high sagging resistance is requested. High viscosity and modified types are recommended.



### Finishing/Skim coat/Satin

This kind of plasters have many different names and its purpose is to create the best surface finish possibility. The plaster is applied by hand in layers down to 0.5 mm in thickness.



## Kimicell CMC—Sodium Carboxymethyl Cellulose

Kimicell CMC is a high purity sodium carboxymethyl cellulose, easy soluble in both cold and hot water. It provides good properties of thickening, water retention, film-forming, rheology and lubricity, which enable Kimicell CMC cover a wide range of applications like foods, personal care products, industrial paints, ceramics, oil drilling, building materials etc.

A broad range of applications in food, cosmetic, paper and other industries cause various types based on substitution degree, viscosity, and purity. For individual requirements on the formulation, please don't hesitate to discuss with us.

### For coatings

Kimicell CMC industrial grade has good dispersing, stability, anti-bacteria, temperature resistance and water retention property. It can be used in industrial grade paints as thickener, emulsifier, adhesive and rheology controller also due to its low cost and good color acceptance.

Type name	Viscosity (Brookfield, mPa.s, 2%)	Viscosity (Brookfield, mPa.s, 1%)	Viscosity setting	Degree of Substitution
KCM 2000P		2000-3000	LV,60rpm, sp.3	0.65-0.90
KCM 4000P		3500-5000	LV,30rpm, sp.4	0.65-0.90
KCM 6000P		6000-7000	LV,30rpm, sp.4	0.65-0.90
KCM 50000QD	50000-60000		LV,5rpm, sp.4	0.70-0.90
KCM 80000QD	80000-100000		LV,5rpm, sp.4	0.65-0.90
KCM 100000QD	100000-120000		LV,30rpm, sp.4	0.65-0.90
KCM 3000AH		3000 min	LV,30rpm, sp.3	0.90 min

### For dying and printing

Kimicell CMC is used in paper, textile printing and dying industry as high-strength binder, oil-resistant, film-former, thickener, rheology controller and water-retention aid in printing, improving dry strength of paper and a good adhesion to fiber.

Type name	Viscosity (Brookfield, mPa.s, 2%)	Viscosity (Brookfield, mPa.s, 1%)	Viscosity setting	Degree of Substitution
KCM 700D		500 min	RV, 20rpm, sp.2	0.95 min
KCM 1000D		900 min	RV, 20rpm, sp.3	1.15 min
KCM 2000D		1000 min	RV, 20rpm, sp.3	1.0 min
KCM 6000D	6000-9000		LV, 30rpm, sp. 4	1.3 min
KCM 8000D	10000 min		RV, 20rpm, sp.6	1.1 min



### For ceramic

Kimicell CMC is used in ceramic, brings smoother surface to the finished ceramic and increase the hardness and resistance of the glaze.

Type name	Viscosity (Brookfield, mPa.s, 1%)	Viscosity setting	Degree of Substitution
KCM 1200C	1000-1500	LV,60rpm, sp.3	0.9 min
KCM 2000C	2000-3000	LV,30rpm, sp.3	0.9 min
KCM 4000C	4000-5000	LV,30rpm, sp.4	0.8 min

### For oil field

Kimicell Oil drilling grade CMC is used as fluid loss controller and tackifier in oil field. It protects the shaft wall and prevent mud loss thus enhance recovery efficiency.

Type name	Viscosity (Brookfield, mPa.s, 1%)	Viscosity setting	Degree of Substitution
KCM LV	70 max	LV, 60rpm, sp.1	0.9 min
KCM HV	2000 max	LV, 30rpm, sp.3	0.9 min

### For cosmetics and food

Kimicell CMC food grade is soluble, odorless, tasteless and no toxicity. It has good stability, anti-bacteria, and good resistance to temperature and salt. In personal care products, Kimicell CMC acts as suspending agent, thickener, emulsifying agent, etc.

Type name	Viscosity (Brookfield, mPa.s, 2%)	Viscosity (Brookfield, mPa.s, 1%)	Viscosity setting	Degree of Substitution
KCM 100CS	100 max		LV,60rpm, sp.1	0.7 min
KCM 2000F		2000-3000	LV,30rpm, sp.3	0.7-0.9
KCM 4000F		4000-5000	LV,30rpm, sp.4	0.7-0.9