

# Fibers and Gels for Construction Chemical Products 1/2019

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**ARBOCEL®**  
Natural Cellulose Fibers and Gels

**LIGNOCEL®**  
Wood Fiber Materials

**SYLOTHIX® / ARBOTHIX®**  
Polyethylene Fibrils



J. RETTENMAIER & SÖHNE  
GMBH + CO KG



Fibers designed  
by Nature

## Contents

### A. General Information

- A.1 Applications in construction industry
- A.2 JRS core competence
- A.3 Main JRS Products for construction chemistry
- A.4 Competence in construction chemistry
- A.5 What is **ARBOCEL®**?
- A.6 What are **ARBOCEL®** gels?
- A.7 Comparison of cellulose ethers versus **ARBOCEL®**
- A.8 Properties of **ARBOCEL®** Cellulose Fibers

### B. **ARBOCEL®** in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

- B.1 Why is **ARBOCEL®** used?
- B.2 Main JRS qualities
- B.3 Modified qualities
- B.4 **ARBOCEL®** selection criteria
- B.5 General correlation: fiber length / effectiveness / mixing behavior

### C. Mineral / Dry Systems

- C.1 **ARBOCEL®** main grades used
- C.2 Blending instructions for dry mixtures
- C.3 Guidance notes
- C.4 Metering and transport options
- C.5 Applications / quantities used
  - C.5.1 Cement tile adhesives
  - C.5.2 Stuccos / plasters
  - C.5.3 Adhesives for EIFS
  - C.5.4 Joint fillers for plasterboards / filler compounds
  - C.5.5 Skim coats
  - C.5.6 Range spacer for steel mats / extruded cement profiles
  - C.5.7 Other applications
    - Self levelling compounds
    - Concrete
    - Refractory
    - Soil stabilization
    - Fire proofing systems to protect steel

### D. Emulsion-Bound Systems / Paste Systems

- D.1 Main **ARBOCEL®** grades used
- D.2 Mixing notes
- D.3 Guidance notes for the fibers
- D.4 Applications / quantities used
  - D.4.1 Synthetic resin plasters
  - D.4.2 Joint fillers for plasterboards / filler compounds / tile adhesives
  - D.4.3 Acrylic roof coatings
  - D.4.4 **ARBOCEL®** gels for paints and plasters
  - D.4.5 Emulsion paints

### E. Bituminous Systems

- E.1 **ARBOCEL®** grades used
- E.2 Guidance notes
- E.3 Applications / quantities
  - E.3.1 Vibration dampening pads
  - E.3.2 Expansion bands / Bitumen binding strips
  - E.3.3 Filling compounds / putties
  - E.3.4 Polymer modified bitumen membranes
  - E.3.5 Roof coatings (with or without aluminium)

### F. **LIGNOCEL®**

- F.1 General remarks
- F.2 Applications
  - F.2.1 Smoothing compounds / wood putty
  - F.2.2 Magnesite screeds
  - F.2.3 Other applications
    - Vibration dampening pads
    - Special plaster boards

### G. **SYLOTHIX®** / **ARBOTHIX®**

- G.1 Stabilizer for viscous systems
- G.2 Type chart
- G.3 Guidance notes

## Warranty

The information in this pamphlet is based on our current knowledge and experience. This information does not absolve the user for the need to make his own tests and experiments.

Nor does it imply any binding assurance of specific properties or suitability for specific applications. Intellectual property rights are to be observed.

## A. General Information

### A.1 Applications in Construction Industry



#### **Residential Construction**

**ARBOCEL®** for plasters, tile adhesives, bitumen membranes etc.



#### **Infrastructure**

**ARBOCEL®** for roads, concrete, steel protection, drilling etc.



#### **Industrial and Office Building**

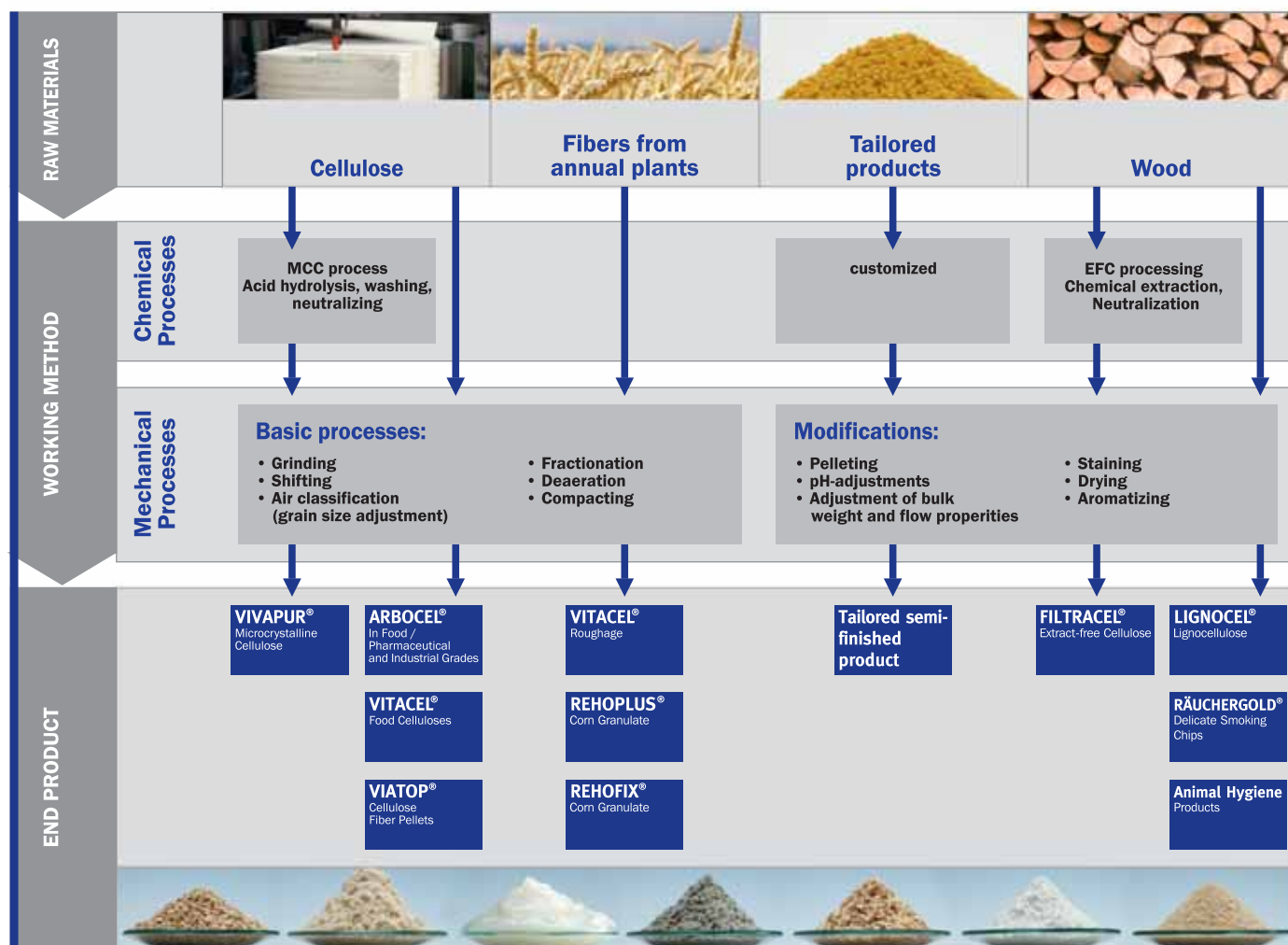
**ARBOCEL®** for precasted concrete, roof coatings etc.

## A. General Information

### A.2 JRS Core Competence



Plant Rosenberg-Holzmühle, headquarters of the JRS Group - one of the production sites worldwide



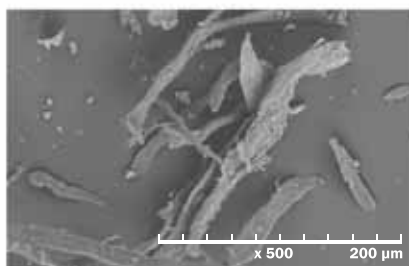
## A. General Information

### A.3 Main JRS Products for Construction Chemistry

#### Cellulose Fibers and modified Cellulose Fibers

##### Main Applications

- Stuccos / plasters
- Tile adhesives
- Joint fillers for plasterboards
- Emulsion paints
- Bituminous products
- Adhesive and reinforcing compounds for composite thermal insulation systems
- Joint fillers / filler compounds / refractory compounds



Scanning electron micrograph (SEM)  
**ARBOCEL® PWC 500**

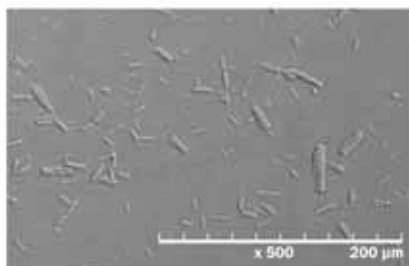


**ARBOCEL® PWC 500**

#### Cellulose Gels

##### Main Applications

- Ready-to-use systems (paints, plasters etc.)



SEM activated **ARBOCEL® gel**

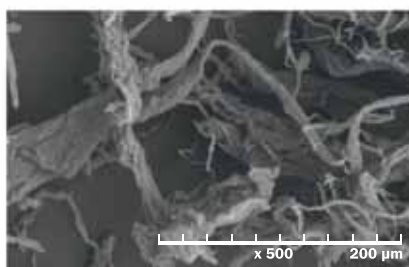


activated **ARBOCEL® gel**

#### Polyethylen Fibrils

##### Main Applications

- Epoxy-resin-bound floors
- One- and two-component adhesives and sealants, etc.

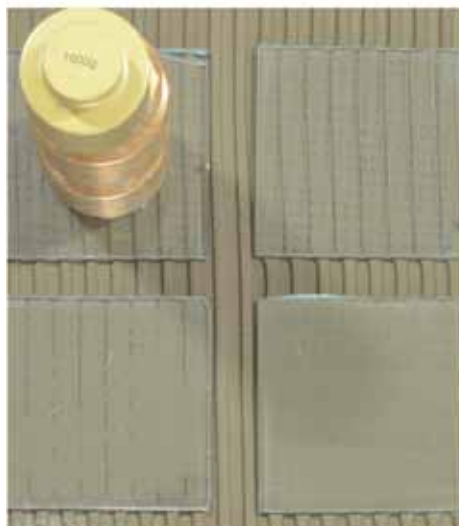


SEM **ARBOTHIX® PE 100**



**ARBOTHIX® PE 100**

## A. General Information



Wettability test for cement tile adhesive



Lab mixer for dry mortars



Activated **ARBOCEL®** gel

## A.4 Competence in Construction Chemistry

### Development / Application Technology

Our aim is to respond flexible to market demands and develop innovative products that excel in your applications.

We can offer you the following services:

- Reformulation and technical support
- Standard tests
- Application tests



Slipping test for cement tile adhesive

### Process Technology / Production

We know that for you, conveyor technology, mixer technology and metering equipment are important components to ensure smooth production. For more details please look at page 19.

### Experience / Expertise

JRS has been supplying innovative **ARBOCEL®** cellulose fibers to manufacturers of construction chemical products worldwide for over 40 years.

Make use of our success and experience.

We are looking forward to helping you with your technical requests.

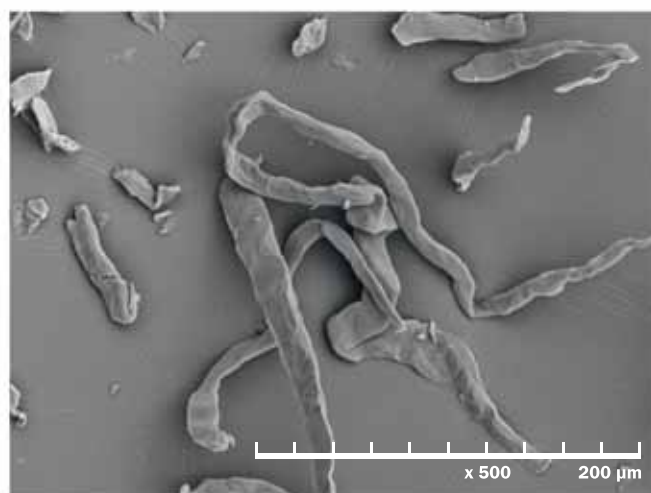


Test equipment for cement tile adhesive

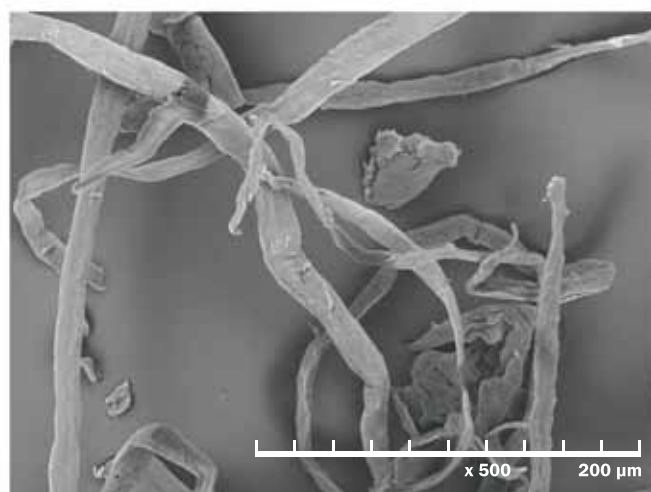
## A. General Information

### A.5 What is ARBOCEL® ?

- **ARBOCEL®** is a powdery to fibrous cellulose additive for use in construction chemical products.
- **ARBOCEL®** additives are produced from cellulose. A whole range of renewable raw materials is available for producing cellulose.
- **ARBOCEL®** are water-insoluble celluloses left in their natural state (not comparable to water-soluble cellulose ethers).
- **ARBOCEL®** is produced in various qualities (fiber lengths, thicknesses, purities, etc.) for a very wide range of industrial applications.



SEM of **ARBOCEL® BWW 40**

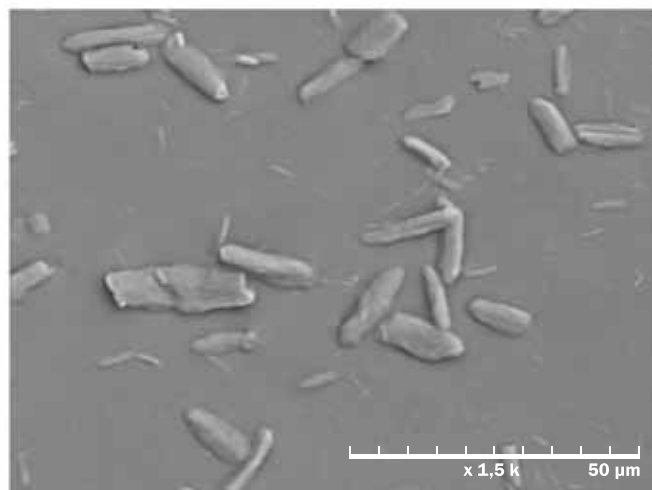


SEM of **ARBOCEL® BC 1000**

## A. General Information

### A.6 What are ARBOCEL® Gels?

- It's a colloidal system based on water-insoluble microcrystalline cellulose co-processed with water soluble polymers.
- **Function:**
  - To reduce syneresis
  - Stabilizer
  - Better open time
  - Rheological agent
  - Thickener



Scanning electron micrograph of activated **ARBOCEL® P 4000**

#### ● How to activate the gel

##### **Guideline:**

Activation of e.g. 3 % fiber gel in water with dissolver.

1. Add the **ARBOCEL®** powder slowly at low shear force to the water (e.g. with 1.1 m / sec).
2. Mixing for further approx. 3 minutes at high shear force (e.g. with 7 m / sec).
3. Activated **ARBOCEL®** gel



Please control the viscosity

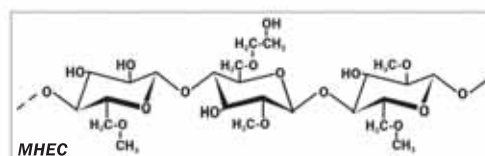
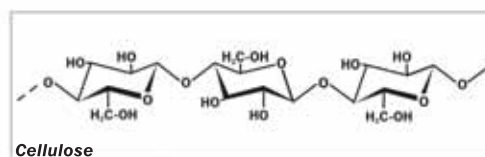
## A. General Information

### A.7 Comparison of Cellulose Ethers versus ARBOCEL®

#### Common properties, differences

	Cellulose Ether	ARBOCEL® Fiber
<b>Water Soluble</b>	yes	no
<b>Stickiness</b>	yes	no
<b>Water Retention</b>	yes	yes
Example: Centrifugal method AACC <sup>1)</sup>	> 2000 %	BE 600/30 PU approx. 350 % BWW 40 approx. 580 % BC 1000 approx. 1000 %
<b>Viscosity increase</b>	yes	yes, but less compared to high viscosity cellulose ethers

<sup>1)</sup>AACC = American Association of Cereal Chemists  
water retention (%) = (weight of wet cellulose - weight of cellulose) / weight of cellulose fiber • 100



### A.8 Properties of ARBOCEL® Cellulose Fibers

From the finest grades with a mean fiber length of 8 µm to the longest fiber grades with a mean fiber length of 2000 µm.

Approx. density 1.5 g / cm<sup>3</sup>.

The long-fiber grades have a “felting” effect due to the curved structure.  
It is also due to this structure that **ARBOCEL®** has a better reinforcing behavior compared to short cut synthetic fibers.

**ARBOCEL®** cellulose fibers are also used as an asbestos substitute.  
Usually 30 - 50 % of the weight of asbestos previously used is sufficient.

Completely safe and therefore suitable as substitute for asbestos in many applications.

The steady-state moisture content of **ARBOCEL®** cellulose fibers is approx. 10 - 12 %. **ARBOCEL®** is normally supplied with a moisture content in the range of 4 - 8 %. In this form **ARBOCEL®** cellulose is slightly hygroscopic (water-absorbing).  
Therefore we recommend to store **ARBOCEL®** in a dry place.

Insoluble in water and organic solvents.

Stable from pH 4 - 12.

Guide values for temperature exposure:

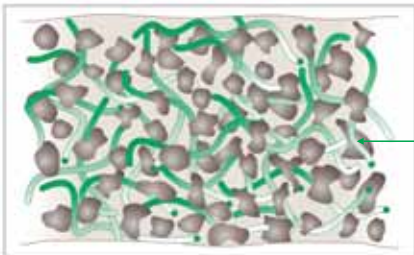
- 160 °C for several days
- 180 °C for approx. 1 day
- 200 °C is the limit of thermal exposure

Water that penetrates into the fiber capillaries reaches the freezing point at approx. -70 °C. As a result of the formation of hydrogen bridge bonds between cellulose and water, the structure of the water is modified in such a way that the water is more compact at low temperatures than in liquid form. In practice this means complete frost protection of **ARBOCEL®** fibers (no bursting effect possible as with ice).

## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

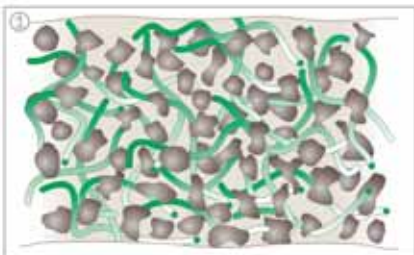
### B.1 Why is ARBOCEL® used?

1. to reinforce dry mortars by the 3-dimensional fiber network



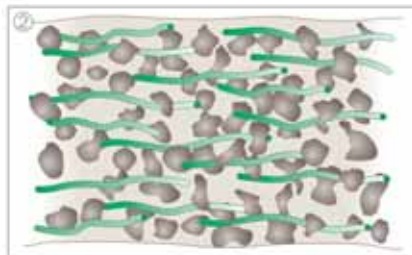
ARBOCEL®

2. to improve the workability  
because of the structural viscous behavior



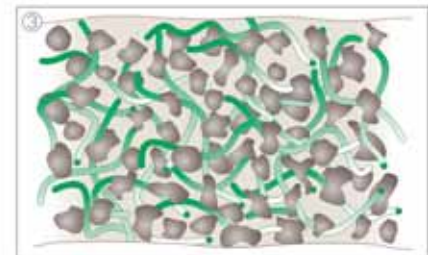
#### System at rest

- Fiber structure created by ARBOCEL®



#### System in motion

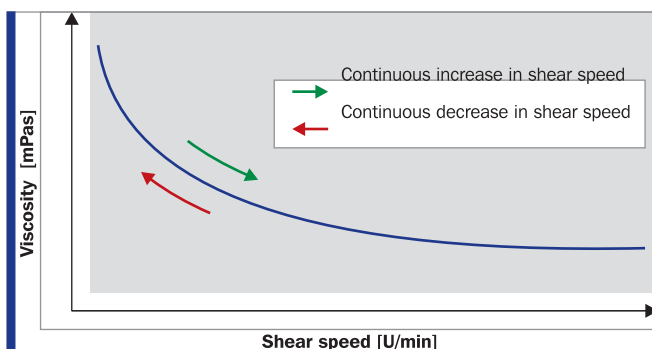
- Collapsed fiber structure
- Fibers align in the flow direction
- Fibers release some of the liquid into the matrix
- Decrease of viscosity



#### System at rest

- As soon as shear forces stop acting on the system, the state shown in the first figure is restored.

### Rheology

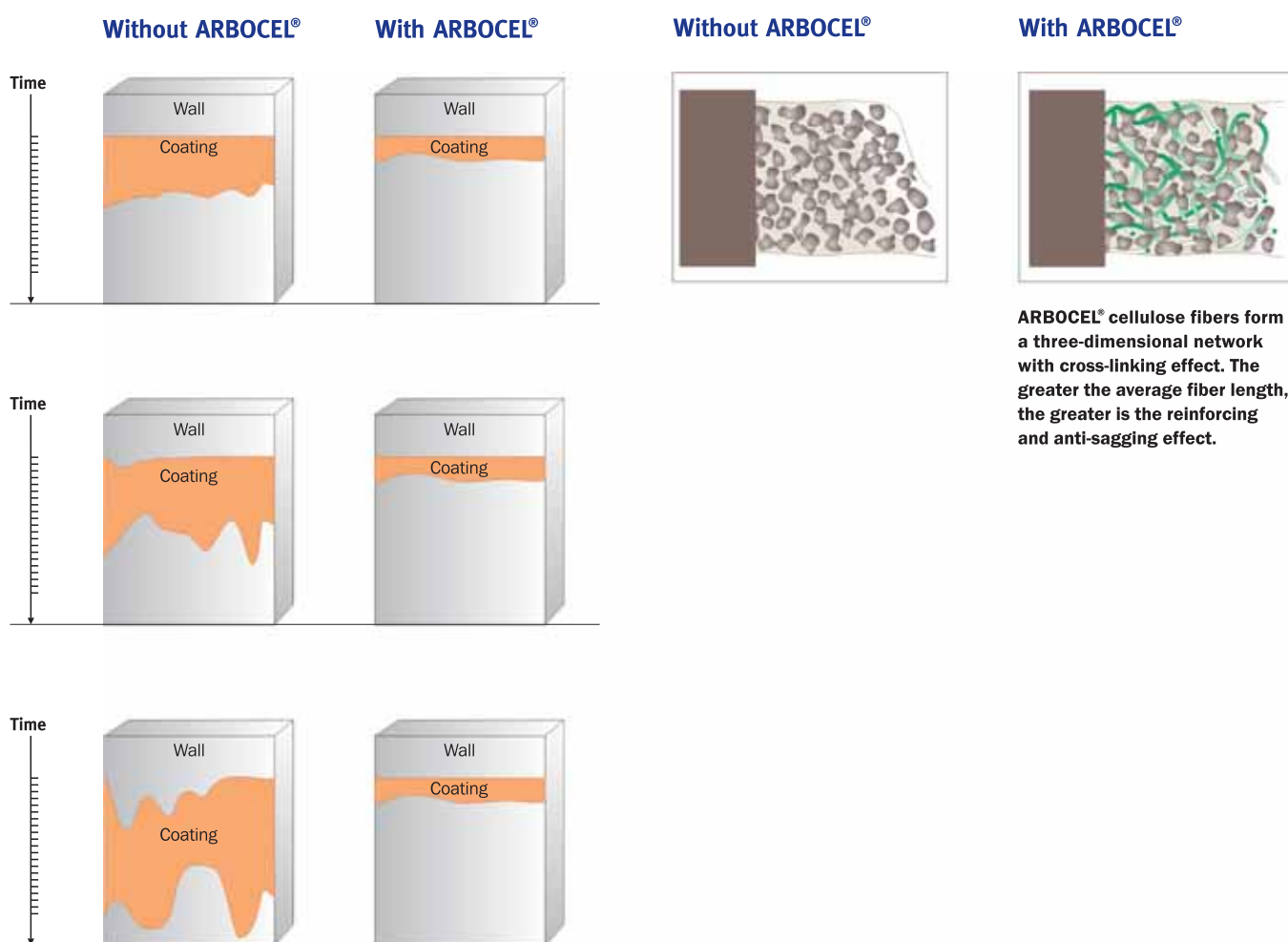


Pseudoplastic or structural viscous behavior of ARBOCEL®

## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

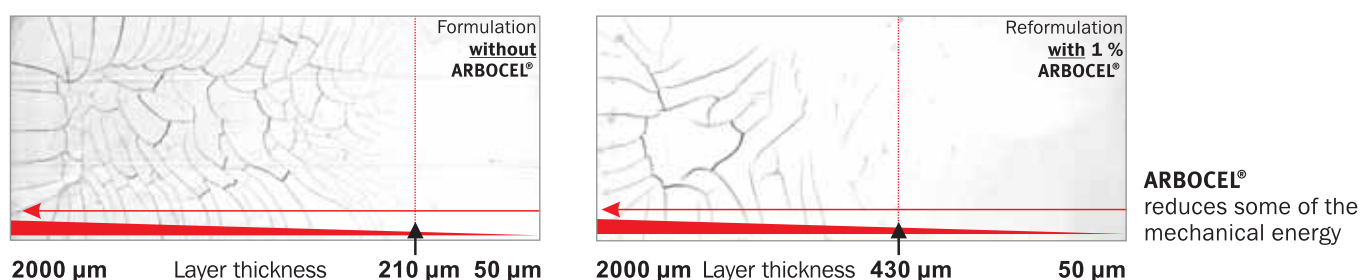
### 3. to reduce sagging by the reinforcement

#### Use in vertical coats



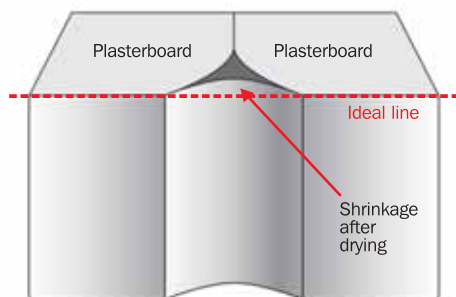
### 4. to reduce micro cracks

#### Crack inhibitor shown on an emulsion paint

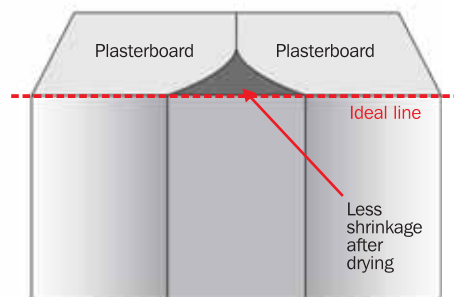


## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

### 5. to reduce shrinkage due to the reinforcing fibers



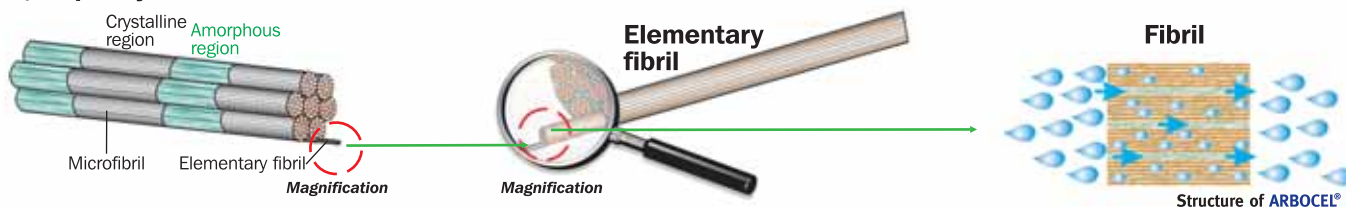
Formulation without ARBOCEL®



Reformulation with ARBOCEL®

### 6. to prolong the open time because liquid is transported by the cellulose fibers from inside (core) to the surface, where evaporation takes place.

#### a) Capillary effect due to the fiber structure



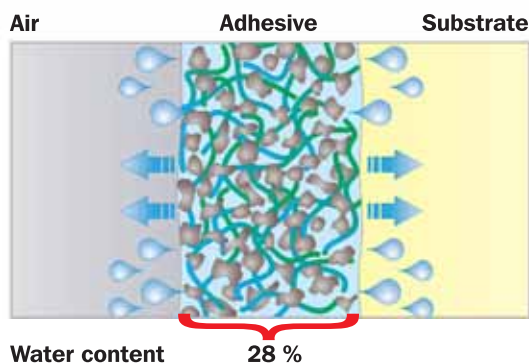
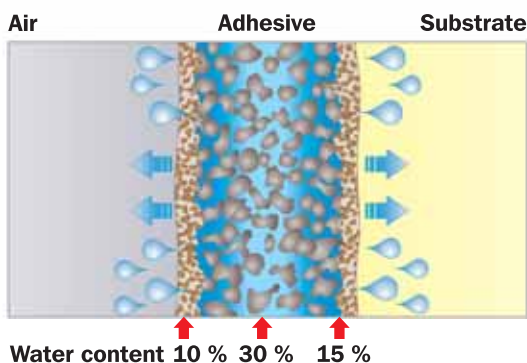
Fibril can absorb and release liquids

#### b) Function of ARBOCEL® in the coating

##### Open time / tendency to form skin with and without ARBOCEL®

Adhesive with water retaining agent,  
approx. 20 minutes after application

Adhesive with water retaining agent and **ARBOCEL®**,  
approx. 20 minutes after application



Note: The above values (e.g. 20 minutes) are intended only to demonstrate the effects of ARBOCEL®

## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

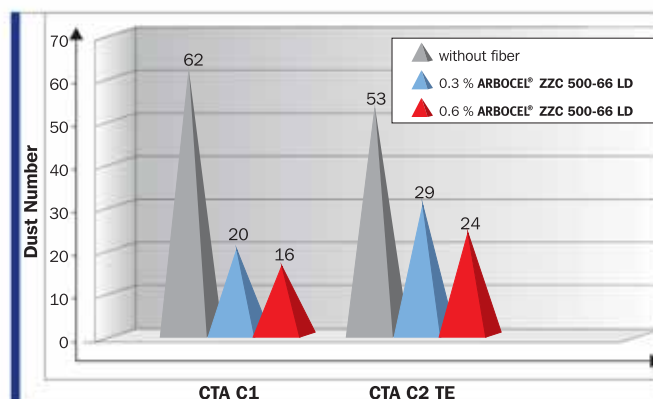
### 7. to reduce dust by using ARBOCEL® LD (Low Dust) fibers for dry mortar products



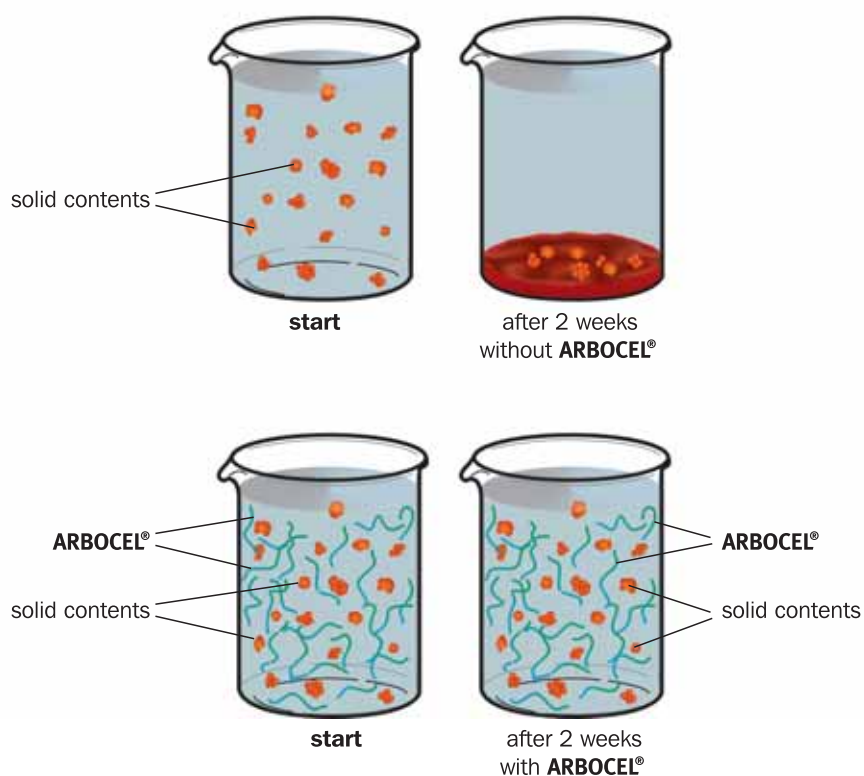
Dry mortar without  
ARBOCEL® LD



Dry mortar with  
0.4 % ARBOCEL® ZC 500-66 LD



### 8. to reduce syneresis in ready-to-use systems with ARBOCEL® gels and fibers



## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

### B.2 Main JRS Qualities

		Brand name	ARBOCEL®	ARBOCEL®
		Grade	BE 600/30 PU	B 00
		Color	white	white
		Raw material	Cellulose	Cellulose
		Average fiber length [µm]	40	120
		Average bulk density [g/l]	200	168
Binders	e.g. Cement, Gypsum, Lime	Mineral plasters		
		Joint fillers for plasterboards / skim coats		
		Mineral tile adhesives		
		Construction adhesives / adhesives for EIFS		
		Extruded cement products (like profiles, range spacer)		
		Refractory compounds		
	Synthetic Resin	Emulsion paints		
		Acrylic roof coating		
		Emulsion-bound finish plasters		
		Joint fillers for Plasterboards / filler compounds / emulsion tile adhesives		
	Bitumen	Vibration dampening pads / expansion tapes		
		Bitumen foils / water proofing membranes		
		Cold bitumen applications		
	Epoxy	Epoxy-resin-bound floors / 1 or 2 components adhesives and sealants		

1) and 2) coated with amorphous silicic acid



## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

### B.3 Modified Qualities

		Brand name	ARBOCEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®
		Grade	Gel <sup>1)</sup>	ZZC 500-66 LD <sup>2)</sup>	ZZC 540 CA	ZZ 8/2 CA 1	FBG 66
		Color	white	gray	gray	gray	gray
		Basic raw material	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose
		Average fiber length [µm]		400	400	1000	pellet approx. 2000 - 10000
		Average bulk density [g/l]	535	125	145	70	530
Binders	e.g. Cement, Gypsum, Lime	Mineral plasters					
		Self levelling compounds					
		Mineral tile adhesives					
	Synthetic Resin	Emulsion paints					
		Acrylic roof coating					
		Emulsion-bound finish plasters					
		Emulsion-bound filler / joint filler / adhesives					
	Bitumen	Bitumen foils / water proofing membranes					
		Additional function through the modification	<ul style="list-style-type: none"> <li>• reduction of syneresis</li> <li>• stabilizer</li> <li>• better open time</li> <li>• rheological agent</li> </ul>	<ul style="list-style-type: none"> <li>• less dust in production</li> <li>• less dust in the finished dry mortar product</li> <li>• no spray unit is needed</li> </ul>	<ul style="list-style-type: none"> <li>• good flowability</li> <li>• easy to blend</li> </ul>	<ul style="list-style-type: none"> <li>• good flowability</li> <li>• easy to blend</li> </ul>	<ul style="list-style-type: none"> <li>• partial replacement of polymers</li> <li>• easy to disperse</li> </ul>

1) Guidance note to activate the ARBOCEL® gels see page 8

2) It's also possible to produce LD grades, based on white or off-white ARBOCEL® grades



preferred JRS grades

**Special types:** Other ARBOCEL® grades with better open time, less slipping of heavy tiles are also available.

For further details please contact: E-mail: industrie@jrs.de, Phone: + 49 (0) 7967 / 152 211

## B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

### B.4 ARBOCEL® Selection Criteria

The most suitable **ARBOCEL®** grade depends on:

- The required profile of the finished product (e.g. surface, color, etc.)
- Type of mixer (dry system or ready-to-use system)
- Application of the product
- Metering requirements

#### Dry System



#### Ready-to-use System



### B.5 General Correlation: fiber length / effectiveness / mixing behavior:

ARBOCEL® type	Average fiber length	Effectiveness	Mixing behavior *	
			In dry mixtures	In aqueous systems
<b>BE 600/30 PU</b>	Short ø 40 µm	Low	Very good	Very good
<b>BWW 40</b>	Medium ø 200 µm	Good	Good	Very good
<b>B 400</b>	Long ø 900 µm	Very good	not recommended	Good

\* If you have any difficulties blending **ARBOCEL®** we will be happy to help you.

## C. Mineral / Dry Systems

### C.1 ARBOCEL® Main Grades Used:

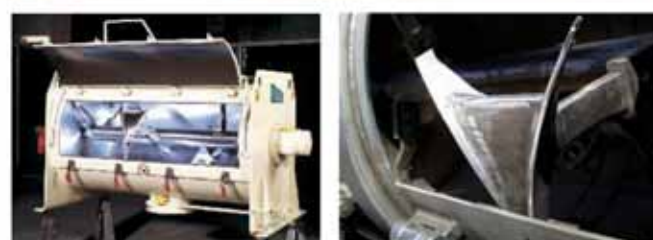
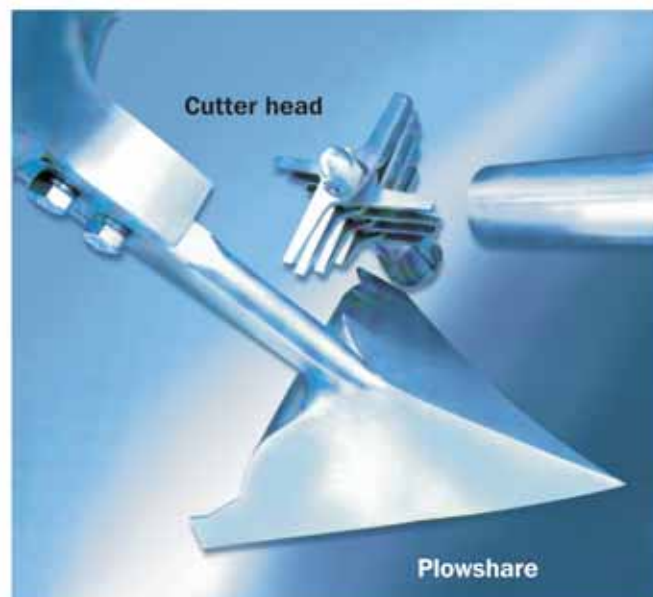
Brand Name	Raw Material	Color
ARBOCEL® FD 40	Cellulose	off-white
ARBOCEL® PWC 500	Cellulose	off-white
ARBOCEL® ZC 500	Cellulose	gray

### C.2 Blending Instructions for Dry Mixtures:

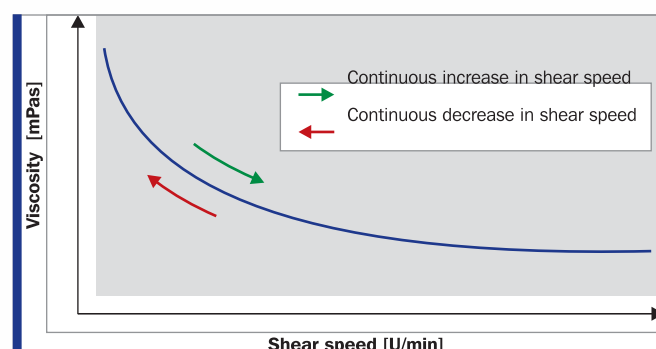
Short to medium-length (40  $\mu\text{m}$  - 500  $\mu\text{m}$ ) **ARBOCEL®** fibers are usually easy to blend. If high-performance mixers with cutter heads (e.g. Eirich, Lödige, or m-tec blades) are available, it is to some extent possible to blend longer **ARBOCEL®** fibers.

### C.3 Guidance Notes

1. It is essential that the working consistency is adjusted, not the appearance, since **ARBOCEL®** fibers have structural viscous properties. This means that the viscosity appears greater at rest than when shear forces are at work (i.e. when the product is being stirred, applied by brush, etc.).
2. **ARBOCEL®** absorbs some water of the mix, so we recommend to add approx. 2 parts more water to 1 part **ARBOCEL®** to achieve the same working viscosity.



### Rheology



Pseudoplastic or structural viscous behavior of **ARBOCEL®**

## C. Mineral / Dry Systems

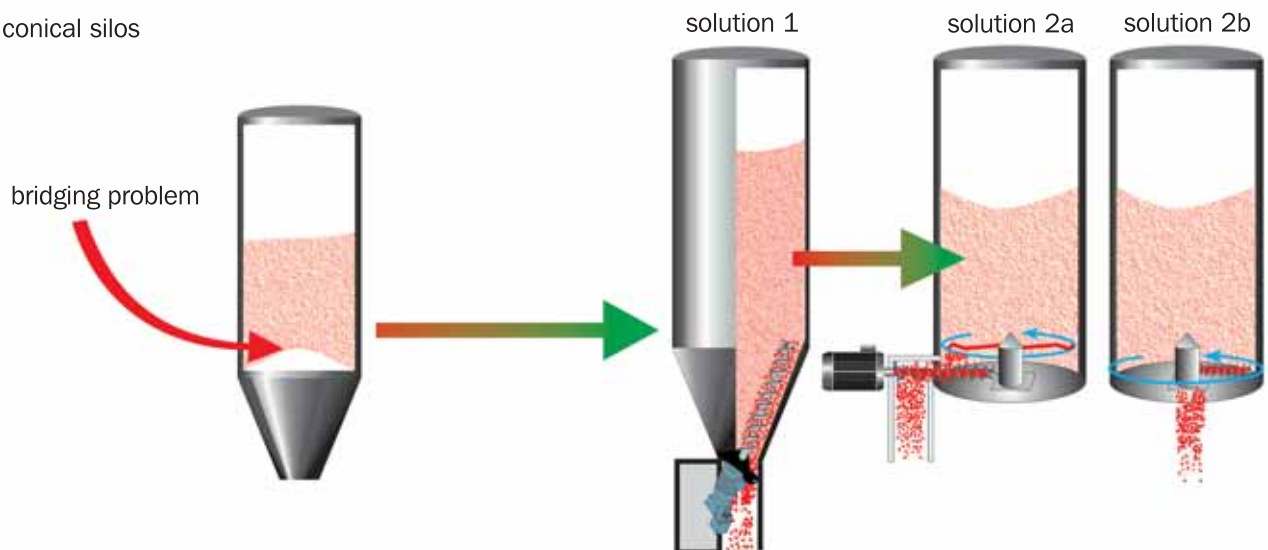
### C.4 Metering and Transport Options

The material handling characteristics of **ARBOCEL®** fibers are typically more difficult than those of the basic products used in construction chemistry (e.g. sand, cement, etc.). JRS will be happy to assist you in matters relating to the

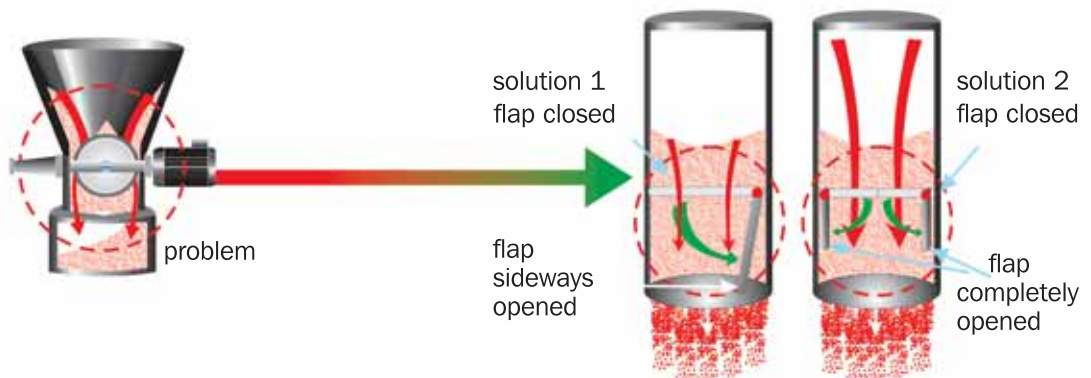
metering, storage and transport of **ARBOCEL®** products. Take advantage of our expertise in the bulk handling of our **ARBOCEL®** fibers.

#### Where can metering / transport difficulties arise?

a.) in conical silos

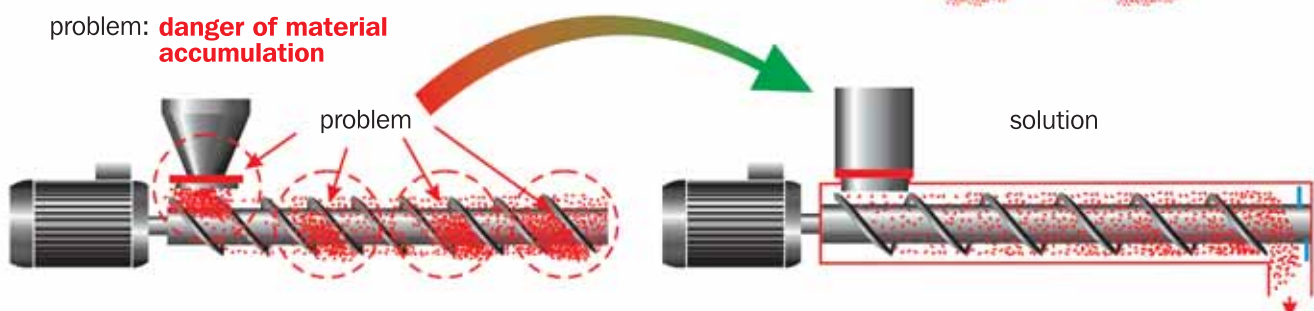


b.) on weighing machines



c.) in worm conveyors

problem: **danger of material accumulation**



## C. Mineral / Dry Systems



### C.5 Applications

#### C.5.1 Cement tile adhesives



Cement Tile Adhesive

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® FD 40	off-white	250 µm	0.4 - 0.5 %
ARBOCEL® PWC 500	off-white	500 µm	0.3 - 0.4 %
ARBOCEL® ZZC 500	gray	400 µm	0.3 - 0.4 %
ARBOCEL® ZZC 540 CA*	gray	400 µm	0.4 - 0.5 %
ARBOCEL® ZZ 8/2 CA 1*	gray	1000 µm	0.2 - 0.3 %
If dust is a subject with the dry mortar product:			
ARBOCEL® ZZC 500-66 LD	gray	400 µm	0.3 - 0.6 %

Advantages with **ARBOCEL®** :

- Good slump resistance of the adhesive (reduced tile slip)
- Improved workability
- Reduces undesirable sticking to tools
- In many cases longer open time and better adhesion strength

#### C.5.2 Stuccos / Plasters

binder: cement-lime, cement, gypsum, gypsum lime



Mineral Finishing Plaster



Mineral Base Plasters

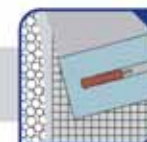
Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® PWC 500	off-white	500 µm	0.4 - 1.0 %
ARBOCEL® ZZC 500	gray	400 µm	0.4 - 1.0 %
ARBOCEL® ZZ 8/2 CA 1*	gray	1000 µm	0.2 - 0.3 %
If dust is a subject with the dry mortar product:			
ARBOCEL® PWC 500-66 LD	off-white	500 µm	0.4 - 1.0 %
ARBOCEL® ZZC 500-66 LD	gray	400 µm	0.4 - 1.0 %

Advantages with **ARBOCEL®** :

- Good slump resistance
- Improved workability
- Inhibits micro cracking after application and during setting
- Can reduce the separation of light weight fillers

## C. Mineral / Dry Systems

### C.5.3 Adhesives and reinforcing compounds in exterior insulation finishing system (EIFS)



Adhesive and Reinforcing Compounds

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® PWC 500	off-white	500 µm	0.3 - 0.4 %
ARBOCEL® ZC 500	gray	400 µm	0.3 - 0.4 %
ARBOCEL® ZC 540 CA*	gray	400 µm	0.4 - 0.5 %

Advantages with **ARBOCEL®** :

- Good slump resistance
- Improves working properties
- Reduction of formulation costs

### C.5.4 Joint fillers for plasterboards / filler compounds



Joint Fillers for Plasterboards

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® FD 00	off-white	150 µm	0.5 - 1.0 %
ARBOCEL® FD 40	off-white	250 µm	0.3 - 0.8 %

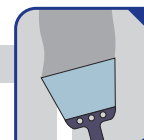
Advantages with **ARBOCEL®** :

- Reduces cracking and shrinkage
- Improves workability
- Improves standability

\* modified **ARBOCEL®** qualities with improved metering and blending properties.

## C. Mineral / Dry Systems

### C.5.5 Skim coats

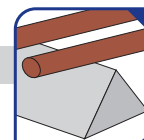


Joint Fillers for Plasterboards

Advantages with **ARBOCEL®** :

- Suppresses cracking
- Improves working properties

### C.5.6 Range spacers for steel mats / extruded cement profiles



Extruded Profiles / Spacers

Advantages with **ARBOCEL®** :

- Extrusion aid
- Improves slump resistance
- Formulation costs can be optimized

### C.5.7 Other applications

**ARBOCEL®** for self levelling compounds

- to reduce bleeding and separation

**ARBOCEL®** for concrete

- to reduce the plastic shrinkage

**ARBOCEL®** for refractory products

- to reduce the density
- for better dewatering and to reduce demixing of the refractory compound

**ARBOCEL®** for soil stabilization

- to reduce the dust development during the application

**ARBOCEL®** for fire proofing systems to protect steel

- good slump resistance
- in case of fire, **ARBOCEL®** creates pores

Please ask our people for the recommended grades.

## D. Emulsion-Bound Systems / Paste Systems

### D.1 Main ARBOCEL® Grades Used

We recommend to use only pure white ARBOCEL® like ARBOCEL® BE 600/30 PU, ARBOCEL® B 00, ARBOCEL® BWW 40, ARBOCEL® BC 1000, ARBOCEL® B 400 and ARBOCEL® gels

### D.2 Mixing Notes

Blending ARBOCEL® fibers is usually straight forward. The addition of wetting agents is normally not required. In order to reach the final viscosity more quickly, it is advisable to add ARBOCEL® in the aqueous phase. ARBOCEL® can also be added after production of the batch for controlling viscosity.

### D.3 Guidance Notes for the fibers

ARBOCEL® will increase the viscosity of the emulsion system. To achieve the same working behavior we recommend to add approx. 2 parts more water to 1 part ARBOCEL®. Keep in mind that in systems containing ARBOCEL® it is not the apparent consistency at rest that should be set but rather the working consistency. Systems in which ARBOCEL® is completely at rest are more viscous.

Guidance notes to activate the ARBOCEL® gels see page 8.



## D. Emulsion-Bound Systems / Paste Systems



### D.4 Applications

#### D.4.1 Synthetic resin plasters

Exterior use:

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® BC 1000	white	700 µm	0.3 - 0.5 %
ARBOCEL® B 400	white	900 µm	0.2 - 0.4 %

Interior use:

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® BC 1000	white	700 µm	0.6 - 1.0 %
ARBOCEL® B 400	white	900 µm	0.5 - 0.9 %



Ready to Use Systems



Synthetic Resin Plasters

Advantages with **ARBOCEL®** :

- Good slump resistance
- Improves workability
- Prevents cracking
- Very good texturing (clear contours)

#### D.4.2 Joint fillers for Plasterboards / filler compounds / emulsion tile adhesives



Ready to Use Systems



Tile Adhesive

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® B 00	white	120 µm	0.5 - 1.0 %
ARBOCEL® BWW 40	white	200 µm	0.3 - 0.8 %

Advantages with **ARBOCEL®** :

- Reduces cracking and shrinkage
- Improves workability
- Improves standability

## D. Emulsion-Bound Systems / Paste Systems

### D.4.3 Acrylic roof coatings



Acrylic Roof Coatings

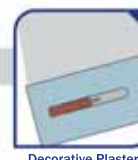
Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® BWW 40	white	200 µm	0.4 - 0.6 %
ARBOCEL® BC 1000	white	700 µm	0.2 - 0.4 %

Advantages with **ARBOCEL®** :

- Inhibits cracking and shrinking
- Improves workability
- Improves flexibility

### D.4.4 ARBOCEL® gels\* for paints and plasters

The type of **ARBOCEL®** gel depends on the final product.  
Please ask for the right type.



Decorative Plaster



Emulsion Paints

Brand Name	Color	By Weight
ARBOCEL® gel	white	0.2 - 3 %

Advantages with **ARBOCEL®** gels:

- Reduce syneresis
- Can prolong open time
- Improves workability
- Rheological additive
- Partial replacement of other thickeners



\* guidance note to activate the **ARBOCEL®** gels see page 8

## D. Emulsion-Bound Systems / Paste Systems

### D.4.5 Emulsion paints (matt or semi gloss)

#### a) Paints for airless spray application



Paints for airless spray application

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® BE 600/30 PU	white	40 µm	0.3 - 1.0 %

#### b) Paints applied by roller or brush



Emulsion Paints

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® B 00	white	120 µm	0.5 - 1.0 %
ARBOCEL® BWW 40	white	200 µm	0.3 - 0.8 %

#### c) Crack-bridging reinforcing paints



Emulsion Paints

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® BC 1000	white	700 µm	0.3 - 0.8 %

Advantages with ARBOCEL® in paints:

- Suppresses sheen
- Improves rheological properties
- Reduces density
- Reduces cracking

In case reduction of syneresis, less volatile organic compound content, open time or rheology is a subject: ARBOCEL® gels.

### Where else is ARBOCEL® used in paint applications?

- Emulsion paints
- Silicate paints
- Lime-cement paints
- Powder paints
- Paints with structure effects (wood fibers)
- Road marking paints

#### For details please contact:

Please order pamphlet for emulsion paints  
E-mail: [industrie@jrs.de](mailto:industrie@jrs.de)  
Phone: + 49 (0) 7967 / 152 211



## E. Bituminous / Asphalt Systems

### E.1 ARBOCEL® Grades Used:

The grades most commonly used are **ARBOCEL® ZZ 8/1 G** and **ARBOCEL® ZZC 500**.

When used as an asbestos replacement, 30 % to maximum 50 % by weight of the asbestos quantity previously used is usually sufficient.

The resulting deficiency of volume should be compensated by the addition of a suitable filler.

If polymer reduction is a subject **ARBOCEL® FBG 66** pellet is a good option. It is a special modified **ARBOCEL®** fiber with bitumen, which offers better handling.

**ARBOCEL®** cellulose fibers result in:

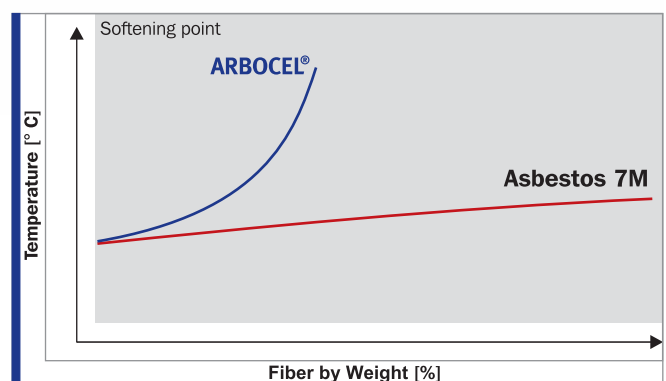
- Greater thickening
- Better heat resistance
- Good workability

In comparison to group 7 asbestos, **ARBOCEL® ZZ 8/1 G** gives a rougher and less glossy surface. If a smoother surface is required, **ARBOCEL® ZZC 500** is recommended. Since this product is a shorter fiber, 20 - 40 % more **ARBOCEL®** by weight must be added in comparison to **ARBOCEL® ZZ 8/1 G**.

### E.2 Guidance Notes:

- The longer the average fiber length of the **ARBOCEL®** grade, the greater is its yield and the more the viscosity is increased.
- The shorter the average fiber length of the **ARBOCEL®** grade, the smoother the surface of the finished product.
- If dissolvers are used, we recommend to add the fibers at the end of the blending process.

- With moderate to medium-viscosity cold bitumen compounds, sedimentation may occur. This can be inhibited by stabilizers such as magnesium coated silicates or pyrogenic silicic acids.
- In case the bitumen product is applied by airless spray, the correct **ARBOCEL®** grade for the nozzle size must be used to prevent clogging.
- The use of **ARBOCEL®** fibers can result in a subsequent thickening effect, thus raising the viscosity. This effect also occurs in bitumen products containing solvents (sol-gel changes), especially in cold bitumen with a petroleum spirit base. Normally this effect runs its course in a matter of a few days.
- Also interesting is that the softening point is higher when the same amount is added in comparison to asbestos 7 M and that it also increases more steeply.



## E. Bituminous Systems

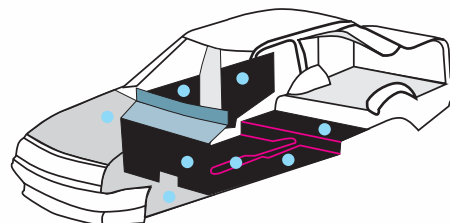


### E.3 Applications / Quantities

#### E.3.1 Vibration dampening pads

These are 2 mm embossed sheets which are usually applied directly to car panels to suppress noise.

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® ZZ 8/1 G	gray	1000 µm	0.8 - 3.0 %



#### E.3.2 Expansion Bands / Bitumen binding strips

These are used as a joint material, e.g. in highway construction in the joint between consolidation strips (concrete to asphalt or concrete to concrete). The tape is activated by heating.

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® ZZ 8/1 G	gray	1000 µm	5.0 - 8.0 %



Advantages with **ARBOCEL®** with damping pads and expansion bands:

- Greatly increases heat resistance
- Replaces asbestos
- Improves working properties

## E. Bituminous Systems

### E.3.3 Filling compounds / putties



Filling Compounds /  
Putties

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® ZZC 500	gray	400 µm	4.0 - 7.0 %
ARBOCEL® ZZ 8/1 G	gray	1000 µm	3.0 - 6.0 %

**Note:**

ARBOCEL® is usually used only in medium and high-viscosity systems.

*Advantages with ARBOCEL® :*

- Replaces asbestos
- Greatly increases heat resistance
- Inhibits cracking

### E.3.4 Polymer modified bitumen foils



Bitumen Foils

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® ZZC 500	gray	400 µm	1.0 - 5.0 %
ARBOCEL® FBG 66	gray	pellet approx. 2 - 10 mm	1.0 - 5.0 %

*Advantages with ARBOCEL® :*

- Good heat resistance
- Partial replacement of polymers
- Easy to disperse compared to some polymers

### E.3.5 Roof coatings (with or without aluminium)



Bitumen Roof Coating

Brand Name	Color	Ø Fiber Length	By Weight
ARBOCEL® ZZC 500	gray	400 µm	2.0 - 6.0 %
ARBOCEL® ZZ 8/1 G	gray	1000 µm	1.0 - 4.0 %

**Note:**

In general when ARBOCEL® is used in bitumen emulsions it must be ensured that the ARBOCEL® is added in small portions to the bitumen emulsion while stirring (if too much ARBOCEL® is added, the bitumen emulsion can separate and form lumps). Afterwards the rest of the material can be added and blended.

ARBOCEL® is usually used in anionic bitumen emulsions.

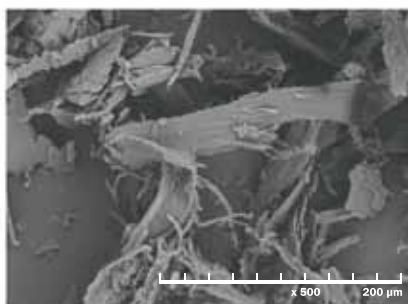
*Advantages with ARBOCEL® :*

- Replaces asbestos
- Greatly increases heat resistance
- Reduces tendency of aluminum particles (in product) to settle out

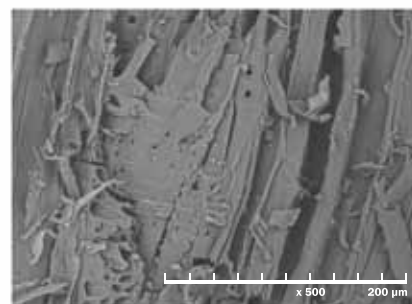
## F. LIGNOCEL®

### F.1 General remarks

**LIGNOCEL®** wood fiber materials are used in construction chemical products only if the wood constituents (lignin, resin and hemicellulose) will not adversely affect the finished product (wood constituents can result in yellowing, bleaching or discoloration).



SEM LIGNOCEL® C 120



SEM LIGNOCEL® 9

### F.2 Applications

#### F.2.1 Smoothing Compounds / Wood Putty

Smoothing Compounds  
Wood Putty

Brand Name	Color	Ø Particle Size	By Weight
LIGNOCEL® C-120	yellow	70 - 150 µm	30 - 40 %

Advantages with **LIGNOCEL®** :

- Improves working properties
- Cost-effective filler

#### F.2.2 Magnesite Screeds



Magnesite Screeds

Brand Name	Color	Ø Particle Size	By Weight
LIGNOCEL® 9	yellow	0.8 - 1.1 mm	30 - 40 %

Advantages with **LIGNOCEL®** :

- Stabilizes the mixture
- Reduces cracking during setting
- Promotes slow and uniform setting

#### F.2.3 Other applications

**LIGNOCEL®** for vibration dampening pads

- to reduce the density

**LIGNOCEL®** for special plasterboards

- to reduce the density
- to improve the stability
- easier to fix screws

## G. SYLOTHIX® / ARBOTHIX®

### Setting and thixotropic agents based on PE-Fibrids

#### G.1 Stabilizer for Viscous Systems

**SYLOTHIX® / ARBOTHIX®** are highly efficient thixotropic agents used in:

- Bitumen
- Epoxy
- Polyester
- PVC
- Polyurethane

*Advantages of SYLOTHIX® / ARBOTHIX®:*

- *Stabilizes*
- *Improves slump resistance*
- *Thickening (thixotropic) effect*
- *Easy to work*
- *Less dust generation*



#### G.2 Type Chart

\* **ARBOTHIX® PE 100** corresponds to and complements the **SYLOTHIX®** product line in its properties.

Type	SYLOTHIX® 51	SYLOTHIX® 52	SYLOTHIX® 53	*ARBOTHIX® PE 100
Fiber length	400 µm	400 µm	100 µm	100 µm
Portion of amorphous silicic acid (particle size 3 µm)	-	approx. 60 %	approx. 50 %	-
Humidity	max. 2 %	max. 3 %	max. 3 %	max. 2 %
Mixing ease	+	++	+++	+++
Effectiveness	+++	++	+	++
<b>SYLOTHIX® and ARBOTHIX®</b> can become electrically charged as they flow from equipment. The product in dust form can form an inflammable and explosive mixture with air. <b>SYLOTHIX®</b> and <b>ARBOTHIX®</b> should be stored in a clean dry room. Opened containers should be resealed to avoid product contamination. The material should be used within six months.				
<b>Health And Safety Information</b>  Please follow safety guidelines as well as national legislation and regulations. Additional information can be found on our Safety Data Sheet.	<b>SYLOTHIX® 51</b> is a fine polyethylene fiber. During processing care must be taken to ensure that no dust is generated.	<b>SYLOTHIX® 52</b> is a combination of fine polyethylene fibers and synthetic amorphous silicic acid. During processing care must be taken to avoid dust generation. In Germany an absolute fine dust level of 4 mg/m³ must not be exceeded during the handling of <b>SYLOTHIX® 52</b> (maximum workplace level).	<b>SYLOTHIX® 53</b> is a combination of fine polyethylene fibers and synthetic amorphous silicic acid. During processing care must be taken to avoid dust generation. In Germany an absolute fine dust level of 4 mg/m³ must not be exceeded during the handling of <b>SYLOTHIX® 53</b> (maximum workplace level).	<b>ARBOTHIX® PE 100</b> is a fine polyethylene fiber. During processing care must be taken to avoid dust generation. In Germany an absolute fine dust level of 4 mg/m³ must not be exceeded during the handling of <b>ARBOTHIX® PE 100</b> (maximum workplace level).



**For detailed information:**

Please order pamphlet for **SYLOTHIX®**

E-Mail: [industrie@jrs.de](mailto:industrie@jrs.de)

Phone: + 49 (0) 7967/152 211

#### G.3 Guidance Notes

**SYLOTHIX®** and **ARBOTHIX®** can be worked into all liquid media and resins with high-speed mixers / dissolvers.

The stirring or dispersing time is approx. 5 - 10 minutes.

**SYLOTHIX®** and **ARBOTHIX®** should not be compacted / compressed before blending (lumping).

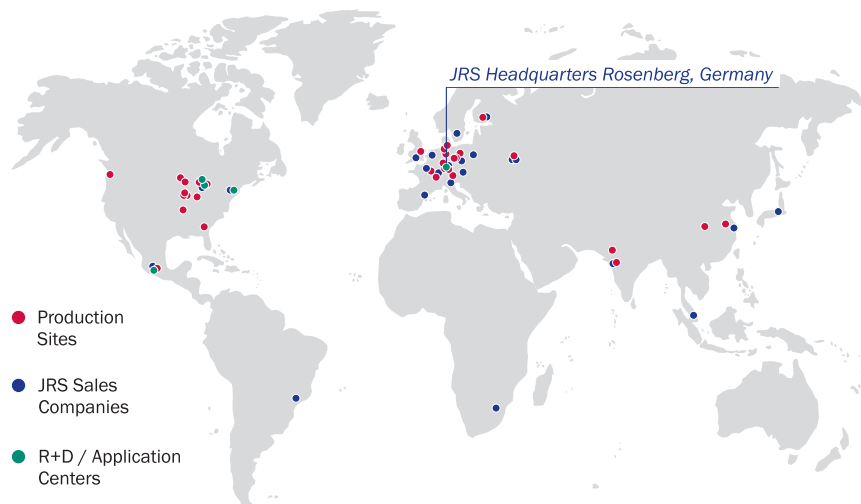
The blending temperature should not exceed 110 °C.

Recommended dosage: 1 - 3 % by weight.



## JRS – Your strong system partner and solution provider for organic fibers in industrial and technical applications

### JRS – YOUR Qualified Partner – worldwide



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In-house research and development, application services

Over 250 technical representatives around the world

Decades of experience and comprehensive application know-how

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(Fruit, Grain, Vegetable, Wood)
- **Microcrystalline Cellulose (MCC)**
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- **Ultrafine Celluloses (UFC)**
- **Croscarmellose (CCM)**
- **Sodium Starch Glycolate (SSG)**
- **Composite Products**
- **Contract Services**