



Fibers for Life.

# Fibers and Gels for Construction Chemical Products



+ ARBOCEL®

+ ALPHACEL®

+ LIGNOCEL®

+ REHOFIX®

+ Specialty Fibers

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### WARRANTY

The information in this brochure is based on our current knowledge and experience. This information does not absolve the user for the need to make their 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.

# Applications in Construction Industry

## INDUSTRIAL AND OFFICE BUILDING

ARBOCEL® for concrete, plaster, roof coatings, seal coatings, bioplastics, flooring, sealants and adhesives



## INFRASTRUCTURE

ARBOCEL® for roads, concrete, steel protection, refractory, drilling, tunneling, fire protection, oil and gas



## RESIDENTIAL CONSTRUCTION

ARBOCEL® for construction plasters, waterproofing, tile adhesives, cements, sealants and coatings



# JRS Core Competence



# Main JRS Products for Construction Chemistry

## PURE UPCYCLED CELLULOSE FIBERS AND MODIFIED CELLULOSE FIBERS

### Main Applications

- Stuccos/plasters
- Tile adhesives
- Drywall mud
- Asphalt/emulsion coatings
- Bituminous products
- Adhesive and reinforcing compounds for composite thermal insulation systems
- Joint fillers/compounds
- Refractory compounds
- Oil drilling and fracking

## CELLULOSE GELS

### Main Applications

- Ready-to-use systems (paints, plasters, dyes)

## HEMP

- Bio-plastics
- Adhesives
- Fillers



## GENERAL INFORMATION

# Competence in Construction Chemistry



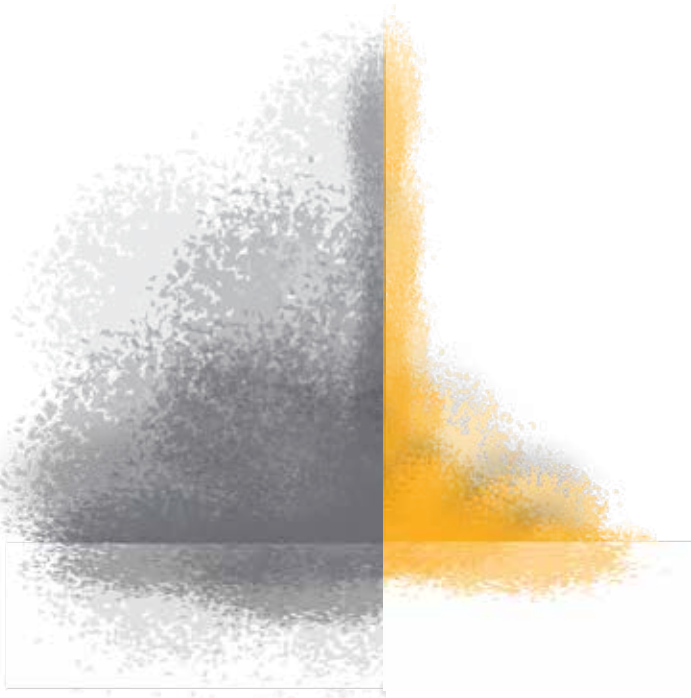
ARBOCEL® BC 200

## DEVELOPMENT/APPLICATION TECHNOLOGY

Our aim is to assist in developing innovative products that excel in your applications. We can offer you the following services:

- Reformulation and technical support
- Standard tests
- Application tests

## LOW DUST

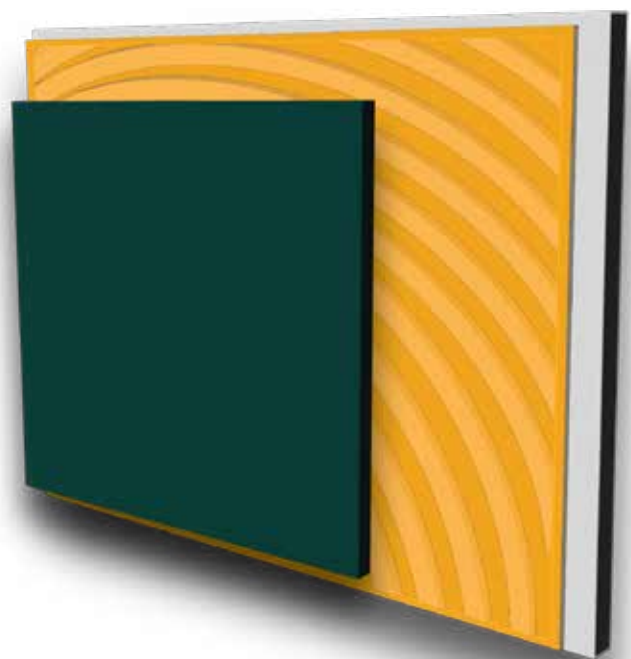


## EXPERIENCE/EXPERTISE

JRS has been supplying innovative ARBOCEL®, LIGNOCEL® and REHOFIX® fibers to manufacturers of construction chemical products worldwide for over 75 years.

Make use of our success and experience for your next project.

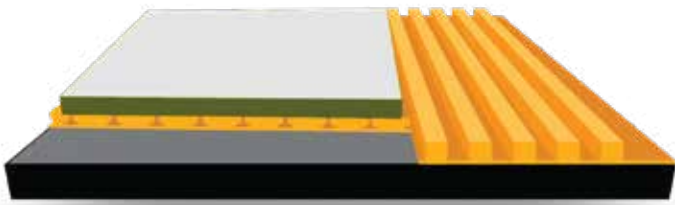
## ANTI-SLIPPAGE



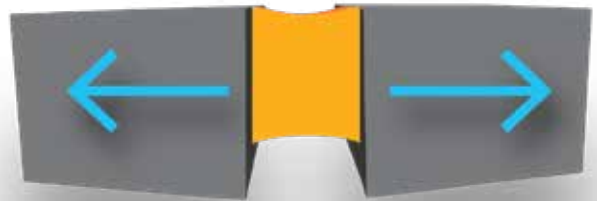


ARBOCEL® 725

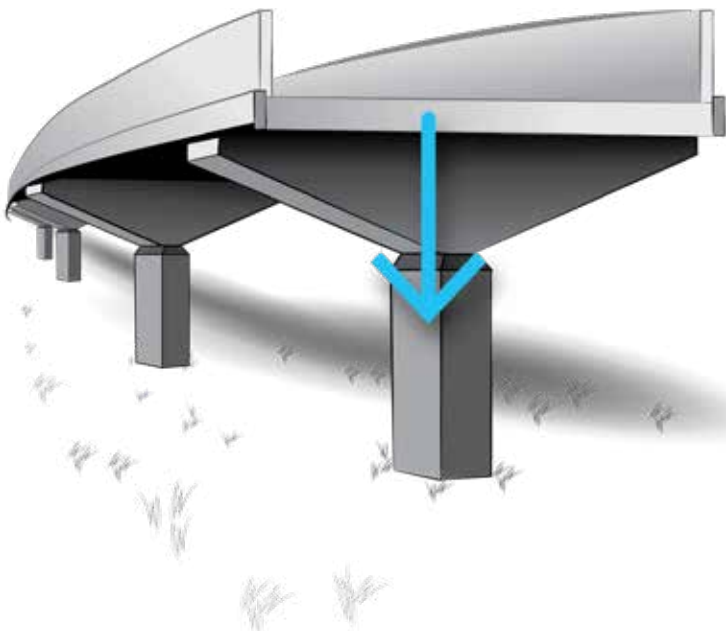
WETTABILITY



TENSILE STRENGTH



COMPRESSIVE STRENGTH



SAG RESISTANCE



# ARBOCEL®

Natural Cellulose Fibers

*SEM of ARBOCEL® BWW 40*

ARBOCEL® fibers are 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, such as trees and plants.

ARBOCEL® fibers 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® BC 1000*

# ARBOCEL® Gels



ARBOCEL® P 4000

A colloidal system based on water-insoluble microcrystalline cellulose co-processed with water soluble polymers.

## GEL ACTIVATION

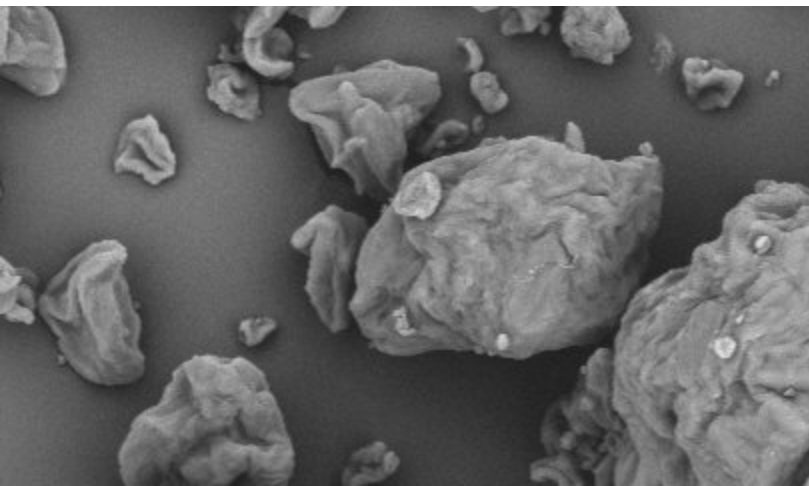
ARBOCEL® powder needs to be activated with high shear to achieve the three dimensional network.

## FUNCTION

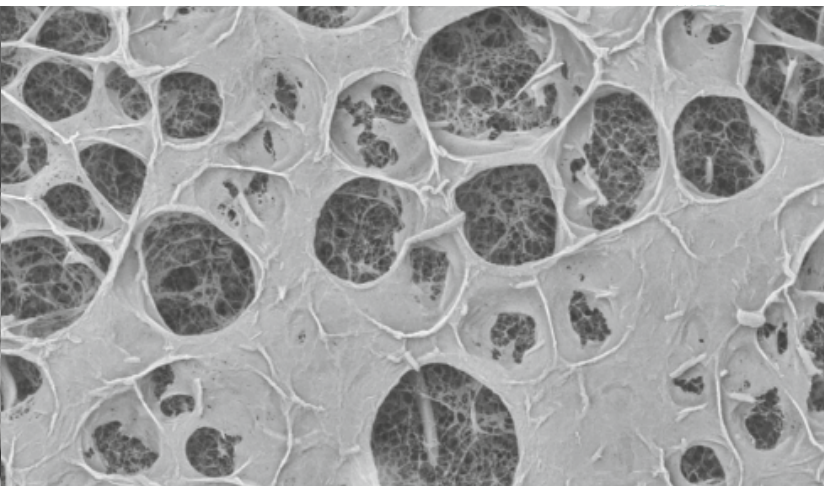
- Reduce syneresis
- Stabilize
- Extended open time
- Rheological agent
- Thickener

1. Add the ARBOCEL® powder slowly at low shear force to the water to incorporate evenly.
2. Mix at high shear force until gel consistency is formed.
3. Activated ARBOCEL® gel.

SEM of ARBOCEL® P 4000



SEM of ARBOCEL® P 4000 ACTI-

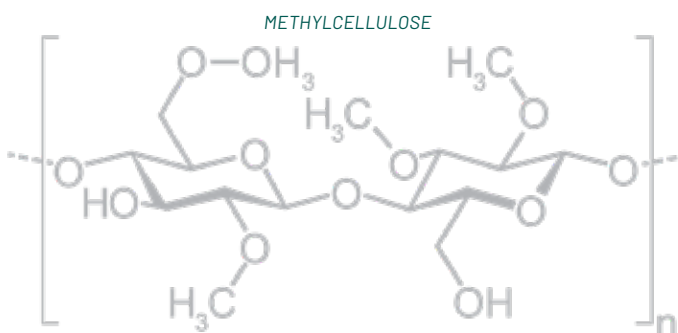
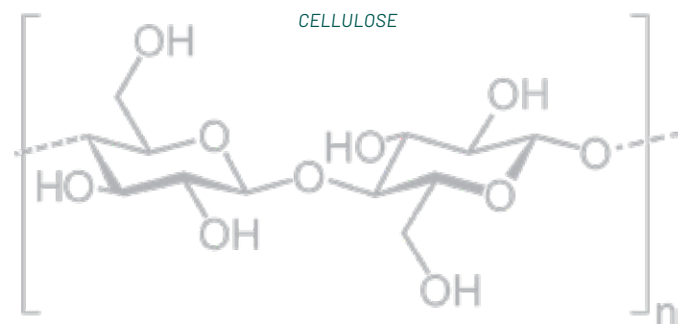


# Comparison of Cellulose Ethers versus ARBOCEL®

## COMMON PROPERTIES AND DIFFERENCES

	Cellulose Ether	ARBOCEL® Fiber
<b>Water soluble</b>	yes	no
<b>Stickiness</b>	yes	no
<b>Increase of viscosity</b>	yes	less in comparison
<b>Water retention</b> Example: Centrifugal method AACC <sup>1</sup>	>2000%	BE 300/300 PU ~350% BWW 40 ~580% BC 300 ~1100%

<sup>1</sup>AACC (American Association of Cereal Chemists): %H<sub>2</sub>O retention = (wet - dry) ÷ wet



## PROPERTIES OF CELLULOSE ETHERS

- Able to form transparent films that provide an oleophobic (oil and grease) barrier.
- Cellulose ethers thicken aqueous and non-aqueous systems. Multiple products are available in a range of molecular weights and structures that provide viscosity options from 5 to 100,000 cP.
- Stable from pH 2-13
- Aqueous solutions gel when heated above a particular temperature, and return into solution upon cooling.
- Cellulose ethers can provide lubrication in extrusion and pumping processes in applications such as for rubber, cement, and ceramic.

# Properties of ARBOCEL® Cellulose Fibers

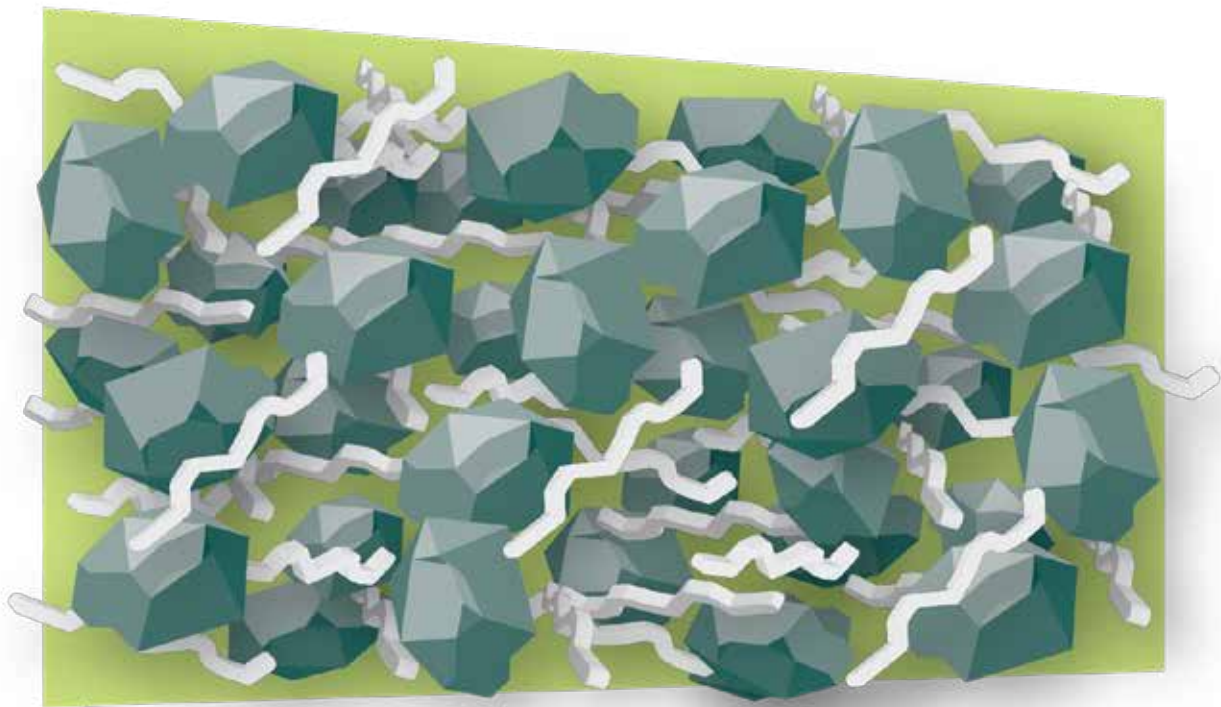
- From the finest grades with a mean fiber length of 8 µm to the longest fiber grades with a mean fiber length of 2,000 µm.
- Created from virgin cellulose and upcycled fibers.
- Approximate bulk density 15–500 g/l
- The long-fiber grades have a “felting” effect due to the curved structure and offer a better reinforcing behavior compared to short cut synthetic fibers.
- ARBOCEL® cellulose fibers are used as an asbestos substitute. Usually 30–50% of the weight of asbestos previously used is replaced with upcycled cellulose.
- The steady-state moisture content of ARBOCEL® cellulose fibers is approximately 4–12%. 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/320°F for several days;
  - 180°C/356°F for approximately 1 day;
  - 200°C/392°F thermal exposure limit
- The inherent structure of ARBOCEL® fibers assists with freeze-thaw stability.



# ARBOCEL® in Construction Chemical and Asphaltic/Bituminous Products

## ADVANTAGES OF USING ARBOCEL®

- 1 Reinforce dry mortars, coating and adhesives with a network of three dimensional fibers**



ARBOCEL® fibers provide a skeletal network within a film mortar improving tensile and cohesive strength as compressive properties.



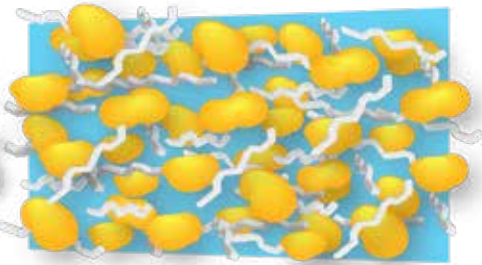
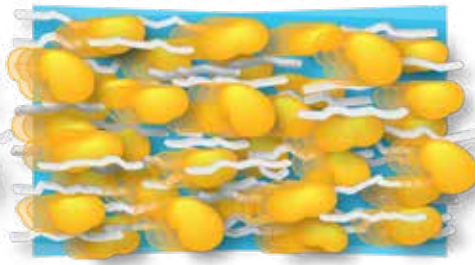
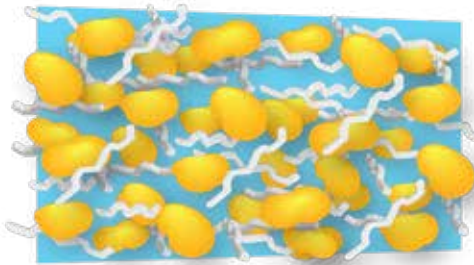
ARBOCEL® BWW 40 50LD



ARBOCEL® 105

ADVANTAGES OF USING ARBOCEL®

**2** Improve the workability due to the structural viscous behavior of ARBOCEL® fibers.



**System at rest**

- Fiber structure created using ARBOCEL®

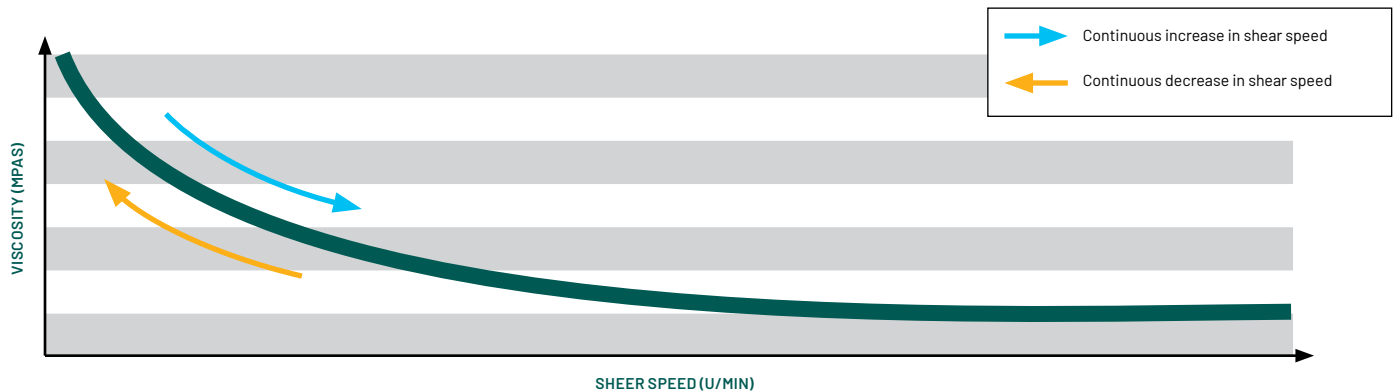
**System in motion**

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

**System at resumed rest**

- As soon as shear forces stop acting on the system, the state of system is restored.

RHEOLOGY: PSEUDOPLASTIC OR STRUCTURAL VISCOUS BEHAVIOR OF ARBOCEL®

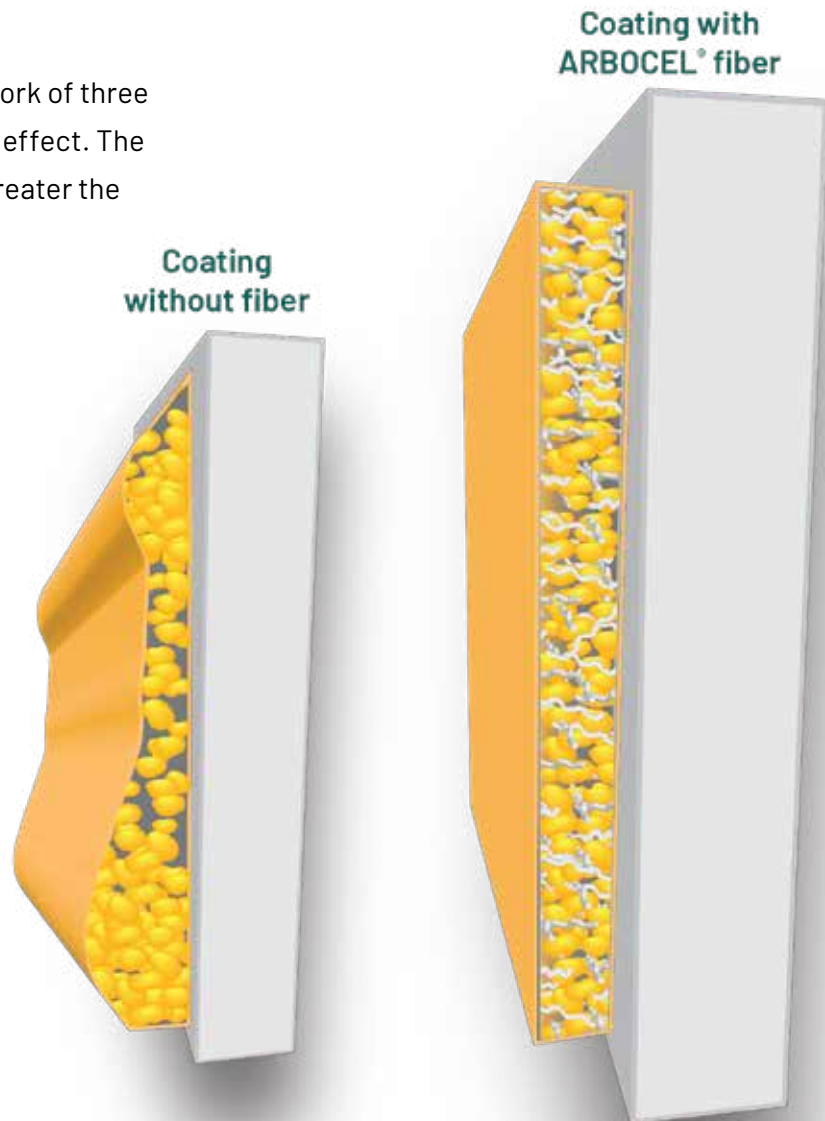


# ARBOCEL® in Construction Chemical and Asphaltic/Bituminous Products

## ADVANTAGES OF USING ARBOCEL®

### 3 Reduce sag with fiber reinforcement

ARBOCEL® cellulose fibers form a network of three dimensional fibers with a cross linking effect. The greater the average fiber length, the greater the reinforcing and anti-sagging effect is.



ARBOCEL® Gels	8 µm
ARBOCEL® UFC 100	10 µm
ARBOCEL® 600-30 PU	30 µm
ARBOTHIX® PE 100	400 µm



ARBOCEL® BC 1000

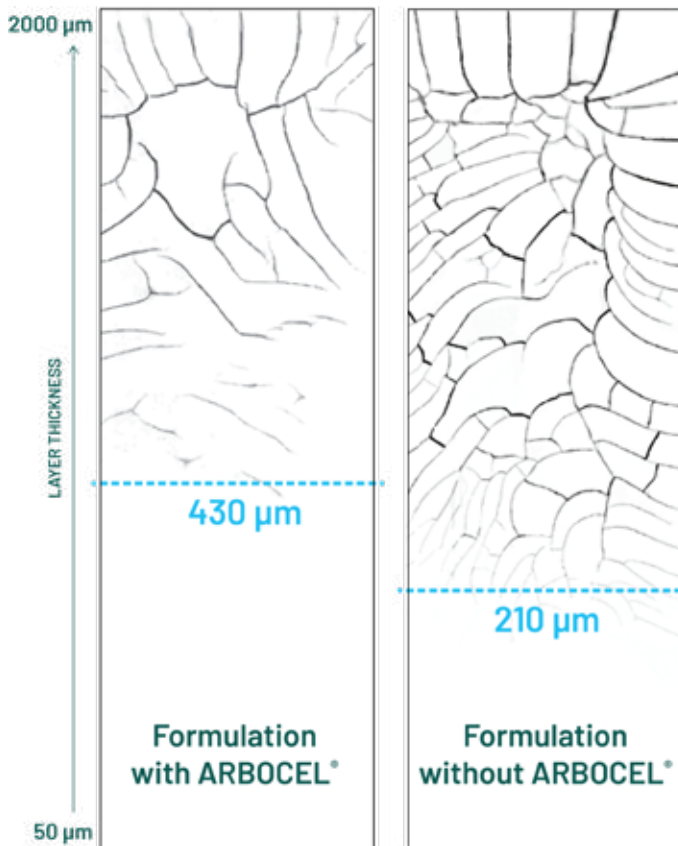


ARBOCEL® 325

## ADVANTAGES OF USING ARBOCEL®

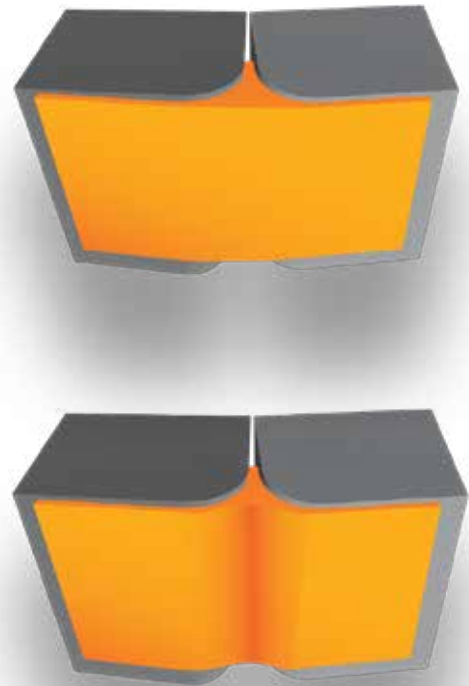
### 4 Reduce micro cracks

Crack inhibitor shown on emulsion paint.



### 5 Reduce shrinkage

The reinforcing nature of ARBOCEL® fibers reduces shrinkage in the formulation.



ARBOCEL® AC-C-100	110 µm
ARBOCEL® BWW40	200 µm
ARBOCEL® GCW10	250 µm



# ARBOCEL® in Construction Chemical and Asphaltic/Bituminous Products

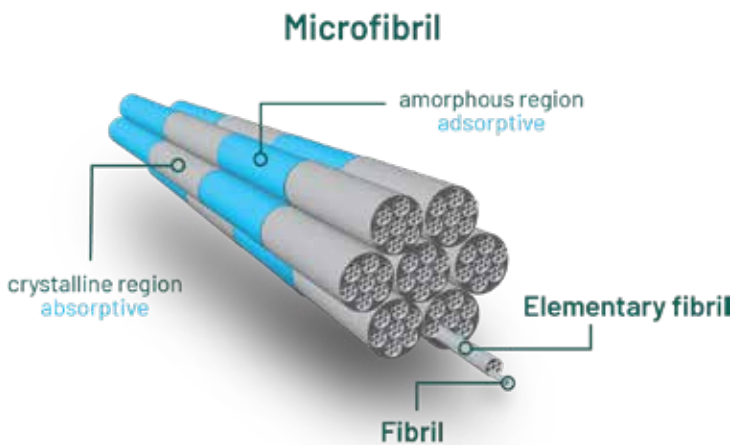
## ADVANTAGES OF USING ARBOCEL®

### 6 Prolong the open time

Liquid is transported by the cellulose fibers from inside (core) to the surface where evaporation takes place.

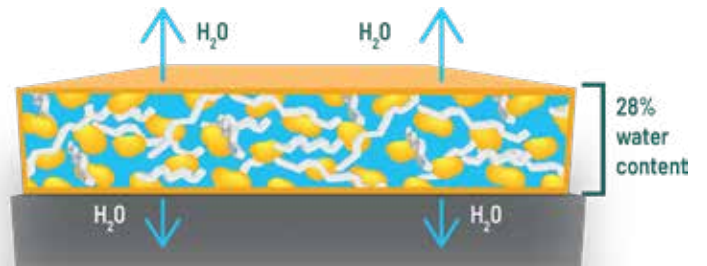
#### A. FIBER STRUCTURE OF CELLULOSE BOOSTS CAPILLARY EFFECT

Fibril can absorb and release liquids.

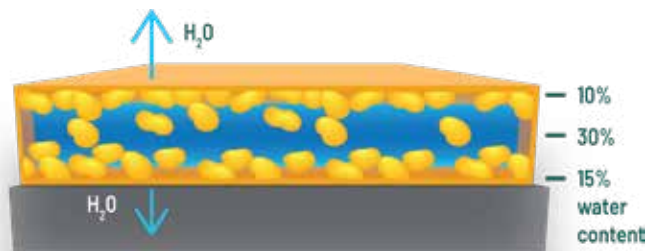


#### B. FIBER FUNCTION OF CELLULOSE IN COATINGS

Fibers can retain water evenly.



Without cellulose fibers, water retention is uneven and skin has a tendency to form.





ARBOCEL® GC66 LD



ARBOCEL® BWW 40

### ADVANTAGES OF USING ARBOCEL®

## 7 Reduce dust in dry mortar products

Incorporating a small amount of ARBOCEL® LD in your formulation reduces harmful dust and improves worker safety.

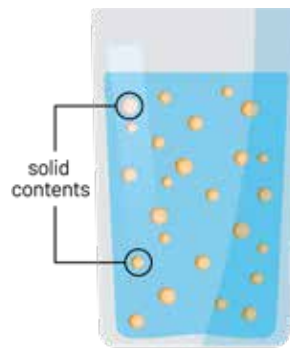
## 8 Reduce syneresis in ready-to-use systems

ARBOCEL® aids in the suspension of solids in liquid systems and prevents settling over time.



Treated with 1.0%  
ARBOCEL® LD

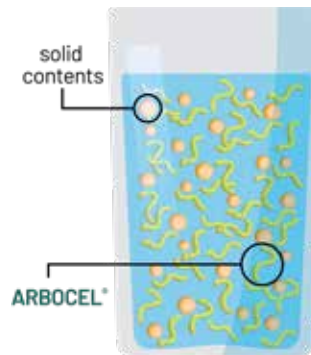
Untreated



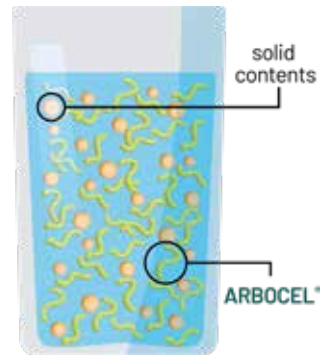
START



2 WEEKS  
without ARBOCEL®



START  
with ARBOCEL®



2 WEEKS  
with ARBOCEL®

# Main JRS Qualities

Brand Name		ARBOCEL®	ALPHACEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®	ARBOCEL®
Grade		BE 600/30 PU	C 100	BWW 40	BC 1000	FIC 200	MP 250	5FT	GC 10
Color		White	White	White	White	White	Off-white	Off-white	Off-white
Raw Material		Cellulose	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose	Cellulose
Average fiber length (um)		40	110	200	700	300	1400	500	250
Average bulk density (g/l)		220	175	130	45	90	15	70	75
Cement, gypsum lime	Mineral Plasters	BETTER	BETTER	BETTER	BETTER			BEST	BEST
	Joint fillers for plasterboards/skim coats		BEST	BEST					
	Mineral tile adhesives	BEST	BEST	BEST					BETTER
	Construction adhesives/adhesive for EIFS		BETTER	BEST	BETTER			BEST	BEST
	Extruded cement products			BEST					
	Refractory compounds			BETTER	BETTER		BEST		
	Self-leveling compounds		BEST	BEST					BEST
Synthetic resin	Emulsion paints	BEST	BEST	BEST	BEST				
	Acrylic roof coating						BEST	BEST	BEST
	Emulsion-bound finish plaster	BEST	BEST	BEST			BEST	BETTER	BEST
	Joint fillers for plasterboards/filler compounds/emulsion tile adhesive		BEST	BEST				BEST	BEST
Bitumen	Vibration dampening pads/expansion tapes			BETTER	BETTER				
	Bitumen foils/water roofing membranes			BETTER					
	Cold bitumen applications			BETTER					

 BETTER  
 BEST





ARBOCEL® BC 300

# ARBOCEL® Selection Criteria

## MOST SUITABLE ARBOCEL® GRADE

Choosing the most suitable grade depends on several factors.

- 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



## GENERAL CORRELATION

ARBOCEL® Type	Average Fiber Length	Effectiveness	Mixing Behavior	
			Dry Mixture	Aqueous Systems
BE 600/30 PU	Short	Low	Very Good	Very Good
BWW 40	Medium	Good	Good	Very Good
BC 300	Long	Very Good	Fair	Good
MP 250	Long	Excellent	Not Recommended	Good

# Dry/Mineral Systems



ARBOCEL® BWW 40

## BLENDING INSTRUCTIONS FOR DRY MIXTURES

Short to medium-length (40 µm - 500 µm) ARBOCEL® fibers are usually easy to blend. If high-performance mixers with cutter heads are used, longer fibers may be appropriate.

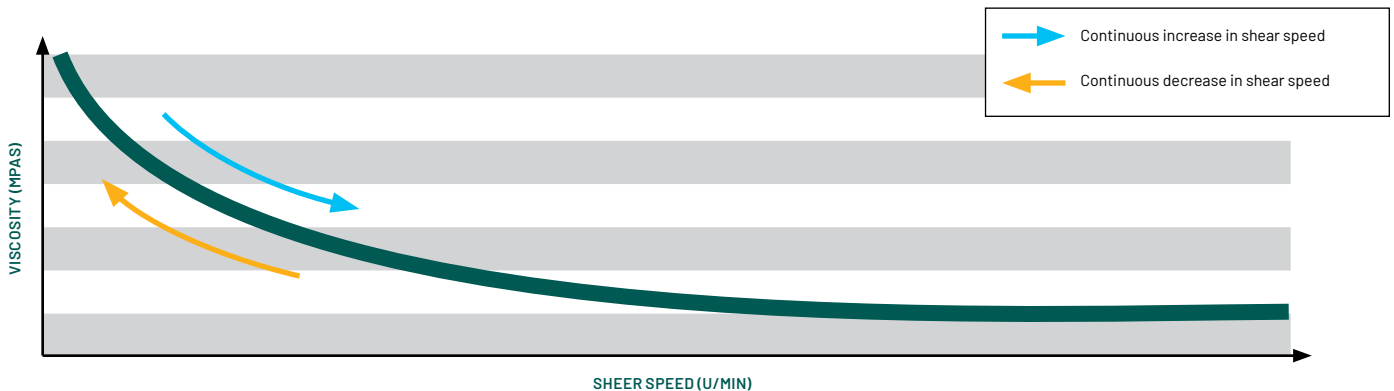
## GUIDANCE NOTES

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.). ARBOCEL® absorbs some water of the mix, so we recommend to add approximately two parts more water to one part ARBOCEL® to achieve the same working viscosity.

## ARBOCEL® MAIN GRADES USED

Brand	Raw Material	Color
ARBOCEL® 5 FT	Cellulose	Off-white
ARBOCEL® BWW 40	Cellulose	White
ARBOCEL® GC 66	Cellulose	Gray
ALPHACEL® BH 100	Cellulose	White

## RHEOLOGY: PSEUDOPLASTIC OR STRUCTURAL VISCOUS BEHAVIOR OF ARBOCEL®



# Dry/Mineral Systems



ARBOCEL® GC 10-70LD

## CEMENT TILE ADHESIVES

- 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

Type	Color	Fiber Length	Weight
ARBOCEL® GCW 10	Off-White	250 µm	0.4-1.0%
ARBOCEL® 5 FT	Off-White	500 µm	0.3-0.4%
ALPHACEL® C-10	White	290 µm	0.3-1.0%
ARBOCEL® BWW 40	White	400 µm	0.4-1.0%
ARBOCEL® MP 250	Gray	1000 µm	0.2-0.5%
If dust is a subject with dry mortar product:			
ARBOCEL® GC 66 70LD	Gray	400 µm	0.3-1.6%

## STEEL RANGE SPACERS/EXTRUDED CEMENT PROFILES

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

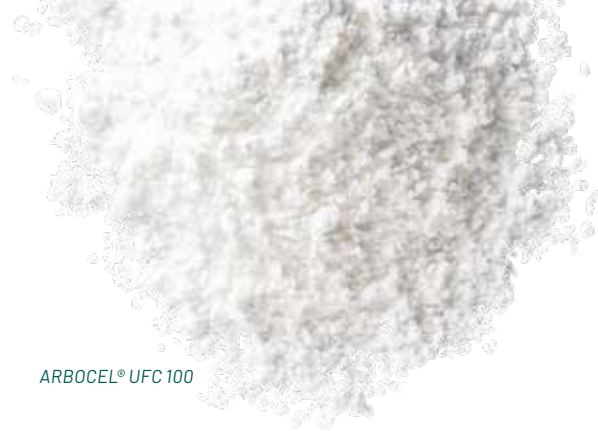
ARBOCEL®	Color	Fiber Length	Weight
105	Gray	1000 µm	0.3-1.0%
FT	Gray	500 µm	0.5-2.0%

## STUCCOS/PLASTERS/EIFS

Binders: cement-lime, cement, gypsum, gypsum lime

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

Type	Color	Fiber Length	Weight
ARBOCEL® 5 FT	Off-White	500 µm	0.4-1.0%
ARBOCEL® FT	Gray	500 µm	0.4-1.0%
ARBOCEL® 230	Gray	1000 µm	0.2-0.5%
ARBOCEL® BWW 40	White	200 µm	0.3-1.0%
ALPHACEL® C 10	White	290 µm	0.2-1.0%
ALPHACEL® BH 20	White	100 µm	0.5-1.5%
If dust is a subject with dry mortar product:			
ARBOCEL® BWW 40 70LD	Off-White	500 µm	0.4-1.0%
ARBOCEL® GC 10 70LD	Gray	250 µm	0.4-1.0%



ARBOCEL® UFC 100

ARBOCEL® BWW 40-50LD

### SKIM COATS/UNDERLAYMENT/THINSET

- Suppresses cracking
- Improves working properties

ARBOCEL®	Color	Fiber Length	Weight
AC-C 100	White	110 µm	0.5-1.0%
BWW 40	White	200 µm	0.3-0.8%
UFC 100	Off-White	100 µm	0.5-2.0%
BE 600-30PU	White	40 µm	0.5-1.0%

### JOINT FILLERS FOR DRYWALL/FILLER COMPOUNDS

- Reduces cracking and shrinkage
- Improves workability
- Improves standability

Type	Color	Fiber Length	Weight
ARBOCEL® B 800	White	100 µm	0.5-1.0%
ARBOCEL® BWW 40	White	200 µm	0.3-0.8%
ALPHACEL® C 100	White	110 µm	0.5-1.0%

## OTHER APPLICATIONS

### SELF LEVELING COMPOUNDS

- Reduce bleeding and separation

### CONCRETE

- Reduce the plastic shrinkage

### REFRACTORY PRODUCTS

- Reduce the density
- Better de-watering
- Reduce segregation of the refractory compound

### FIRE-PROOFING SYSTEMS TO PROTECT STEEL

- Good slump resistance
- Creates pores, in case of fire

ARBOCEL®	Color	Fiber Length	Weight
CF 100	Gray	1400 µm	2.0-12.0%
SISAL 250	Beige	6000 µm	1.0-15.0%
HF 250	Beige	250 µm	1.0-12.0%

Consult with your local JRS Team for specific recommendations.

# Emulsion-Bound/Paste Systems

## GUIDANCE NOTES FOR THE FIBERS

ARBOCEL® will increase the viscosity of the emulsion system. To achieve the same working behavior, it is recommended to add approximately two parts more water to one part ARBOCEL®. With 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.

## TEXTURED PLASTERS/FILLERS/COATINGS

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

## EXTERIOR USE

ARBOCEL®	Color	Fiber Length	Weight
<b>BWW 40</b>	White	700 µm	0.3-0.5%
<b>MP 250</b>	White	900 µm	0.2-0.4%
<b>Cotton</b>	Various	Various	1.5-2.0%

## INTERIOR USE

ARBOCEL®	Color	Fiber Length	Weight
<b>BWW 40</b>	White	700 µm	0.6-1.0%
<b>MP 250</b>	White	900 µm	0.5-0.9%

## MIXING NOTES

Blending ARBOCEL® fibers is straightforward. 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.

## GELS FOR PAINTS AND PLASTERS

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

ARBOCEL®	Color	Weight
<b>P 4000</b>	White	0.5-1.0%

## ACRYLIC ROOF COATINGS

- Inhibits cracking and shrinking
- Improves workability
- Improves flexibility

SYLOTHIX®	Color	Fiber Length	Weight
<b>51</b>	White	400 µm	1.0-3.0%
<b>31 WPF</b>	White	200 µm	0.5-3.0%
<b>31 WAF</b>	Off-White	500 µm	0.5-3.0%



### EMULSION PAINTS (MATTE OR SEMI-GLOSS)

- Suppresses sheen
- Improves rheological properties
- Reduces density
- Reduces cracking
- Sheer thinning
- Reduces syneresis

#### A. PAINTS FOR AIRLESS SPRAY APPLICATION

ARBOCEL®	Color	Fiber Length	Weight
<b>BE 600/30 PU</b>	White	40 µm	0.3-1.0%
<b>UFC 100</b>	White	9 µm	0.5-0.9%

#### B. PAINTS APPLIED BY ROLLER OR BRUSH

ARBOCEL®	Color	Fiber Length	Weight
<b>AC C-100</b>	White	120 µm	0.5-1.0%
<b>BWW 40</b>	White	200 µm	0.3-0.8%

#### C. CRACK-BRIDGING REINFORCING PAINTS

ARBOCEL®	Color	Fiber Length	Weight
<b>MP 250</b>	White	1400 µm	0.3-0.8%

### DRYWALL/PLASTER/TILE

- Reduces cracking and shrinkage
- Improves workability
- Improves standability

ARBOCEL®	Color	Fiber Length	Weight
<b>B 800</b>	White	120 µm	0.5-1.0%
<b>BWW 40</b>	White	200 µm	0.3-0.8%
<b>BH 40</b>	Off-White	60 µm	0.3-1.0%

### OTHER PAINT APPLICATIONS

- Emulsion paints
- Silicate paints
- Lime-cement paints
- Powder paints
- Paints with structure effects
- Road marking paints

# Asphalt/Bituminous Systems

## ARBOCEL® GRADES USED

The grades most commonly used are:  
ARBOCEL® 325, 425, 40605, 105 and FTP.

When used as an asbestos replacement, 30% to maximum 50% by weight of the asbestos quantity previously used, is sufficient. The resulting deficiency of volume should be compensated by the addition of a suitable filler.

ARBOCEL® cellulose fibers result in:

- Greater viscosity build
- Better heat resistance
- Good workability
- Sheer thinning
- Decreased swelling
- Rheology control
- Reduced cracking
- Increased open time
- Uniform curing

In comparison to asbestos and other mineral fillers, ARBOCEL® brand products give a rougher and less glossy surface. If a smoother surface is required, short fiber ARBOCEL® brands are recommended. With short fiber ARBOCEL® products, 20 - 40% more by weight may be added in comparison to long fiber products.





### BITUMEN TAPES/EXPANSION BANDS

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

- Increases heat resistance
- Replaces asbestos
- Improves working properties

ARBOCEL®	Color	Fiber Length	Weight
105	Gray	1050 µm	5.0-8.0%

### MASTICS/PUTTIES

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

- Replaces asbestos
- Greatly increases heat resistance
- Inhibits cracking
- Uniform curing

ARBOCEL®	Color	Fiber Length	Weight
105	Gray	1050 µm	3.0-6.0%
FT	Gray	500 µm	3.0-6.0%
GC 66	Gray	300 µm	3.0-7.0%

### POLYMER MODIFIED ASPHALT SHEETS

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

ARBOCEL®	Color	Fiber Length	Weight
725	Gray	540 µm	1.0-5.0%
220	Gray	1025 µm	3.0-6.0%

### ROOF COATINGS WITH OR WITHOUT ALUMINUM

When ARBOCEL® is used in bitumen emulsions, it should be added in small portions while stirring. If too much ARBOCEL® is added, the bitumen emulsion can separate and form lumps. ARBOCEL® FTP or 425P can be used to minimize these effects. Afterwards, the rest of the material can be added and blended.

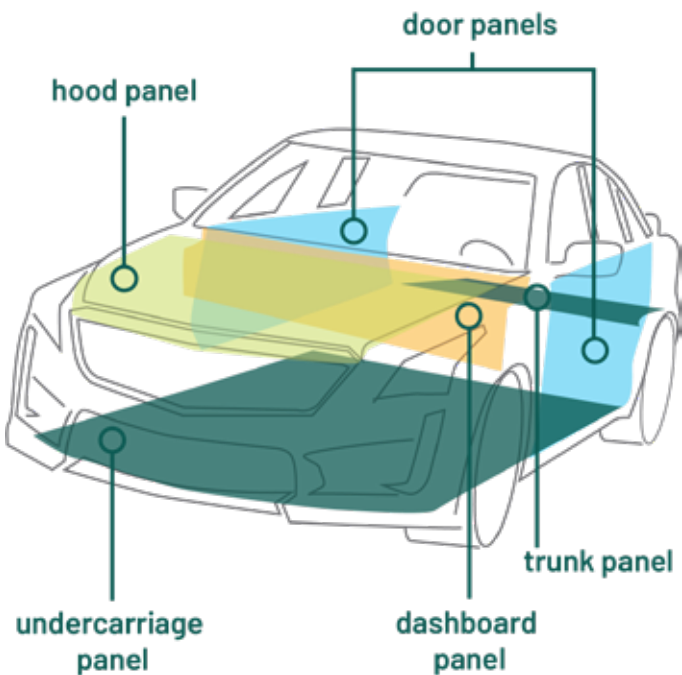
- Replaces asbestos
- Increases heat resistance
- Reduces tendency of aluminum particles (in product) to settle out

ARBOCEL®	Color	Fiber Length	Weight
GC 66	Gray	300 µm	2.0-6.0%
GC 10	Gray	250 µm	2.0-6.0%
725	Gray	540 µm	1.0-4.0%
230	Gray	1000 µm	1.0-3.0%

VIBRATION DAMPENING PADS

These sheets are usually applied directly to car panels to strengthen as well as suppress noise.

ARBOCEL®	Color	Fiber Length	Weight
100	Gray	1400 µm	0.8-3.0%
220	Gray	1025 µm	0.8-3.0%
FT	Gray	500 µm	1.0-3.0%
GC 10	Gray	250 µm	1.0-4.0%



GUIDANCE NOTES

- The longer the average fiber length of the ARBOCEL® grade, the greater its yield and the viscosity is increased.
- The shorter the average fiber length of an 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, especially in cold bitumen with a petroleum base. Normally this effect mediates in a matter of a few days.

LIGNOCEL®



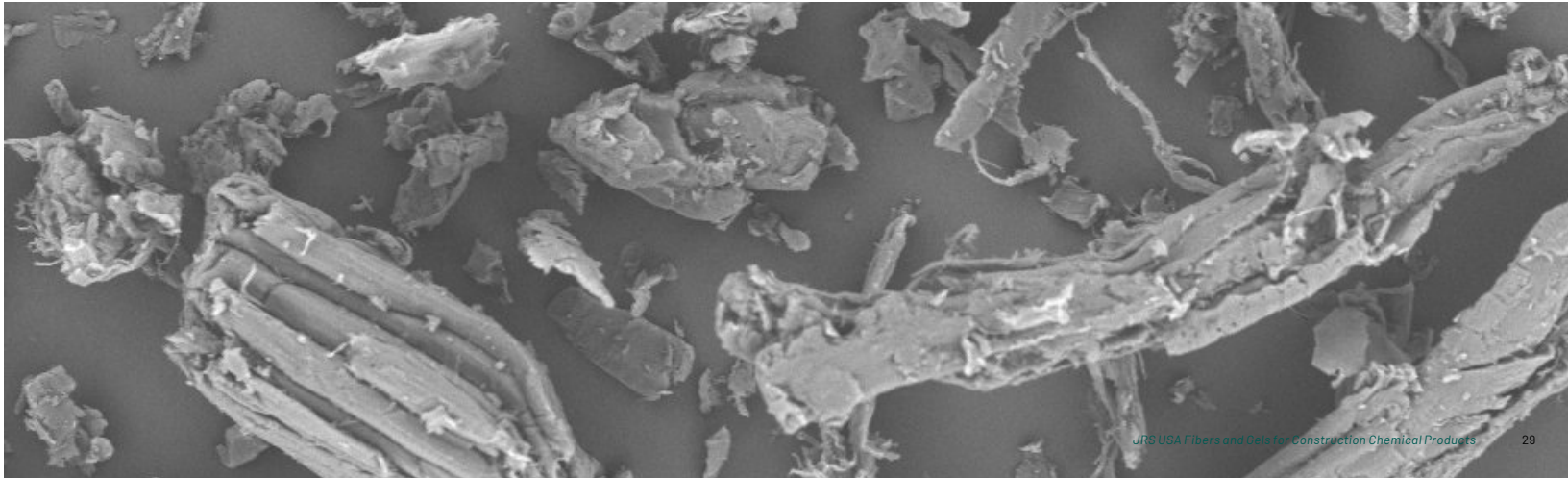
SEM of LIGNOCEL® C 120

**LIGNOCEL®**  
Wood Fiber Materials

**ARBOCEL®**  
Hemp Fiber Materials

LIGNOCEL® wood flour or ARBOCEL® hemp fibers contain lignin, resin and hemicellulose. These materials are typically more cubic in nature and provide unique physical properties when added to construction formulations.

SEM of LIGNOCEL® HB 120



LIGNOCEL®/LIGNOCEL®

# LIGNOCEL® and Hemp

## SMOOTHING COMPOUNDS/WOOD PUTTY

- Improves working properties
- Cost-effective filler

LIGNOCEL®	Color	Fiber Length	Weight
<b>C 120</b>	Yellow	70-150 µm	10.0-40.0%
<b>H 150</b>	Beige	~150 µm	0.5-20.0%
<b>HBK 250-2000</b>	Yellow	~1500 µm	5.0-90.0%
<b>H 250</b>	Beige	~250 µm	0.5-33.0%
<b>HB 120</b>	Beige	40-120 µm	0.5-20.0%

## ADVANTAGES

- Reduced density
- Improved bond strength
- Better stability
- Added impact resistance

## OTHER APPLICATIONS

VIBRATION DAMPENING PADS

EXTRUDED CEMENT BOARD

WOOD PUTTY

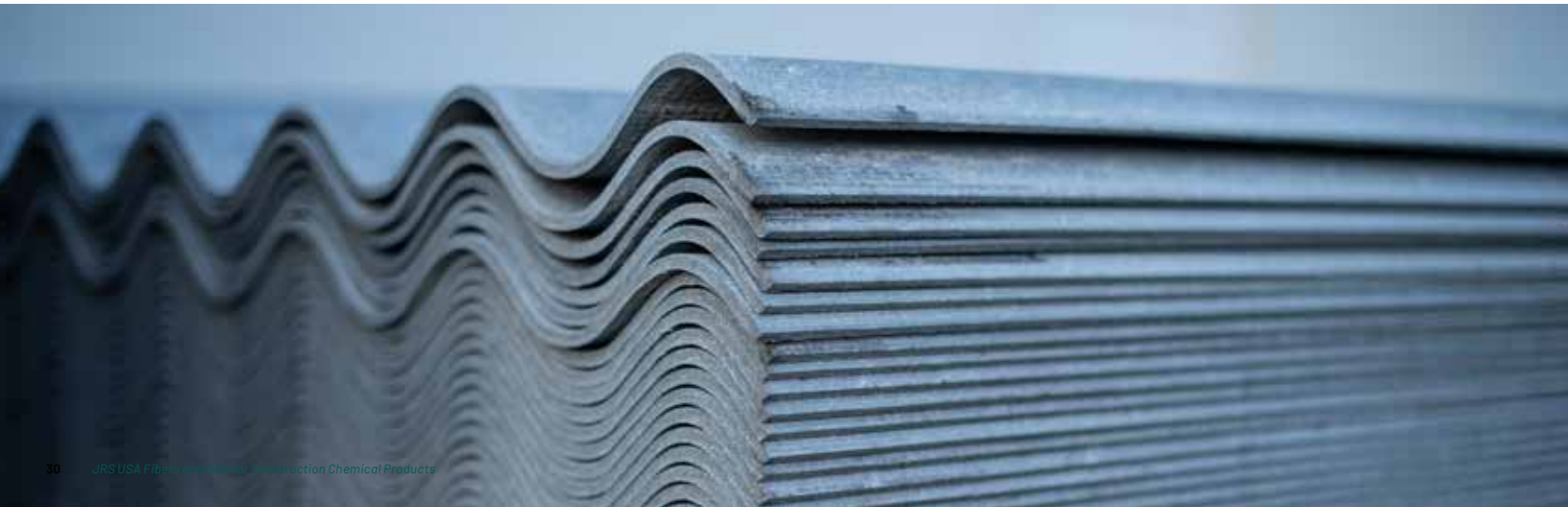
ADHESIVES/BIOPLASTICS/GLUES

COMPOSITES

EXTRUSIONS

SPECIAL DRYWALL

LIGNOCEL®/LIGNOCEL®



## SPECIALTY FIBERS

KEVLAR FLOCK MFKESF-6104

KEVLAR K1351

JRS offers a wide variety of natural and specialty fibers. These fibers come in both precision cut and flocked depending upon the formulation and application.

### APPLICATIONS

Belts	Tapes	Paints
Hoses	Plastics	Extrusions
Rubber	Ceramics	

# SPECIALTY FIBERS

- Cotton
- Polyester
- Nylon
- Acrylic
- Kevlar/Aramid
- Flocks
- Precision Cuts

CHOPPED COTTON THREAD MFIHT 504

CHOPPED COTTON THREAD MFIHT 508

# Specialty Fibers

SPECIFICS	FIBER COMPOSITION	COTTON			NYLON	
		Cotton	Cotton	Cotton	Nylon	Nylon
		Pre-cut Clips	Flock	Precision Cut Cord	Precision Cut	Flock
COLOR AVAILABLE	Indigo	Indigo Black White Mixed	Indigo	White	Variable	
INDUSTRIAL APPLICATIONS	Adhesive & Sealants		●		●	●
	Batteries				●	●
	Building Products - Papers	●	●	●	●	●
	Friction	●	●	●	●	●
	Paints & Surface Coating		●	●		●
	Plastics	●	●	●		
	Resin/Composites Gaskets	●		●	●	●
	Cements - Plasters					
	Ceramics		●			
	Bio Fuel					
	Rubber Compound	●	●		●	●
	Tile Mortar		●			
	TEXTILE	Fabric Backing		●		
Gloves			●			

SYNTHETICS					ARAMID	
Polyester -RFL	Polyester	Polyester	Polypropylene	Acrylic	Kevlar	Twaron
Precision Cut	Precision Cut	Flock	Precision Cut	Flock	Flock	Flock
Orange	White	Variable	White	Variable	Yellow	Yellow
●	●	●		●	●	●
●	●	●	●			
	●	●	●		●	●
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## Your strong system partner and solution provider for sustainable fibers in industrial and technical applications

### JRS IS YOUR QUALIFIED PARTNER WORLDWIDE

- Worldwide logistics and presence
- High availability and efficient, high-capacity production
- In-house research and development, application services
- Over 250 technical representatives around the world
- Decades of experience and comprehensive application expertise
- Quality manufacturing ISO 9001

### J. RETTENMAIER USA LP

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### OTHER JRS PRODUCTS AND SERVICES

- Wide Range of Plant Fibers (fruit, grain, vegetable, wood)
- Microcrystalline Cellulose (MCC)
- Cellulose Derivatives (HPMC, MC, etc.)
- Ultrafine Celluloses (UFC)
- Croscarmellose (CCM)
- Sodium Starch Glycolate (SSG)
- Composite Products
- Contract Services

