Ideas from Nature

ARBOCEL®
Natural Cellulose Fibers

LIGNOCEL®
Wood Fiber Materials

SYLOTHIX®
Polyethylene Fibers

ARBOTHIX®
Polyethylene Fibers
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Warranty

The information in this pamphlet is based on our current knowledge and experience. This information does not absolve the user for the 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 Chemistry
A. General Information

A.2 JRS Product Range
### A. General Information

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

<table>
<thead>
<tr>
<th>Cellulose fibers</th>
<th><strong>Main Applications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARBOCEL®</td>
<td>Stuccos / plasters</td>
</tr>
<tr>
<td></td>
<td>Tile adhesives</td>
</tr>
<tr>
<td></td>
<td>Joint fillers for plasterboards</td>
</tr>
<tr>
<td></td>
<td>Adhesive and reinforcing compounds for composite thermal insulation systems</td>
</tr>
<tr>
<td></td>
<td>Joint fillers / filler compounds</td>
</tr>
<tr>
<td></td>
<td>Emulsion paints, etc.</td>
</tr>
<tr>
<td></td>
<td>Bituminous products</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PE-fibrides</th>
<th><strong>Main Applications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARBOTHIX®</td>
<td>Epoxy-resin-bound floors</td>
</tr>
<tr>
<td>SYLOTHIX®</td>
<td>One- and two-component adhesives and sealants, etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wood fibers</th>
<th><strong>Main Applications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGNOCEL®</td>
<td>Magnesite-bound flooring compounds</td>
</tr>
<tr>
<td></td>
<td>Smoothing compounds, etc.</td>
</tr>
</tbody>
</table>
A. General Information

A.4 Competence in Construction Chemistry

Development / Application Technology

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

Process Technology / Production

We know that for you, conveyor technology, mixer technology and metering equipment are important components to ensure smooth production.

To ensure that our JRS products function optimally in your production plant, our Technical Department will support you in all matters relating to conveyor, mixing technology and metering.

On request, JRS can also supply silos and hoppers with suitable discharge equipment.

Experience / Expertise

JRS has been supplying innovative ARBOCEL® cellulose fibers to manufacturers of construction chemical products worldwide for over 30 years.

Make use of our success and experience.

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

A.6 Comparison of Cellulose Ethers versus ARBOCEL®

### Common properties, differences

<table>
<thead>
<tr>
<th></th>
<th>Cellulose ether</th>
<th>ARBOCEL® quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water soluble</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Stickiness</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Water retention</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Example: Centrifugal method AACC</td>
<td>&gt; 2000 %</td>
<td>BE 600/30 PU approx. 350 % BWW 40 approx. 580 % BC 1000 approx. 1000 %</td>
</tr>
<tr>
<td>Viscosity increase</td>
<td>yes</td>
<td>yes, but less compared to high viscosity cellulose ethers</td>
</tr>
</tbody>
</table>

\(^{AAAC} = \text{American Association of Cereal Chemists}
water retention (%) = (weight of wet cellulose - weight of cellulose) / weight of cellulose fiber × 100
A. General Information

### A.7 Properties of ARBOCEL® Cellulose Fibers

<table>
<thead>
<tr>
<th>Point</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>From the finest grades with a mean fiber length of 10 µm to the longest fiber grades with a mean fiber length of 2000 µm.</td>
<td></td>
</tr>
<tr>
<td>Composite densities in finished products: 1.1 - 1.3 g/cm³.</td>
<td></td>
</tr>
<tr>
<td>In the long-fiber grades, curved fibers have a “felting” effect.</td>
<td></td>
</tr>
<tr>
<td><strong>ARBOCEL®</strong> cellulose fibers are also used as an asbestos substitute. Usually 30 - 50 % of the weight of asbestos previously used is sufficient.</td>
<td></td>
</tr>
<tr>
<td>Completely safe and therefore suitable as substitute for asbestos in many applications.</td>
<td></td>
</tr>
<tr>
<td>The steady-state moisture content of <strong>ARBOCEL®</strong> cellulose fibers is approx. 10 - 12 %. <strong>ARBOCEL®</strong> is normally supplied with a moisture content in the range of 4 - 8 %. In this form <strong>ARBOCEL®</strong> cellulose is slightly hygroscopic (water-absorbing). We therefore recommend that it is stored in a dry place.</td>
<td></td>
</tr>
<tr>
<td>Insoluble in water and organic solvents.</td>
<td></td>
</tr>
<tr>
<td>Resistant to dilute acids and bases.</td>
<td></td>
</tr>
<tr>
<td>Guide values for temperature exposure:</td>
<td></td>
</tr>
</tbody>
</table>
|  | 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 approximately -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. Strong thickening effect / fiber reinforcement

ARBOCEL® cellulose fibers form a three-dimensional framework with pronounced cross-linking effect. The cross-links trap liquids (water, emulsions, bitumen, etc.) in the structure. The greater the average fiber length, the greater is the thickening effect.

Thanks to these properties, ARBOCEL® has proved to be a suitable asbestos replacement.

2. Improved processing characteristics thanks to the structural viscosity behavior of ARBOCEL® fibers

When shear forces act on the system (e.g. through stirring, pumping, etc.), some of the liquid trapped in the fiber structure is released into the matrix. The fibers align along the flow direction and consequently are able to slide past each other. The system becomes liquid (decrease of the viscosity). When the material is at rest, the fiber structure reforms, immediately re-trapping the liquid, i.e. the original viscosity state is immediately restored.

Structural viscous behavior of ARBOCEL®
B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

3. Good liquid absorption capacity in the ARBOCEL® fiber structure

Liquid can be absorbed and transported through the ARBOCEL® capillaries. Once the system has set, the ARBOCEL® fibers are bound in the matrix, i.e. embedded in the binder, preventing any further absorption of moisture (e.g. from rain).

4. Better slump resistance

No slippage during processing in the just-applied state. As a result, much thicker coats can be applied in a single step.

In addition, the fiber reinforcement provides excellent thermal properties, with good liquid retention even at high temperatures.
5. Crack inhibitor
The mechanical energy generated during the setting or drying process is absorbed by the reinforcing fibers.

6. Reduced shrinkage due to the reinforcing fibers

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

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

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

B.2 Recommended JRS Qualities

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Color</th>
<th>Raw material</th>
<th>Grade</th>
<th>µm</th>
<th>Average fiber length</th>
<th>g/l</th>
<th>Bulk weight approx.</th>
<th>e.g. Cement, Gypsum, Lime</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE 600/30 PU</td>
<td>White</td>
<td></td>
<td></td>
<td>40</td>
<td>220</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 600</td>
<td>White</td>
<td></td>
<td></td>
<td>60</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 00</td>
<td>White</td>
<td></td>
<td></td>
<td>120</td>
<td>165</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWW 40</td>
<td>White</td>
<td></td>
<td></td>
<td>200</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FI 540 CA*</td>
<td>White</td>
<td></td>
<td></td>
<td>600</td>
<td>155</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 200</td>
<td>White</td>
<td></td>
<td></td>
<td>300</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC 1000</td>
<td>White</td>
<td></td>
<td></td>
<td>700</td>
<td>37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 400</td>
<td>White</td>
<td></td>
<td></td>
<td>900</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD 00</td>
<td>Off-white</td>
<td></td>
<td></td>
<td>150</td>
<td>165</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD 40</td>
<td>Off-white</td>
<td></td>
<td></td>
<td>250</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PWC 500</td>
<td>Off-white</td>
<td></td>
<td></td>
<td>500</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZZC 500</td>
<td>Off-white</td>
<td></td>
<td></td>
<td>400</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZZ 8/2 CA 1*</td>
<td>Gray</td>
<td></td>
<td></td>
<td>1000</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZZ 8/1 G</td>
<td>Gray</td>
<td></td>
<td></td>
<td>1000</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>White</td>
<td>PE</td>
<td></td>
<td>400</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>White</td>
<td>PE</td>
<td></td>
<td>400</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>White</td>
<td>PE</td>
<td></td>
<td>100</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE 100</td>
<td>White</td>
<td>PE</td>
<td></td>
<td>100</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 120</td>
<td>Yellow</td>
<td>Wood</td>
<td></td>
<td>70-150</td>
<td>115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Yellow</td>
<td>Wood</td>
<td></td>
<td>800-1100</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Modified qualities with improved metering and blending properties
1) and 2) coated with amorphous silicic acid
**Special types:** Other ARBOCEL® grades with modified properties can be produced in cooperation with our customers. Take advantage of our technical experience and production expertise.

<table>
<thead>
<tr>
<th>Binders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synthetic resin</strong></td>
</tr>
<tr>
<td>Emulsion paints</td>
</tr>
<tr>
<td>Emulsion-bound acrylic paints</td>
</tr>
<tr>
<td>Emulsion-bound alkyd paints</td>
</tr>
<tr>
<td>Emulsion-bound latex paints</td>
</tr>
<tr>
<td>Emulsion-bound filler joint leveling compounds</td>
</tr>
<tr>
<td>Emulsion-bound joint fillers for plasters</td>
</tr>
<tr>
<td>Vibration damping pads</td>
</tr>
<tr>
<td>Bituminous expansion joints</td>
</tr>
<tr>
<td>Cold bitumen/mastic applications in general</td>
</tr>
<tr>
<td>Bitumen emulsions</td>
</tr>
<tr>
<td>Epoxy-resin-bound floors</td>
</tr>
<tr>
<td>1 or 2-component epoxy adhesives and sealants</td>
</tr>
<tr>
<td>Smoothing compounds</td>
</tr>
<tr>
<td>Magnesium-bound flooring compounds</td>
</tr>
</tbody>
</table>
B. ARBOCEL® in Construction Chemical Products (mineral or emulsion-bound) and Bituminous Products

B.3 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

Our experts will be happy to help you finding the optimum ARBOCEL® grade for your application.

B.4 General Correlation:

fiber length / effectiveness / mixing behavior:

<table>
<thead>
<tr>
<th>ARBOCEL® type</th>
<th>Fiber length</th>
<th>Effectiveness</th>
<th>Mixing behavior*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>In dry mixtures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In aqueous systems</td>
</tr>
<tr>
<td>BE 600/30 PU</td>
<td>Short ø 40 µm</td>
<td>Low</td>
<td>Very good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very good</td>
</tr>
<tr>
<td>BC 200</td>
<td>Medium ø 300 µm</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very good</td>
</tr>
<tr>
<td>B 400</td>
<td>Long ø 900 µm</td>
<td>Very good</td>
<td>not recommended</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
</tbody>
</table>

* If you have any difficulties blending ARBOCEL®, we will be happy to help you.
C. Mineral / Dry Systems

C.1 ARBOCEL® Grades Used:
The recommended grades used are ARBOCEL® BWW 40, ARBOCEL® FD 40, ARBOCEL® PWC 500 and ARBOCEL® ZZ 8/2 CA 1.

C.2 Blending Instructions for Dry Mixtures:
Short (40 µm - 120 µm) to medium-length (120 µm- 500 µm) ARBOCEL® fibers are usually easy to blend. If high-performance mixers with swirlers / cutter heads (e.g. Eirich, Lôdige, Drais or m-tec blades) are available, it is typically possible to blend ARBOCEL® long 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. If the original water/cement values need to be maintained, the increased water requirement due to ARBOCEL® must be compensated for by adjusting the proportion of cement or binder by weight.
C. Mineral / Dry Systems

C.4 Metering and Transport Options

The material handling characteristics of ARBOCEL® fibers are typically more difficult than that 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.

Problem
Where can metering / transport difficulties arise?

a.) in conical silos
   Problem: bridging

b.) on weighing machines
   Problem: danger of material accumulation

c.) in worm conveyors
   Problem

Solution

Solution 1

Solution 2a
Flap closed
Flap sideways opened
Flap completely opened

Solution 2b
Flap closed

Just ask JRS - we will be glad to help you finding a solution!
C. Mineral / Dry Systems

Solutions

JRS offers the following services:

a.) **Silo discharge modifications.** On request, JRS will supply complete silos with suitable discharge equipment.
b.) **Customer-specific supply and metering equipment,** can also be manufactured by JRS on request.
c.) **Modification of existing silos** (fitting of suitable discharge aids).
d.) **Specially modified ARBOCEL® grades** with optimized flow/metering properties.
e.) **Advice on the sizing and design of plant components** for bulk handling.
f.) **Planning, construction and commissioning of complete customized silo systems.**
C. Mineral / Dry Systems

C.5 Applications / Quantities Used

C.5.1 Cement tile adhesives

0.4 - 0.5 % ARBOCEL\textsuperscript{®} FD 40 or ARBOCEL\textsuperscript{®} BWW 40 by weight
0.3 - 0.4 % ARBOCEL\textsuperscript{®} ZZ 8/2 CA 1 by weight

Advantages with ARBOCEL\textsuperscript{®}:
- 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

a) Mineral stucco finish coats

0.4 - 1.0 % ARBOCEL\textsuperscript{®} PWC 500 or
ARBOCEL\textsuperscript{®} FI 540 CA by weight

Advantages with ARBOCEL\textsuperscript{®}:
- Good slump resistance
- Improved workability
- Inhibits cracking after application and during setting
- Improves texturing (clear contours)

b) Mineral insulating plasters

0.3 - 0.5 % ARBOCEL\textsuperscript{®} PWC 500 or
ARBOCEL\textsuperscript{®} ZZC 500 by weight

Advantages with ARBOCEL\textsuperscript{®}:
- Very good slump resistance
  (even when applied in thick coats)
- Improved workability
- Separation inhibitor for dry ready-to-use mixtures
C. Mineral / Dry Systems

c) Mineral stucco / plaster base coats

0.2 - 0.5 % ARBOCEL® PWC 500 or ARBOCEL® ZZC 500 by weight

Advantages with ARBOCEL®:
  – Easy to work when smoothing
  – Separation inhibitor for dry ready-to-use mixtures
  – Improves slump resistance


d) Mineral stucco / plaster light base coats

0.2 - 0.3 % ARBOCEL® PWC 500 or ARBOCEL® ZZC 500 by weight

Advantages with ARBOCEL®:
  – Easier to work when smoothing
  – Improves yield of the plaster
  – Separation inhibitor for dry ready-to-use mixtures
  – Longer life of worm conveyors
  – Improves slump resistance

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

Approx. 0.3 % ARBOCEL® PWC 500 or ARBOCEL® ZZC 500 by weight

Advantages with ARBOCEL®:
  – Good slump resistance
  – Improves working properties
  – Reduction of formulation costs
C. Mineral / Dry Systems

C.5.4 Joint fillers for plasterboards
0.5 - 1.0 % ARBOCEL® FD 40 or ARBOCEL® FD 00 by weight

Advantages with ARBOCEL®:
– Reduces cracking and shrinkage
– Improves workability
– Improves standability

C.5.5 Filler compounds and joint fillers
0.5 - 1.0 % ARBOCEL® FD 00 or ARBOCEL® FD 40 by weight

Advantages with ARBOCEL®:
– Reduces cracking and shrinkage
– Improves workability
– Improves standability

C.5.6 Pastes for heavy wallpapers
3.0 % ARBOCEL® BWW 40 by weight
5.0 % ARBOCEL® B 600 by weight

Advantages with ARBOCEL®:
– Improves workability
– Less tendency to splatter when being applied
– Formulation costs can be reduced
C. Mineral / Dry Systems

**C.5.7 Construction adhesives**
0.2 - 0.5 % ARBOCEL® ZZC 500 by weight

Advantages with ARBOCEL®:
- Improves workability
- Reduces tool sticking
- Optimizes formulation costs
- Improves slump resistance

**C.5.8 Extruded spacers for steel mats in concrete construction**
0.1 - 1.0 % ARBOCEL® ZZ 8/1 G by weight

Advantages with ARBOCEL®:
- Extrusion aid
- Improves slump resistance
- Formulation costs can be optimized

**C.5.9 Extruded cement profiles**
(e.g. window ledges)
3.0 - 5.0 % ARBOCEL® ZZ 8/1 G by weight

Advantages with ARBOCEL®:
- Extrusion aid
- Improves slump resistance

**C.5.10 Skim Coats**
1.0 - 3.0 % ARBOCEL® FD oo by weight

Advantages with ARBOCEL®:
- Suppresses cracking
- Improves working properties
D. Emulsion-Bound Systems / Paste Systems

D.1 ARBOCEL® Grades Used
ARBOCEL® BE 600/30 PU, ARBOCEL® B 00, ARBOCEL® BWW 40 and ARBOCEL® B 400

D.2 Mixing Notes
Blending ARBOCEL® fibers is usually 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. If dissolvers are used, it is recommended that ARBOCEL® be added at the end of the mixing process. Even small amounts of ARBOCEL® will significantly increase the viscosity of an emulsion-bound system. The longer the fibers of the ARBOCEL® type used, the greater is the viscosity increase.

D.3 Guidance Notes
The consistency of the ARBOCEL® formulation must be set for an optimum tradeoff between workability and slump resistance. Keep in mind that 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.
D. Emulsion-Bound Systems / Paste Systems

D.4 Applications / Quantities Used

D.4.1 Synthetic resin coatings

**Exterior use**: 0.2 - 0.4 % ARBOCEL® B 400 or ARBOCEL® BC 1000 by weight

**Interior use**: 0.5 - 2.0 % ARBOCEL® B 400 or ARBOCEL® BC 1000 by weight

Advantages with ARBOCEL®:
- Good slump resistance
- Improved workability
- Prevents cracking
- Very good texturing (clear contours)

D.4.2 Joint fillers for Plasterboards

0.5 - 1.0 % ARBOCEL® B 00 by weight

Advantages with ARBOCEL®:
- Reduces cracking and shrinkage
- Improves workability
- Improves standability

D.4.3 Emulsion tile adhesives

0.4 - 0.5 % ARBOCEL® BWW 40 or ARBOCEL® BC 200 by weight

Advantages with ARBOCEL®:
- Good slump resistance (no slipping of tiles)
- Improved workability

D.4.4 Emulsion fillers / joint filler compounds

0.5 - 0.8 % ARBOCEL® B 600 or ARBOCEL® B 00 by weight

Advantages with ARBOCEL®:
- Inhibits cracking and shrinking
- Improves workability
- Improves standability
D. Emulsion-Bound Systems / Paste Systems

D.4.5 Emulsion paints (semi gloss and matt)

a) Paints for airless spray application
1.0 - 5.0 % ARBOCEL® BE 600/30 PU by weight

Advantages with ARBOCEL®:
– Suppresses sheen
– Improves rheological properties
– Reduces density
– Inhibits cracking

b) Facade paints applied by roller or brush
0.5 - 3.0 % ARBOCEL® B 00 or ARBOCEL® BWW 40 by weight.

Advantages with ARBOCEL®:
– Improves rheological properties
– Suppresses cracking and shrinking
– Thicker applied coats

c) Crack-bridging reinforcing paints
0.4 - 0.8 % ARBOCEL® BC 200 or ARBOCEL® BC 1000 by weight

Advantages with ARBOCEL®:
– Crack suppression
– Improves rheological properties
D. Emulsion-Bound Systems / Paste Systems

Where else is ARBOCEL® used in paint applications?

- Emulsion paints
- Silicate paints
- Lime-cement paints
- Powder paints
- Paints with structure effects (wood fibres)

Applications and amounts in paint applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Recommended ARBOCEL® grade</th>
<th>Recommended average quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior emulsion paints, matt, applied by airless spray</td>
<td>BE 600/30 PU</td>
<td>1.0 - 5.0 %</td>
</tr>
<tr>
<td>Exterior emulsion paints, matt, applied by airless spray</td>
<td>BE 600/30 PU</td>
<td>0.5 - 2.5 %</td>
</tr>
<tr>
<td>Emulsion silicate paints</td>
<td>BE 600/30 PU</td>
<td>0.5 - 1.0 %</td>
</tr>
<tr>
<td>Emulsion powder paints (special full-tone powder paints)</td>
<td>BE 600/30 PU</td>
<td>5.0 - 8.0 %</td>
</tr>
<tr>
<td>Textured paints applied by rollers</td>
<td>BWW 40 B 00</td>
<td>0.5 - 3.0 %</td>
</tr>
<tr>
<td>Reinforcing paints</td>
<td>BC 200 BC 1000</td>
<td>0.5 - 3.0 %</td>
</tr>
<tr>
<td>Paints for road markings</td>
<td>BC 1000</td>
<td>0.4 - 0.8 %</td>
</tr>
</tbody>
</table>

For detailed information:
Please order pamphlet for emulsion paints
E-mail: industrie@jrs.de
Phone: + 49 (0) 7967 / 152 211
E. Bituminous Systems

E.1 ARBOCEL® Grades Used:

The grades most commonly used in the bitumen sector 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 for by the addition of a suitable filler.

ARBOCEL® cellulose fibers result in:

– Greater thickening
– Extremely good slump resistance even in hot environments (over 90 °C)
– 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, it is recommended that ARBOCEL® ZZC 500 be used. 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 larger the amount of ARBOCEL® used, the greater the cross-linking effect of the fiber structure formed. The fiber structure enhances the thermal resistance of the formulation.

– The fiber structure results in bitumen being deposited on the fibers.

– The shorter the average fiber length of the ARBOCEL® grade, the smoother the surface of the finished product.

– If dissolvers are used, we recommend that the fibers be added at the end of the blending process.

– With moderate to low-viscosity cold bitumen compounds, sedimentation may occur. This can be inhibited by stabilizers such as magnesium coated silicates or pyrogenic silicic acids.

– In the case of bitumen systems that are 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.

– It is also interesting to note 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.

Amount used:
0.8 - 3.0 % ARBOCEL® ZZ 8/1 G by weight

Advantages with ARBOCEL®:
– Increases heat resistance
– Replaces asbestos
– Improves working properties

E.3.2 Expansion Bands

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.

Quantity used:
approx. 5.0 - 8.0 % ARBOCEL® ZZ 8/1 G by weight

Advantages with ARBOCEL®:
– Greatly increases heat resistance
– Replaces asbestos
– Improves working properties
E. Bituminous Systems

E.3.3 Filling compounds / putty

3.0 - 6.0 % ARBOCEL® ZZ 8/1 G by weight
4.0 - 7.0 % ARBOCEL® ZZC 500 by weight for smoother surfaces

Advantages with ARBOCEL®:
– Replaces asbestos
– Greatly increases heat resistance
– Inhibits cracking

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

E.3.4 Medium and high-viscosity spray and brush-applied compounds

2.0 - 4.0 % ARBOCEL® ZZ 8/1 G by weight (brush-applied use)
3.0 - 5.0 % ARBOCEL® ZZC 500 by weight (spray-applied use)

Advantages with ARBOCEL®:
– Replaces asbestos
– Inhibits cracking
– Permits thicker coats to be applied in one process
– Greatly increases heat resistance of coats, i.e. no running down vertical walls
E. Bituminous Systems

E.3.5 Roof coatings (with or without aluminum)

2.0 - 6.0 % ARBOCEL® ZZC 500 or ARBOCEL® ZZ 8/1 G by weight

Advantages with ARBOCEL®:
- Replaces asbestos
- Greatly increases heat resistance
- Reduces tendency of aluminum particles (in product) to settle out
- In bitumen foils partial replacement of SBS possible

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). The rest of the material can then be added and blended. ARBOCEL® is usually used in anionic bitumen emulsions.
F. LIGNOCEL®

F.1 Application

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).

F.2 Smoothing Compounds

Approx. 30 - 40 % LIGNOCEL® C 120 by weight

Advantages with LIGNOCEL®:
- Improves working properties
- Makes for a more cost-effective filler

F.3 Magnesite-bound Flooring Compounds

Approx. 30 - 40 % LIGNOCEL® 9 by weight

Advantages with LIGNOCEL®:
- Stabilizes the mixture
- Reduces cracking during setting
- Promotes slow, uniform setting
G. SYLOTHIX® / ARBOTHIX®

Setting and thixotropic agents

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

<table>
<thead>
<tr>
<th>*ARBOTHIX® PE 100</th>
<th>SYLOTHIX® 51</th>
<th>SYLOTHIX® 52</th>
<th>SYLOTHIX® 53</th>
<th>*ARBOTHIX® PE 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber length</td>
<td>400 µm</td>
<td>400 µm</td>
<td>100 µm</td>
<td>300 µm</td>
</tr>
<tr>
<td>Portion of amorphous silicic acid (particle size 3 µm)</td>
<td>-</td>
<td>ca. 60 %</td>
<td>ca. 50 %</td>
<td>-</td>
</tr>
<tr>
<td>Humidity</td>
<td>max. 2 %</td>
<td>max. 3 %</td>
<td>max. 3 %</td>
<td>max. 2 %</td>
</tr>
<tr>
<td>Mixing ease</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>+++</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

SYLOTHIX® and ARBOTHIX® can become electrically charged as they flow from equipment. The product in dust form can form an inflammable and explosive mixture with air. SYLOTHIX® and ARBOTHIX® 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.

For detailed information:
Please order pamphlet for SYLOTHIX®
E-Mail: 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 (clumping).

The blending temperature should not exceed 110 °C.
Recommended dosage: 1 - 3 % by weight.
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