CIUR a.s.

ROAD CONSTRUCTION

Additives to asphalt mixtures from cellulose fibers

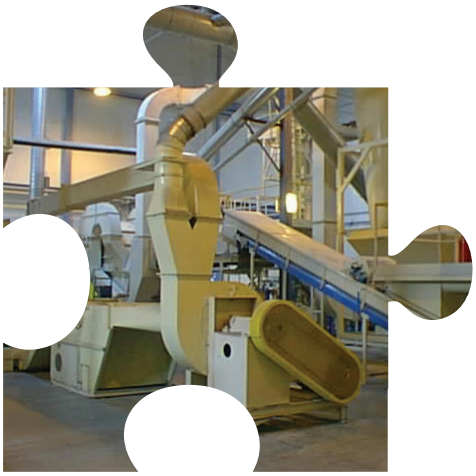
Cellulose fibre S-CEL 7®
Pelletised fibre S-CEL 7G®

Fibre Granules IMPROCEL®
Solutions with Additional Benefits

CIUR a.s. is a manufacturing company with a tradition of producing cellulose fibre since 1991.

Manufacturing began, with a focus on Climatizer Plus®, an insulation material for the building industry. In 1993 CIUR began developing cellulose fibres for industrial applications.

Since 1998 technology has been developed for a high quality specialized cellulose road fibre S-CEL 7® and also a pelletizing process for production of granules S-CEL 7G® used in road constructions worldwide. Both products have been highly succesful in the production of Stone Mastic Asphalt (SMA), an asphalt paving mixture used in road surfacing.



SMA can be used in numerous applications. Examples include: highly trafficked roads, highways, roads used frequently by heavy trucks, bridges, intersections, roundabouts, gradients, airport runways, parking lots, industrial sites and loading bays.

Typically, by weight, 0.3-0.4% of S-CEL 7® cellulose fibre is added during the manufacturing process, depending on the manufacturer's specifications.

What can be achieved by applying mastic asphalt carpet with fibre S-CEL 7®:

- Durability
- Water resistance
- Dimensional stability even at high loads
- Maintaining adequate surface roughness
- Low noise
- High abrasion resistance

- Allows an increase in bitumen content
- Stabilizes the asphalt mixture even with a higher bitumen content
- Improves workability of the mixture during laying
- Improves thermal resistance

TECHNICAL PARAMETERS S-CEL 7®

Fibre length	
over 1.2 mm	approx. 30 %
between 0.76 to 1.5 mm	approx. 50 %
to 0.75 mm	approx. 20 %
average	approx. 1.1 mm
Thickness of the fibre	approx. 35 - 45 µm
Bulk density	approx. 40 kg/m^3
pH factor	7.5 +/- 1
Ash content % by weight	20 +/- 5
Average moisture	less than 5.5 % of weight
Appearance	grey fibre
Recommended dosage	3 - 4 kg / 1 t of mixture

TECHNICAL PARAMETERS S-CEL 7G®

Average length of the fibre	approx. 1.1 mm
Thickness of the fibre	approx. 35 - 45 µm
Bulk density	approx. 420 - 520 kg/m^3
pH factor	7.5 +/- 1
Average moisture	less than 5.5 % of weight
Appearance	grey - brown granules
Granule diameter	6 mm
Average length of granules	2 - 10 mm
Recommended dosage	3 - 4 kg / 1 t of mixture

Processing of S-CEL 7®

- Cellulose fibre supplied in small low melt bags of 1-4 kg is intended for use in mixing plants with a batch type mixing (low melt bags added directly into the SMA mixer).

- Cellulose fibre in big-bag packaging is suitable for mixing plants with automatic high-capacity fibre dosage (fibre added via a blowing machine).

Processing of S-CEL 7G®

- Granulated cellulose fibre in low melt bags of 1-10 kg is intended for use in mixing plants with a batch type mixers without automatic dosing (low melt bags added directly into SMA mixer).

- Cellulose fibre granules in big-bag packaging or storage silo. Suitable for mixing plants with high capacity automatic granule dosing systems - batch type and also continuous mixing plants.

Benefits

- **Uses 100% post-consumer waste product**
- **Provides greater surface area and strength**
- **Stabilizes binding agent (Bitumen) by helping to maintain its viscosity and reducing its drainage (known as “drain down”)**
- **Improves workability of the mixture during laying**
- **Can be used in noise reducing asphalt**
- **Improves durability of the wearing course**
- **Increase in water restistance**
- **Reduction in rutting and improved stability on high trafficked roads**
- **Recognized as the most cost-efficient and effective fibre filler for SMA applications**
- **Meets ISO 9001 quality requirements**

Quality Assurance

CIUR is fully committed to providing a first class, high quality service to all our customers from initial enquiry through to delivery and beyond.

All CIUR’s products are manufactured under stringent conditions to very high standards thereby ensuring consistent produce quality and performance. Current CIUR Company Certification includes ISO9001:2008 (Quality Management), ISO14001:2004 (Environmental Management) and OHSAS 18001:2007 (Occupational Health and Safety Management).

Storage

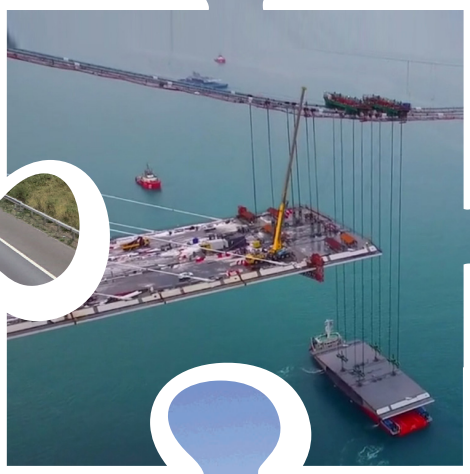
Cellulose fibre is produced from recycled paper and therefore should always be stored under cover and away from standing water and ignition sources. Do not use cellulose fibre if it is wet or has been wet and has subsequently dried out.

Proven, approved and recommended right across Europe

Germany

Czech Republic

Great Britain



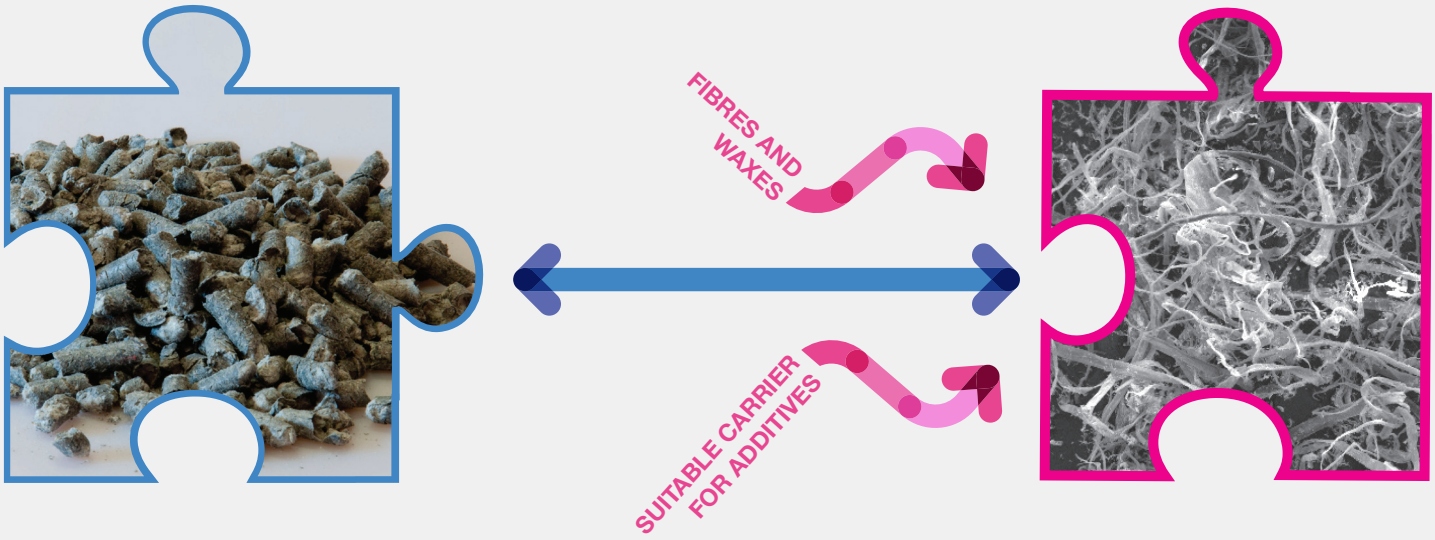
Turkey

Russia

Slovak Republic

IMPROCEL®

Composite Products = “Multiple Benefits in 1 pellet“

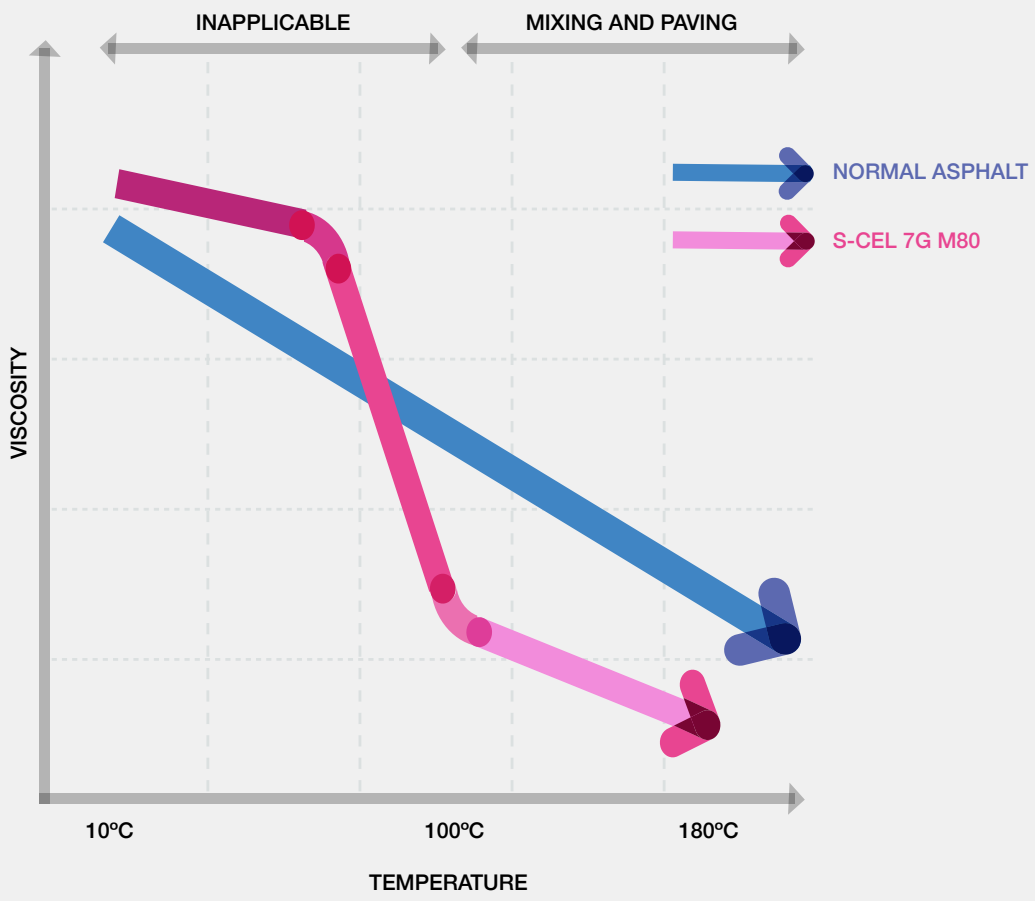


PRODUCTS ATRIBUTES for wax composites (e.g. IMPROCEL® WM80)

- Fibre as carriers for the additives as well as to control the flow behavior of the bitumen
- Improve performance of the bitumen and resulting asphalt
- Reduce viscosity at temperatures > 120°C
- Keep the mixing temperature low to increase softening point
- Improve wetting properties, compatibility and adhesion of the bitumen to minerals rich in SiO2
- Pellet with very good flow characteristics for automated dosage systems
- Delivery in small batch-sized bags, big-bags and road tankers for bulk silo storage
- Mainly automated dosing out of small to large storage silos
- Distribution of the waxes and fibres during the dry-mixing stage
- Immediately effective when the addition of bitumen starts (same as using common cellulose fibres)
- Technical advantages with regard to safer and faster fibre distribution
- Modify only just quantities you need, e.g. necessary for the areas with higher demands in application performance or maintenance quantities

Benefits of wax composites (e.g. IMPROCEL® WM80)

- Improvement in the **stability** of the asphalt mixture
- **Improvement of the properties** of the binder and the resulting mixture
- **Reduction of the viscosity** at temperatures of > 120°C
- **Improving of the adhesion** of the binder to aggregates rich in SiO_2
- Maintaining of the **low mixing temperature** to increase the softening point
- Roads can be put into **operation earlier** - paved asphalt has lower temperature
- **Technology improvement** - to facilitate work on mixing plants
- **Compaction aid** - with the advantage of lowering the temperature a better compaction behavior can be achieved especially for: manual paving, bad weather conditions, thin layers, asphalt with known difficult compaction
- **Less ageing** inclination of the binder - the lower production and paving temperature reduce the rate of oxidation in the binder
- Lower material wear on the plant parts, **lower energy consumption**, lower CO_2 emissions
- The possibility to modify only the required amount - for example in small batch plants



MIXING

Possibitity of reducing the mixing and paving temperature >20°C

PAVING & COMPACTION

Reduced paving temperatures
Reduced emmissions
Easy manual handing

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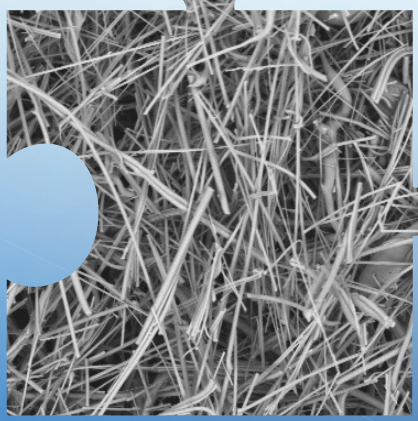

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