# CFF GmbH & Co. KG

Natural cellulose fibres in dispersion paints

# Fact & figures CFF GmbH & Co. KG

# CFF location

# Experience in Cellulose Fibres

- ✓ Founded in 1977
- ✓ 105 employees
- ✓ 45.000 tons of production output/ year
- ✓ Sales expectation 2017 ~ 40 Mio. EUR
- ✓ Sales & Logistics in more than 75 countries

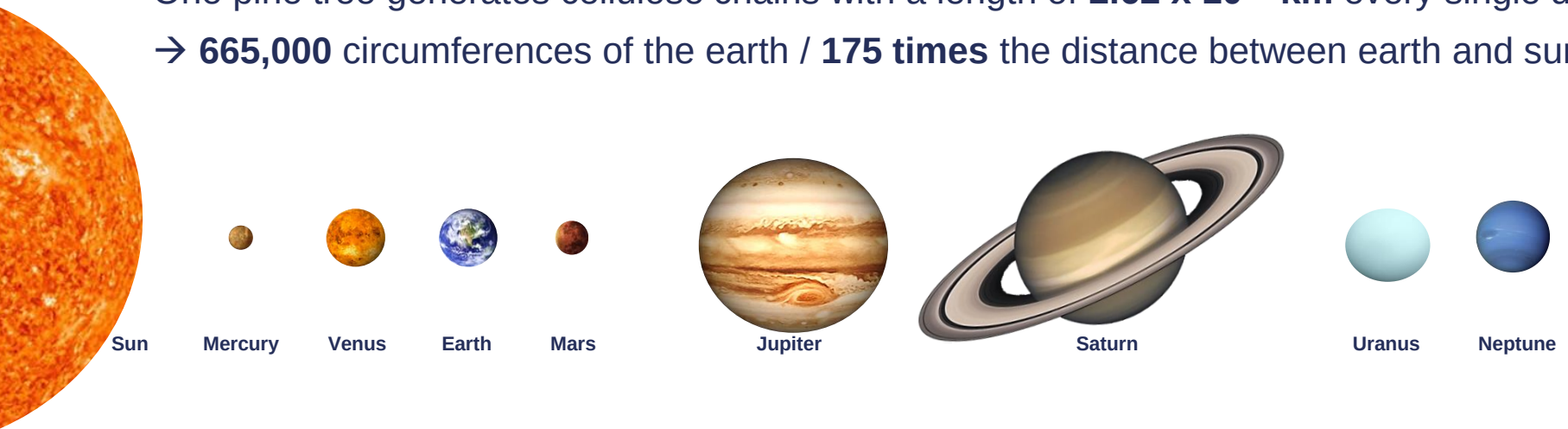
# Quality certified production process

- ✓ DIN EN ISO 9001:2015
- ✓ DIN EN ISO 22000:2005
- ✓ HACCP
- ✓ DIN EN ISO 50001:2011

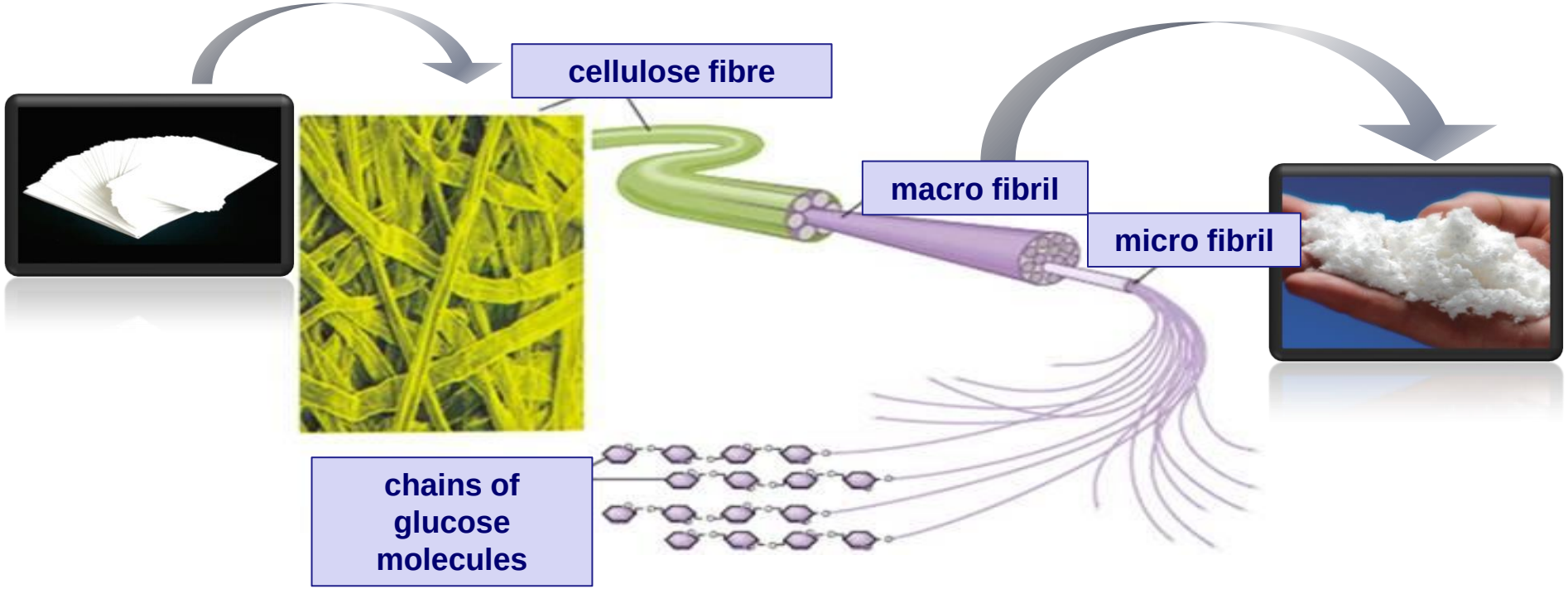
# Cellulose – world‘s most abundant polymer

- ✓ a pine tree generates **13.7 g** cellulose per day
- ✓ 13.7 g cellulose – 51 sextillion glucose molecules – 2.62 x $10^{10}$ km

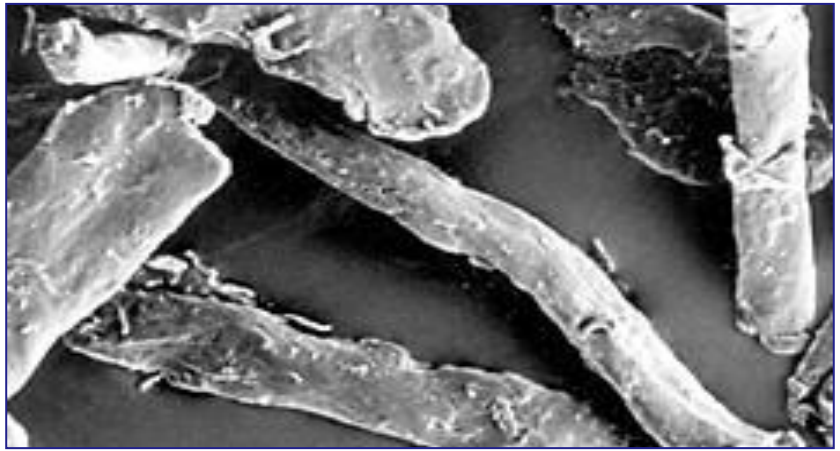
- ✓ One pine tree generates cellulose chains with a length of **2.62 x $10^{10}$ km** every single day!
  → **665,000** circumferences of the earth / **175 times** the distance between earth and sun!

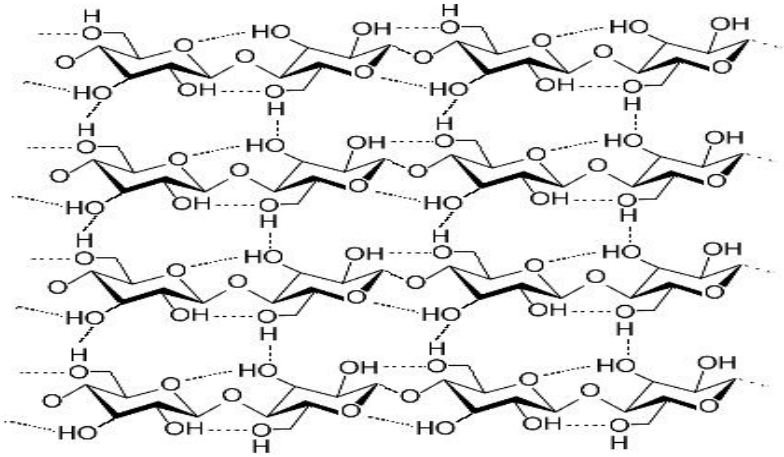


# Cellulose fibres - appearance & characteristics



# Cellulose fibres - appearance & characteristics





# Pure cellulose fibres – basic information

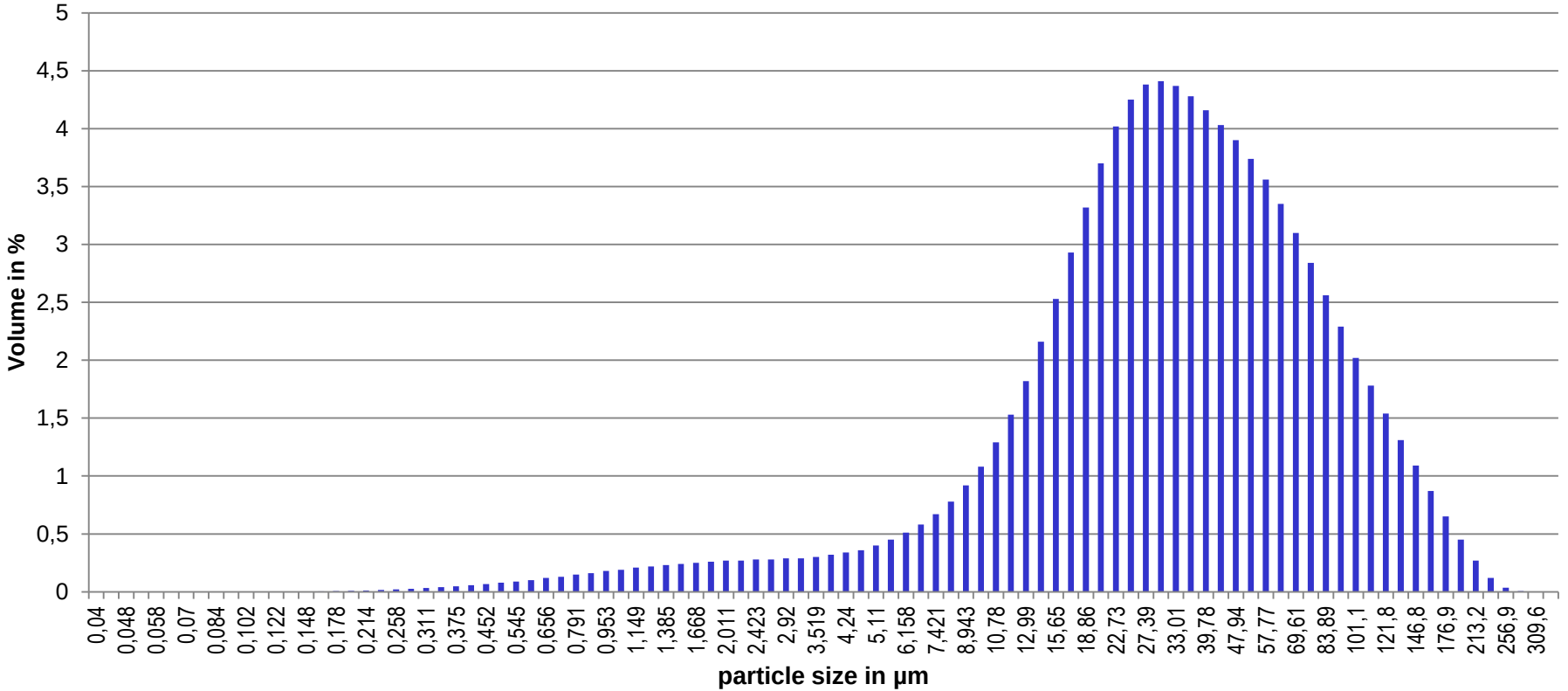
## External production (raw material)

- Wood
- Cooking
- Clean cellulose
- Bleaching
- Hot steam drying
- Packing in plates
- Raw cellulose plates

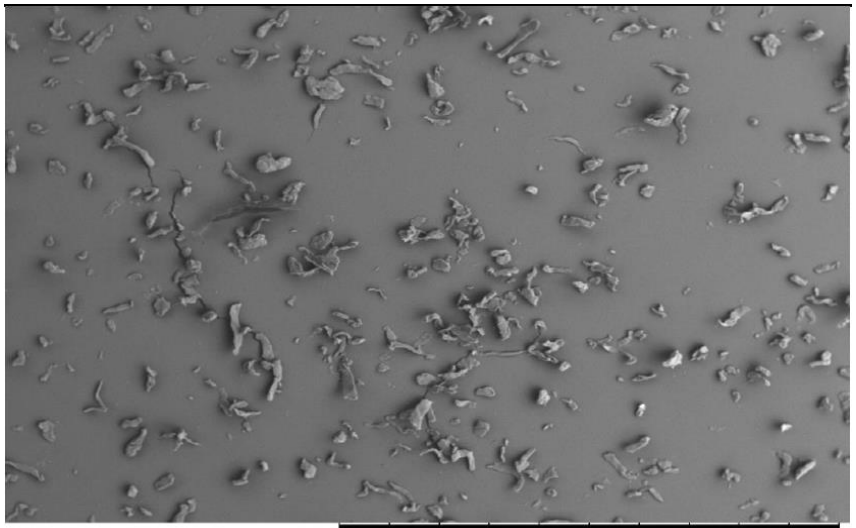
## Internal production (CFF)

- Raw cellulose plates
- Milling 1. step
- Milling 2. step
- Fine millling
- Sieving / pelletising
- Packing

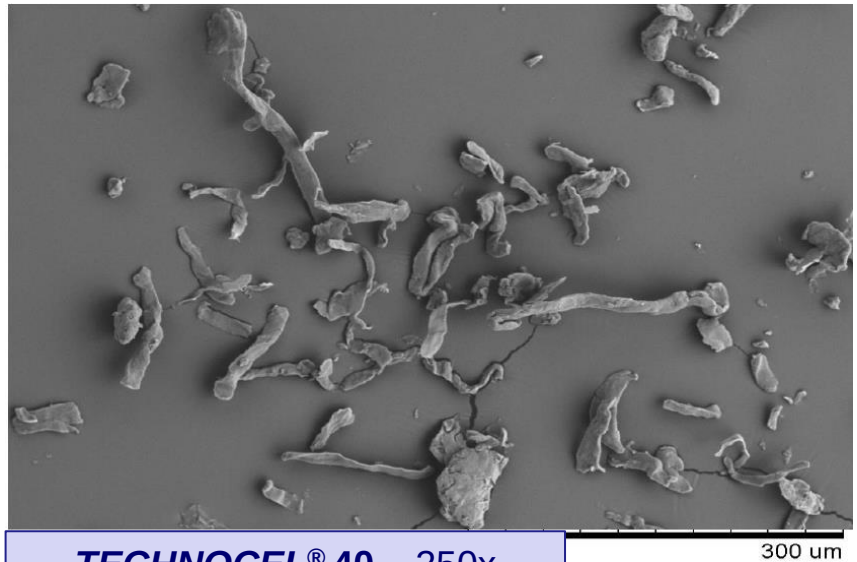
# Particle distribution *TECHNOCEL*® 40



# Microscopic pictures *TECHNOCEL*® 40




***TECHNOCEL*® 40** 100x




***TECHNOCEL*® 40** 250x

# *TECHNOCEL*® pure series

| Brand name | Appearance | | | | | | | Ø length | White-ness | Bulk density | Water binding cap. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | White | Off-white | Grey | Beige | Pow-dery | Cubic | Fibrous | µm | % | g/l | % |
| *TECHNOCEL*® FM8 | • | | | | • | | | 6-12 | > 80 | > 150 | ~ 390 |
| *TECHNOCEL*® 10 | • | | | | • | | | ~ 18 | > 80 | < 300 | ~ 360 |
| *TECHNOCEL*® 40 | • | | | | • | | | ~ 40 | > 80 | > 200 | ~ 380 |
| *TECHNOCEL*® 50G | • | | | | | • | | ~ 50 | > 80 | > 280 | ~ 350 |
| *TECHNOCEL*® 75 | • | | | | • | | | ~ 60 | > 80 | > 150 | ~ 470 |
| *TECHNOCEL*® 150 | • | | | | • | | | ~ 120 | > 80 | > 130 | ~ 520 |
| *TECHNOCEL*® 180 | • | | | | • | | | ~ 200 | > 80 | > 110 | ~ 540 |
| *TECHNOCEL*® 200 | • | | | | | | • | ~ 300 | > 80 | > 60 | ~ 780 |
| *TECHNOCEL*® 200G | • | | | | | • | | ~ 300 | > 80 | > 300 | ~ 360 |
| *TECHNOCEL*® 300 | • | | | | | | • | ~ 500 | > 80 | > 35 | ~ 940 |
| *TECHNOCEL*® 1000 | • | | | | | | • | ~ 700 | > 80 | > 30 | ~ 1030 |
| *TECHNOCEL*® 2500 | • | | | | | | • | ~ 2000 | > 80 | > 35 | ~ 840 |
| *TECHNOCEL*® 2500-1 | • | | | | | | • | ~ 900 | > 80 | > 20 | ~ 1330 |

# *TECHNOCEL*® technical series

| Brand name | Appearance | | | | | | | Ø length | White-ness | Bulk density | Water binding cap. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | White | Off-white | Grey | Beige | Pow-dery | Cubic | Fibrous | µm | % | g/l | % |
| ***TECHNOCEL*® 75-1** | • | | | | • | | | **~ 60** | **> 80** | **> 150** | **~ 490** |
| ***TECHNOCEL*® 75-2** | | • | | | • | | | ~ 60 | > 74 | > 200 | ~ 360 |
| ***TECHNOCEL*® 150-1** | • | | | | • | | | ~ 120 | > 80 | > 130 | ~ 500 |
| ***TECHNOCEL*® 90-2** | | • | | | • | | | ~ 150 | > 65 | < 180 | ~ 490 |
| ***TECHNOCEL*® 150-2** | | • | | | • | | | ~ 250 | > 65 | < 150 | ~ 390 |
| ***TECHNOCEL*® 165** | | • | | | • | | | ~ 250 | > 74 | > 70 | ~ 600 |
| ***TECHNOCEL*® 200-1** | • | | | | | | • | ~ 300 | > 80 | > 40 | ~ 740 |
| ***TECHNOCEL*® 500-1** | | • | | | | | • | ~ 300 | > 74 | > 60 | ~ 620 |
| ***TECHNOCEL*® 500-1L** | | • | | | | | • | ~ 500 | > 74 | > 50 | ~ 690 |
| ***TECHNOCEL*® 1000-1** | • | | | | | | • | ~ 800 | > 80 | > 30 | ~ 850 |
| ***TECHNOCEL*® 1000-1W** | • | | | | | | • | ~ 800 | > 85 | > 30 | ~ 940 |

# Pure cellulose fibres - appearance & characteristics

- ✓ odour- and tasteless
- ✓ white colour
- ✓ temperature-stable (up to 200°C)
- ✓ insoluble in water
- ✓ high water and oil retention

# Pure cellulose fibres - appearance & characteristics

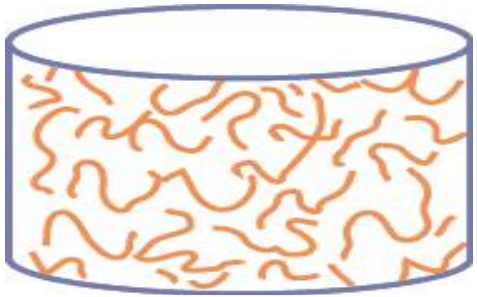
- ✓ high tensile strength
- ✓ physiologically and toxicologically harmless
- ✓ chemically inert

# Main characteristics of cellulose fibres in final products

- ✓ Building of a 3-dimentional fibre network
- ✓ Absorption & retention of water
- ✓ Structural viscosity

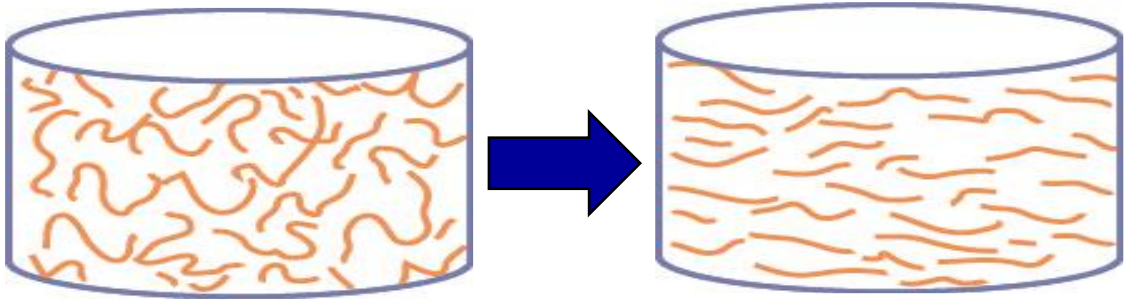
# *TECHNOCEL*® improves the rheological properties:

high viscosity in the unmoved fibre system



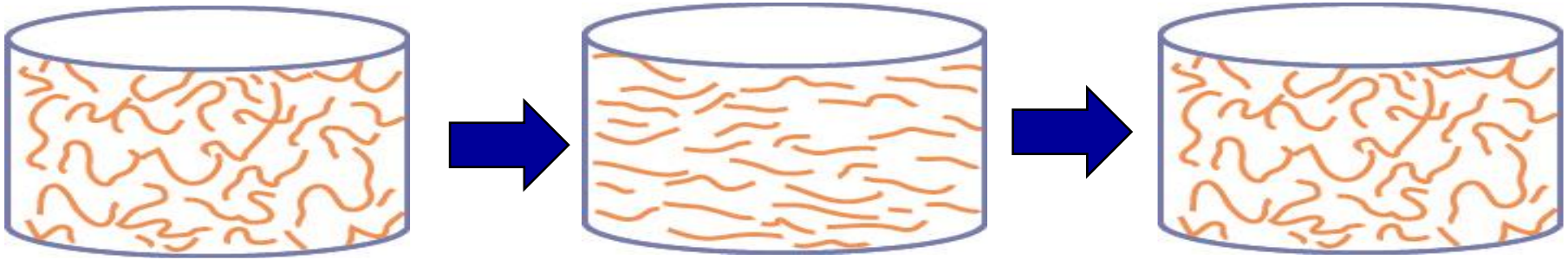
# *TECHNOCEL*® improves the rheological properties:

- ✓ breaking of the fibre network
- ✓ viscosity decreases by pumping, mixing/ blending
- ✓ fibres order in the direction of the flow



# *TECHNOCEL*® improves the rheological properties:

- ✓ rest position: increased viscosity state



# *Which TECHNOCEL® fibre is the right one?*

**As long as possible – as short as necessary**

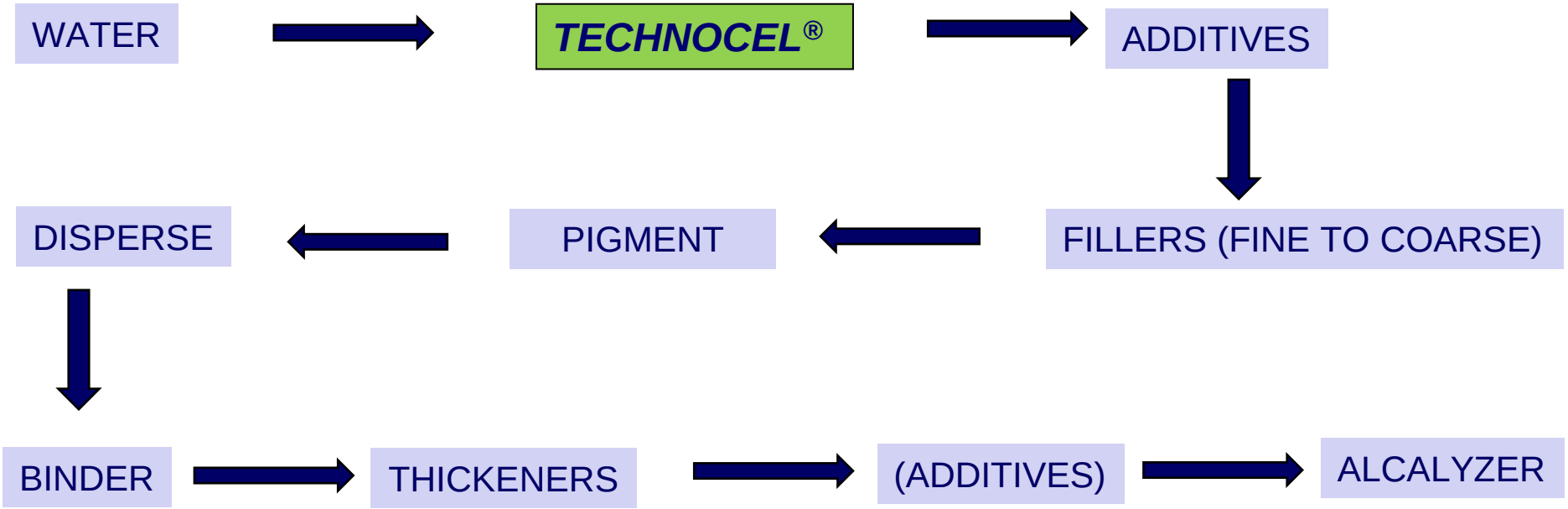
The reinforcing- effectiveness of the fibre and the water binding capacity increases exponential with the fibre length

# How to choose the right *TECHNOCEL*® for your application:

## Further points to consider:

- What is the final application in detail
- Which conditions during application ( e.g. sprayable)
- further demands( e.g. dosage & mixing)

# Addition of ***TECHNOCEL®*** during mixing



# Advantages of *TECHNOCEL*® in paints:

- ✓ improvement of rheology
- ✓ reduced density & surface sheen
- ✓ tarnishing effect
- ✓ **improved scrub resistance**
- ✓ suppression of micro cracks
  → thicker wet film layers possible

# Advantages of *TECHNOCEL*® in paints:

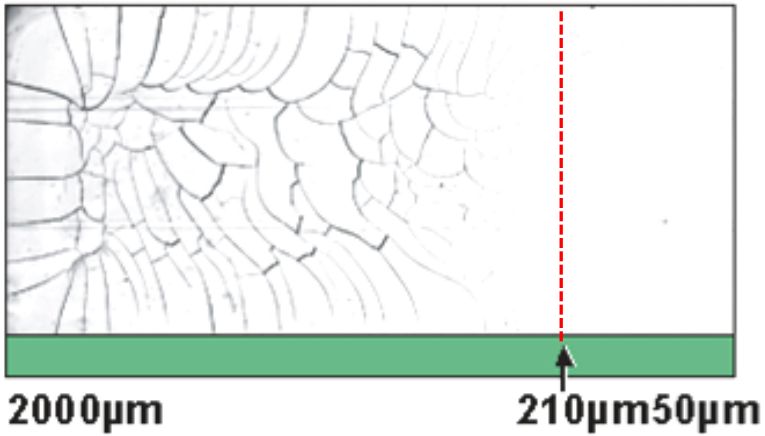
- ✓increased impact resistance
- ✓ less slipping of roller
- ✓improves spatter suppression
- ✓constant & even drying
- ✓increases the amount of water needed due to water retention of the fibres

**→ lower weight per liter paint!**

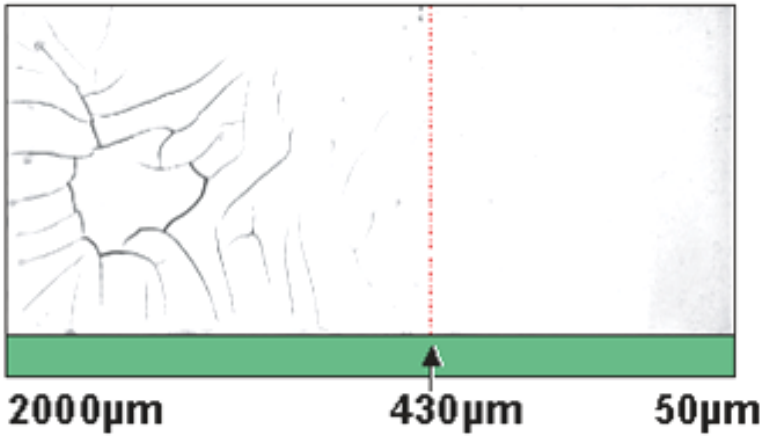
# *TECHNOCEL*® in powder paints:

- ✓ Less time for mixing
- ✓ Fast wetting
- ✓ Improvement of color acceptation
- ✓ Excellent rub out
- ✓ Better scrub resistance
- ✓ Reduction of splash
- ✓ Better dispersion
- ✓ Higher water addition rate

# Mud cracking + Layer thickness

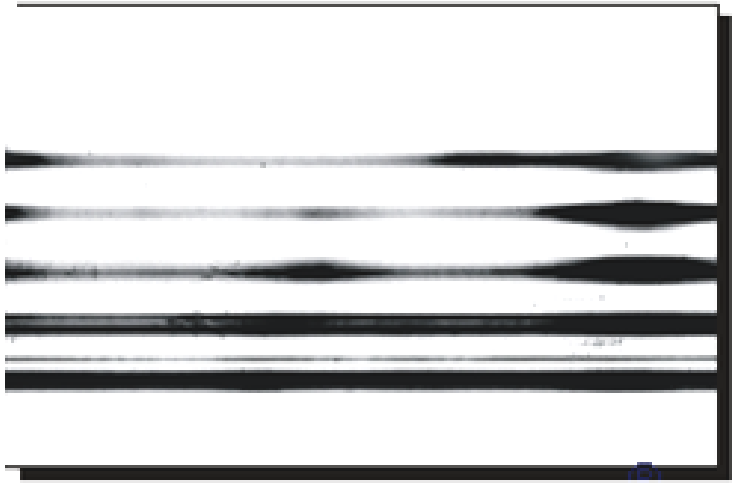



without ***TECHNOCEL®***




5% ***TECHNOCEL® 40***

# **Improved wet scrub resistance -** DIN 53778



without ***TECHNOCEL®***

5% ***TECHNOCEL®* 40**

# Splash suppression/ reduction

without ***TECHNOCEL®***

Usage of 5% ***TECHNOCEL® 40***

# *TECHNOCEL®*

## Formulation example dispersion paint

| Pos. | Product | weight particles |
|---|---|---|
| 1 | Slaked lime | 2,0 |
| 2 | Talcum powder | 100,0 |
| 3 | Calciumcarbonat < 0,9 µm | 180,0 |
| 4 | Titandioxid | 75,0 |
| 5 | *TECHNOCEL®* 40 | 50 - 60,0 |
| 6 | Dispersion/ binder | 120,0 |
| 7 | Film bonding agent | 20,0 |
| 8 | Methylhydroxyethylcellulose | 4,0 |
| 9 | Dispersion agent | 2,5 |
| 10 | Netting agent | 0,5 |
| 11 | Air entrainer | 3,0 |
| 12 | Calciumcarbonat < 12 µm | 433,0 |
| | TOTAL | 1000 |

# Recommended *TECHNOCEL®* types

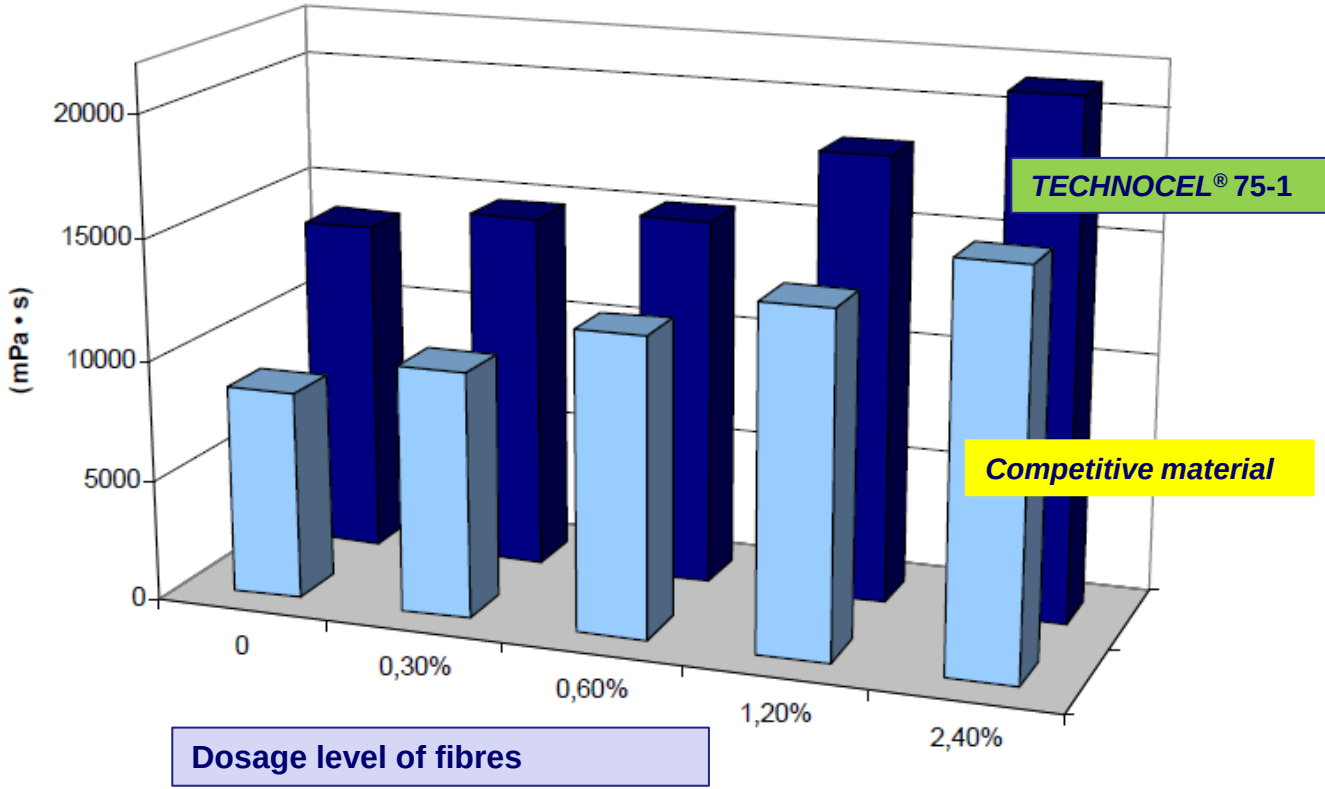
| application | recommended fibre grade | Dosage recommended |
|---|---|---|
| emulsion paints indoors and outdoors<br>(airless-sprayed or roller applied)<br>emulsion silicate paints<br>emulsion powder paints | ***TECHNOCEL®* 40**<br>***TECHNOCEL®* 75/ 75-1**<br>***TECHNOCEL®* 150/ 150-1**<br>***TECHNOCEL®* 180**<br>***TECHNOCEL®* 165/ 500-1** | **1,0% - 5,0 %** |
| structured paints | ***TECHNOCEL®* 150/ 150-1**<br>***TECHNOCEL®* 180**<br>***TECHNOCEL®* 200/ 200-1**<br>***TECHNOCEL®* 165/ 500-1** | **0,5% - 3,0 %** |
| reinforcing paints<br><br>road marking paints | ***TECHNOCEL®* 300**<br>***TECHNOCEL®* 1000/ 1000-1** | **0,5% - 3,0 %**<br><br>**0,5 – 0,8 %** |

# ***TECHNOCEL®*** formulation example & comparison

**Paint SOP 60%; dry residue of 45%**

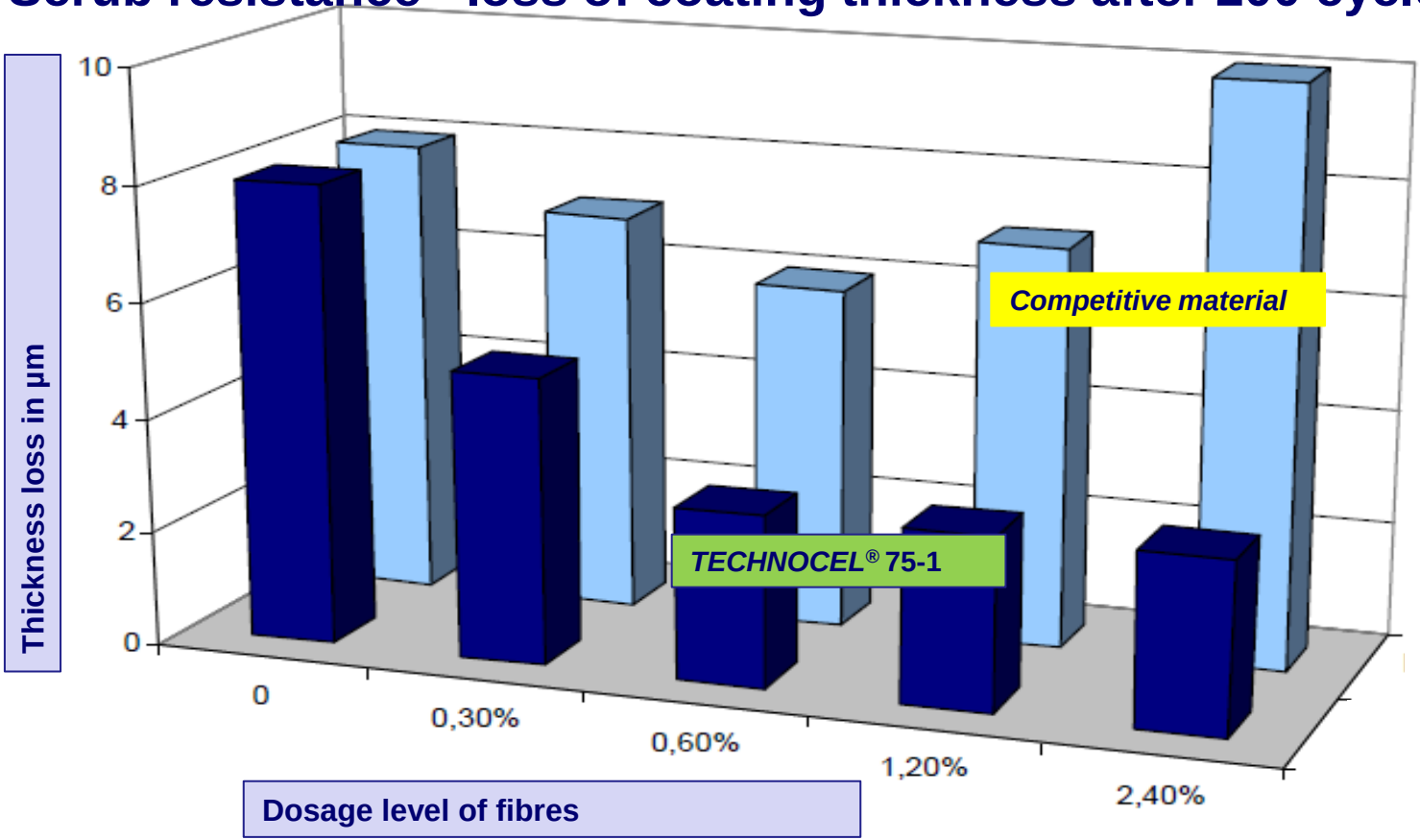
- ✓ white titanium in SOP 69.7%
- ✓ Tylose HS 30,000 YP2 - cellulose ether
- ✓ Revacryl AE 3723 - polymer dispersion
- ✓ ***TECHNOCEL®* 75-1** fibers Formulation ratio: 0.3%; 0.6%; 1.2%; 2.4%

# Viscosity 3 days after preparation

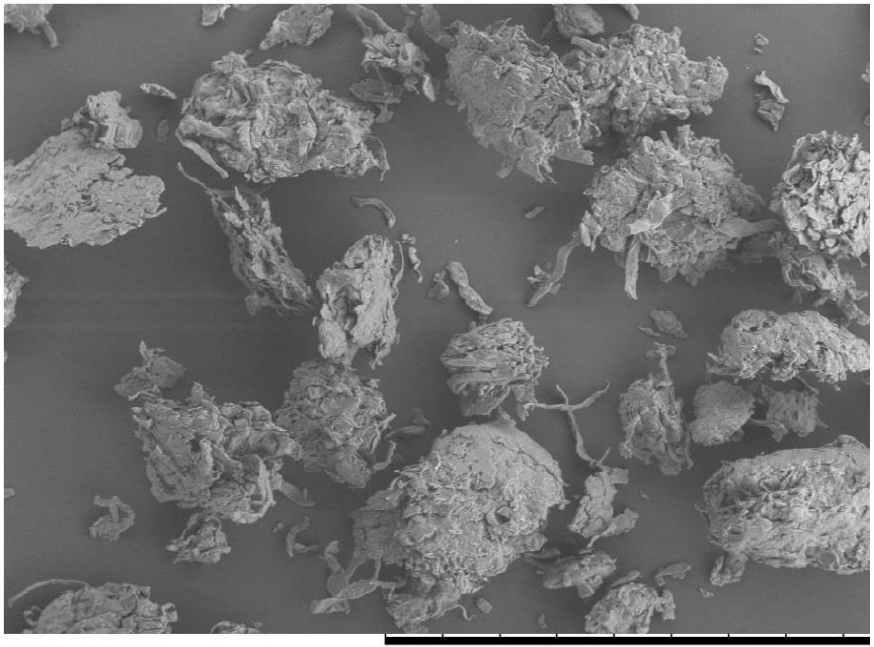


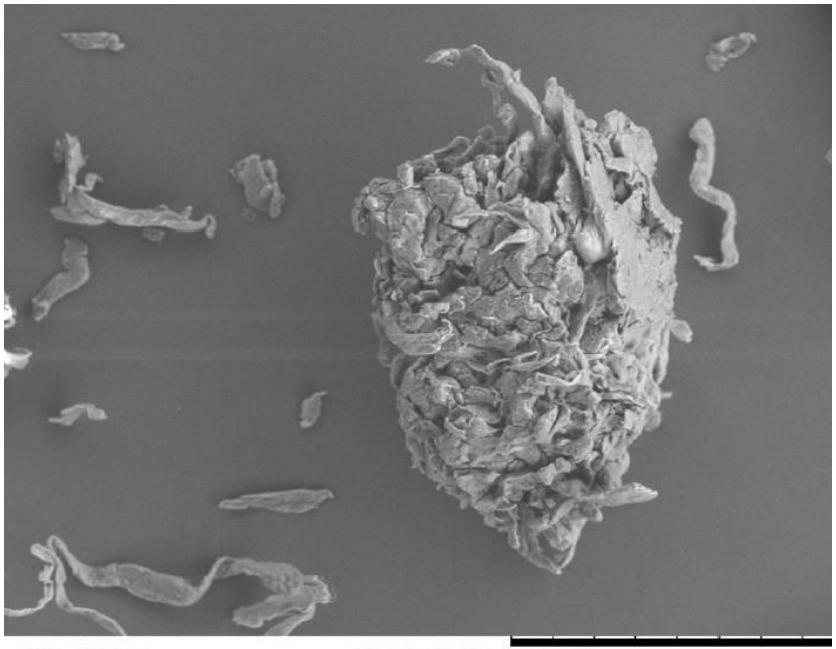

**Determination of apparent viscosity according to ISO 2012 Impeller no. 05 at 20 rpm**

# Scrub resistance - loss of coating thickness after 200 cycles



# New Products – *TECHNOCEL*® granules

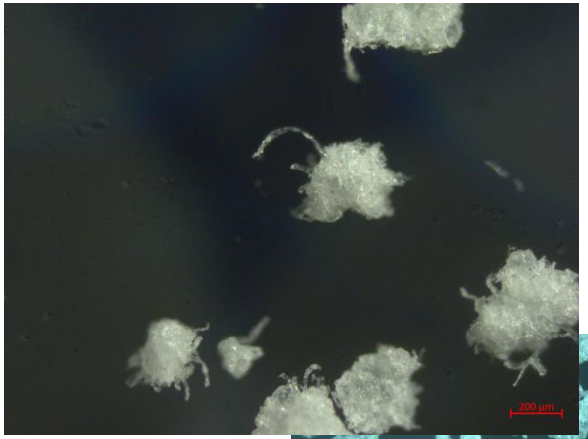


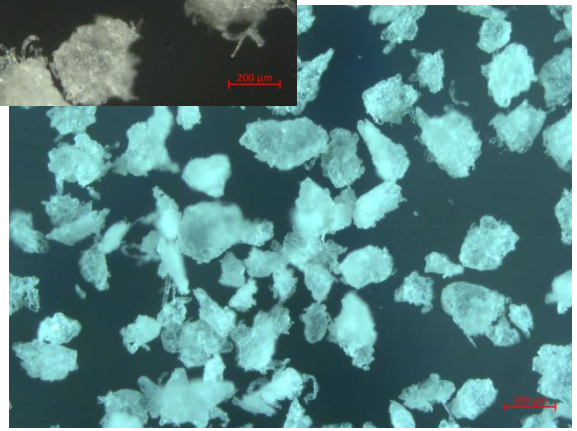



# New Products – *TECHNOCEL*® granules

NEW

- ✓ Defined & stable particles
- ✓ Applicable for “soft touch” surfaces & rough surface appearance
- ✓ Available in various sizes



# New Products – *TECHNOCEL*® FM8


- ✓ Ultra fine cellulose 6µm -12µm

  for varnishes and coatings

- ✓ For non transparent varnishes,

  increasing layer thickness, less cracking and shrinkage

# *CFF* „Your strong partner“


**CFF GmbH & Co. KG**

**Arnstaedter Straße 2**

**98708 Gehren**

**www.cff.de**

**Tel.: +49 36783 882-0**

**Fax: +49 36783 882-252**