

# GREEN PRODUCTS

SUSTAINABLE ADDITIVES  
FOR A WIDE RANGE OF APPLICATIONS



**GLOBAL  
PORTFOLIO**



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# MÜNZING CREATING SUSTAINABLE VALUE



Sustainability comprises an important part of our corporate strategy, we consider it to be our driving force to develop the best possible solutions. As a company of the chemical industry with energy intensive processes, we are aware of the responsibility we have towards our environment and our society.

Sustainability has been a deeply rooted topic for the MÜNZING group since the company was founded in 1830. Through our innovative strength, we have continued to develop over the years and always adhere to our sustainable values along the three pillars of sustainability: Economy, Environment and Society.

Our sustainability strategy is inspired by our guiding principle "Creating Additive Value". We create sustainable products and technologies to support global efforts to reduce energy, minimize emissions and usage of resources to help our customers  
CREATING SUSTAINABLE VALUE!

In order to do so, we constantly work on increasing the amount of products in our portfolio which have renewable raw materials and/or are biodegradable. Furthermore, we are doing research to enlarge the recycled inputs on the MÜNZING products and developing a method to determine CO<sub>2</sub>-footprint at product level.

Approximately 20% of our worldwide employees are working in the fields of development and application technology. Through constant investment in these fields, we want to strengthen our competence so that we can offer high-quality additives to our customers for their current products and future developments, tailored to their needs.



# Test method: Renewable organic carbon content according to ASTM D6866

When cosmic radiation hits nitrogen molecules in our atmosphere, the  $^{14}\text{N}$  isotope converts into a  $^{14}\text{C}$  isotope. These  $^{14}\text{C}$ -containing molecules enter the biomass cycle through processes such as the photosynthesis of plants and, in further steps, through the intake of these plants as food for humans and animals. In this way, the  $^{14}\text{C}$  isotopes accumulate in all living organisms (renewable materials) to a specific  $^{14}\text{C}$  content, which corresponds to the  $^{14}\text{C}$  composition in our atmosphere. However, these  $^{14}\text{C}$  isotopes are unstable and decay radioactively with a half-life of about 5700 years. In dead organisms (fossil-based material), no further  $^{14}\text{C}$  isotopes are accumulated and the  $^{14}\text{C}$  content decreases over time due to radioactive decay. Since raw materials based on crude oil or natural gas

already have had a lifetime of more than 50,000,000 years, they do no longer contain any measurable amount of  $^{14}\text{C}$  isotopes due to radioactive decay. This means, if no  $^{14}\text{C}$  content can be detected in a specific product, the raw material source of this product is based on a fossil feedstock.

Accelerator Mass Spectrometry (AMS) is a measurement method for determining the content of  $^{14}\text{C}$  isotopes in a sample. The results can be used to prove that the ingredients of a specific product originate from living organisms (renewable materials), such as plant-based resources. For this purpose, the AMS method according to ASTM D6866 has established itself as an industrial standard in recent years and can be carried out by numerous testing institutes.

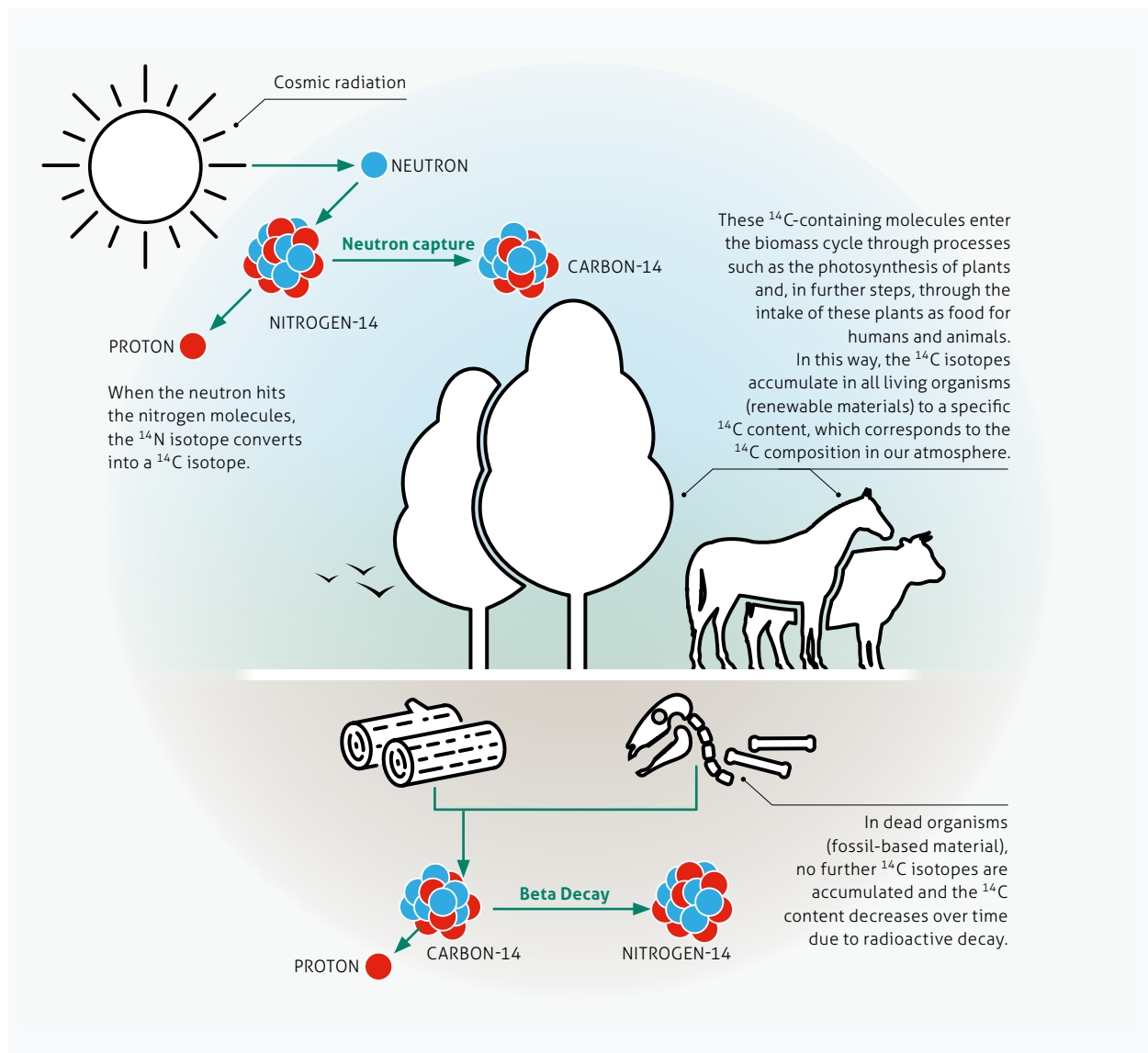


Figure 1 | Renewable organic carbon content

## Schematic product composition

Taking a deeper look into MÜNZING additives, the ingredients of those products can be divided into neutral substances (carbon-free ingredients such as water, SiO<sub>2</sub> etc.), and carbon-containing substances. Furthermore, according to their feedstock origin, the carbon-containing substances can be separated into fossil carbon-containing substances, and renewable carbon-containing substances. The figure shows the composition of an exemplary MÜNZING additive. In this example, the content of neutral substances and fossil carbon-containing substances is 25% each. The content of

renewable carbon-containing substances is 50%, and the additive therefore has a renewable content of 50%. By measuring the <sup>14</sup>C content of the sample via AMS according to ASTM D6866, only the carbon-containing components are considered. Therefore, the amount of the detectable renewable carbon-containing substances in the sample will be 66%. This content corresponds to the 50% renewable content based on a total of 75% carbon-containing ingredients of the exemplary MÜNZING additive shown in the figure.

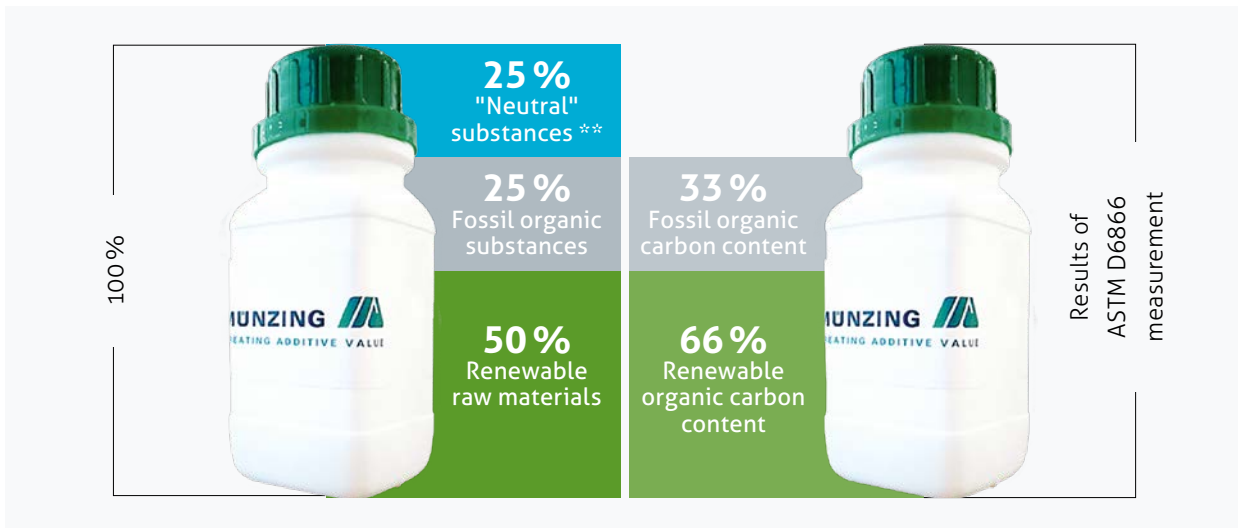


Figure 2 | Schematic product composition

\*\* e.g. water, ammonia, SiO<sub>2</sub>

## Test method: Biodegradability according to OECD 301 F


























The biodegradability of a substance can be determined by several methods. MÜNZING agreed on applying the OECD 301 F test method as a company-wide standard. The data provided in this brochure is based on tests according to this specific test method we carried out ourselves.

The OECD 301 F is a manometric respirometry test which is suitable for compounds which are poorly soluble, highly soluble, volatile or adsorbing. Since the MÜNZING portfolio contains products with a wide variety of physical properties, it was important to choose a test with large applicability. The test substance and mineral medium is inoculated with defined microorganisms

and stored in a closed bottle at constant temperature. The oxygen consumption of the microorganisms during the test period is measured to determine how much test substance was metabolized. While the produced carbon dioxide is absorbed in a liquid phase, the consumed oxygen is measured by a decrease in gas pressure within the closed bottle. The biodegradability is expressed as the percentage of actual consumed oxygen in relation to the chemical oxygen demand (COD).

A substance is readily biodegradable according to OECD 301 F if there is ≥60% removal of COD reached in a 10-day window within the 28 days testing period.

# Green Products















| Product                      | Chemistry                                   | "Neutral" substances <br>Fossil substances <br>Renewable substances  | Renewable organic carbon<br>content in %<br>according to<br>ASTM D6866* | Readily biodegradable<br>according to<br>OECD 301 | Adhesives &<br>Heatseal   | Architectural<br>Coatings   |
|------------------------------|---|---|---|---|---|---|
| <b>DEFOAMER</b>              |   |   |   |   |   |   |
| AGITAN® 271                  | Vegetable oil,<br>polyoxalkylene            |    | 45–55   | no  |    |    |
| AGITAN® 301                  | Vegetable oil,<br>few silicone              |    | 85–95   | yes   |    |   |
| AGITAN® 352                  | Vegetable oil,<br>polyoxalkylene            |    | 50–60   | yes   |    |    |
| <b>POWDER DEFOAMERS</b>      |   |   |   |   |   |   |
| AGITAN® P 841                | Vegetable oil,<br>polyglycols on<br>carrier |    | 50–60   | yes   |   |  |
| <b>DISPERSING AGENTS</b>     |   |   |   |   |   |   |
| EDAPLAN® 397 R               | Polyglycol ester                            |    | 90–100  | yes   |   |  |
| <b>WETTING AGENTS</b>        |   |   |   |   |   |   |
| METOLAT® 367 R               | Ester                                       |    | 90–100  | yes   |   |  |
| METOLAT® 368                 | Ester                                       |    | 90–100  | yes   |  |  |
| METOLAT® 388 R               | Nonionic<br>compounds                       |    | 90–100  | yes   |  |  |
| <b>POWDER WETTING AGENTS</b> |   |   |   |   |   |   |
| METOLAT® P 588               | Polyglycol ester<br>on carrier              |    | 50–60   | yes   |   |  |

**\*Certificate is available on request**

The information and values provided in this brochure are given in good faith based on our professional know-how and test results, but without warranty. Our advice does not release you from the obligation to verify the information provided.

| Building & Construction (Products) | Energy & Oilfield | Industrial Coatings | Laminates | Paper | Printing Inks | Water treatment & Process Water | Wood Coatings | Wood Panels | Properties   |
|------------------------------------|-------------------|---------------------|-----------|-------|---------------|---------------------------------|---------------|-------------|--|
|                                    | ●                 | ●                   |           | ●     |               |                                 |               |             | Excellent stability, high efficiency, alkali and acid resistant, pH-range between 3 and 12.  |
|                                    |                   |                     |           | ●     |               | ●                               |               |             | Nonionic structure, excellent compatibility with binders, easy to incorporate, suitable for food contact applications.   |
|                                    |                   | ●                   |           | ●     | ●             |                                 | ●             |             | Excellent stability, high efficiency, alkali and acid resistant, pH-range between 3 and 12.  |
| ●                                  | ●                 |                     |           |       |               |                                 |               |             | Mineral oil and silicone free, strong fluidization properties, very smooth surfaces (exposed concrete), aids color development.  |
|                                    |                   |                     |           |       | ●             |                                 |               |             | Dispersing of phthalocyanine pigments and selected organic pigments, especially for water-based systems, but also suitable for non water-based systems, for food contact applications.       |
|                                    |                   | ●                   |           |       | ●             |                                 |               |             | Compatibility agent, wetting of pigments and fillers, strong reduction of dynamic surface tensions.  |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | Nonionic, silicone free wetting agent for water-based systems, improves substrate wetting and leveling, strong reduction of dynamic surface tension, suitable for food contact applications. |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | Compatibility agent, wetting of pigments and fillers in aqueous and non-aqueous systems, low foaming.  |
| ●                                  |                   |                     |           |       |               |                                 |               |             | Accelerated wetting of solid particles, faster wetting of pigment surface, increases color strength, homogeneous distribution of pigments, improves surface aspect.                          |

# Green Products

| Product                   | Chemistry        | "Neutral" substances <br>Fossil substances <br>Renewable substances  | Renewable organic carbon<br>content in %<br>according to<br>ASTM D6866* | Readily biodegradable<br>according to<br>OECD 301 | Adhesives &<br>Heatseal  | Architectural<br>Coatings   |
|---------------------------|------------------|--|---|---|--|---|
| <b>RHEOLOGY MODIFIERS</b> |                  |  |   |   |  |   |
| TAFIGEL® PUR 54 R         | Polyurethane     |   | 80-90   | no  |   |    |
| TAFIGEL® PUR 64 R         | Polyurethane     |   | 50-60   | no  |   |    |
| TAFIGEL® PUR 82 R         | Polyurethane     |    | 90-100  | no  |  |   |
| <b>MICRONIZED WAXES</b>   |                  |  |   |   |  |   |
| CERETAN® MA 7020          | EBS              |   | 90-100  | no  |  |   |
| CERETAN® MA 7020 (V)      | EBS              |   | 90-100  | no  |  |   |
| CERETAN® MA 7050          | EBS              |   | 90-100  | no  |  |   |
| CERETAN® MA 7050 (V)      | EBS              |   | 90-100  | no  |  |   |
| CERETAN® MBP 00125        | Biopolymer       |   | 90-100  | yes   |  |  |
| CERETAN® MBP 20220        | Biopolymer       |   | 90-100  | yes   |  |  |
| CERETAN® MC 6015          | Carnauba         |   | 90-100  | no  |  |   |
| CERETAN® MXBP 60125       | Functional blend |   | 90-100  | no  |  |  |

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|                                    |                   |                     |           |       |               |                                 | ●             |             | Thickening independent of pH, good flow, leveling and gloss; good spatter resistance; very good colour acceptance on tinting; easy handling due to low viscosity.   |
| ●                                  |                   | ●                   |           |       |               |                                 | ●             |             | High sag resistance, good leveling, excellent atomization during spray application, pH-independent thickening effect.   |
|                                    |                   |                     |           |       | ●             |                                 |               |             | Thickening independent of pH, excellent flow, leveling and gloss, good spatter resistance, excellent color acceptance on tinting, suitable for indirect food contact applications.  |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | To improve matting, scratch resistance, slip and anti-blocking properties. Degassing agent for powder coatings.   |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | To improve matting, scratch resistance, slip and anti-blocking properties. Degassing agent for powder coatings. Vegetable version of CERETAN® MA 7020.  |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | To improve matting, scratch resistance, slip and anti-blocking properties. Degassing agent for powder coatings.   |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | To improve matting, scratch resistance, slip and anti-blocking properties. Degassing agent for powder coatings. Vegetable version of CERETAN® MA 7050.  |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | Additive to improve anti-blocking, abrasion resistance and matting. Good sandability and hot block resistance because of duroplastic behaviour.   |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | Improvement of surface slip, anti-blocking and rub resistance. For powder coatings it is suitable as degassing and leveling agent.  |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | The product is a micronized spherical carnauba wax which improves slip and gloss properties as well as scratch resistance.  |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | The addition of CERETAN® MXBP 60125 results in good scratch and abrasion resistance properties as well as low COF. Depending on the applied film thickness the micronized wax is also used for matting and anti-blocking effects. |

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|-------------------------------------|--------------------------------|---|---|---|---|---|
| <b>OPEN TIME ADDITIVES</b>          |                                |   |   |   |   |   |
| LUBRANIL® N 20                      | Functional blend               |    | 90–100  | yes   |   |    |
| LUBRANIL® VP 100                    | Functional blend               |    | 90–100  | yes   |   |    |
| OMBRELUB® 730                       | Derivatives of fatty compounds |    | 40–50   | yes   |   |    |
| <b>WAX DISPERSIONS</b>              |                                |   |   |   |   |   |
| LUBA-print® WBP 2700                | Natural wax blend              |    | 80–90   | yes   |   |   |
| LUBA-print® WBP 00125               | Biopolymer                     |    | 90–100  | yes   |   |  |
| LUBA-print® 164/R                   | Amide wax                      |    | 80–90   | no  |  |   |
| LUBA-print® 164/H                   | Amide wax                      |    | 80–90   | no  |  |   |
| WÜKONIL® NAT 1000                   | Natural wax blend              |    | 90–100  | yes   |   |  |
| <b>RELEASE AND ANTI-DUST AGENTS</b> |                                |   |   |   |   |   |
| FENTAK® PR30352                     | Fatty acid formulation         |    | 90–100  | yes   |   |   |
| FENTAK® PR31225                     | Wax dispersion                 |    | 90–100  | no  |   |   |
| FENTAK® IR32801                     | Calcium stearate dispersion    |    | 85–95   | yes   |   |   |
| FENTAK® MR30301N                    | Fatty acid formulation         |    | 60–70   | yes   |   |   |
| FENTAK® GE19200                     | Wax emulsion                   |    | 70–80   | yes   |   |   |

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|------------------------------------|-------------------|---------------------|-----------|-------|---------------|---------------------------------|---------------|-------------|---|
|                                    |                   |                     |           |       |               |                                 |               |             | The LUBRANIL® N 20 prolongs the open time, it improves the workability, reduces pinholes and prevents cracks.   |
|                                    |                   |                     |           |       |               |                                 |               |             | The LUBRANIL® VP 100 prolongs the open time, it improves the workability, reduces pinholes and prevents cracks.   |
|                                    |                   |                     |           |       |               |                                 |               |             | Prolongation of open-time, reduction of cracks, improvement of processing properties.   |
|                                    |                   |                     |           |       | ●             |                                 |               |             | The addition of the LUBA-print® WBP 2700 results in good rub resistance and slip without a strong impact on gloss.  |
|                                    |                   | ●                   |           |       | ●             |                                 | ●             |             | Additive to improve anti-blocking, abrasion resistance and matting. Good sandability and hot block resistance because of duroplastic behaviour.   |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | The product is used to improve slip, anti-blocking and scratch resistance in coatings. It can be also used as pelletizing aid for non-sticking, free flowing powders.   |
|                                    |                   |                     |           |       |               |                                 |               |             | The product is used as pelletizing aid for non-sticking, free flowing powders.  |
|                                    |                   | ●                   |           |       |               |                                 | ●             |             | Additive to improve the hydrophobicity, slip and anti-blocking. The advantage compared to paraffin is the higher melting point which reduces the tendency for dirt pick up and gives also an improvement in scratch resistance. |
|                                    |                   |                     | ●         |       |               |                                 |               |             | Internal release agent for phenolic resins  |
|                                    |                   |                     | ●         |       |               |                                 |               | ●           | Internal release agent for phenolic resins  |
|                                    |                   |                     | ●         |       |               |                                 |               |             | Internal release agent for urea or melamin resins   |
|                                    |                   |                     | ●         |       |               |                                 |               |             | Leveling and anti-dust additive   |
|                                    |                   |                     | ●         |       |               |                                 |               | ●           | External release agent for several thermosetting and thermoplastic resins   |



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