Omya Multifill®

The roadmap to higher mineral contents
**Omya Multifill®** is an integral concept to optimize your paper – in quality, in performance and in costs.

By systematically combining the creative skills of our research and development laboratories, the process expertise of our paper application teams and the process flexibility of our GCC and PCC installations, the new **Omya Multifill®** concept takes the calcium carbonate filler loading to the next level.

**Omya Multifill®** carefully organizes and structures the application of different filler level-boosting technologies in a manner that optimizes the impact of each technology component in a synergistic fashion.

The **Omya Multifill®** concept is based on the four steps:

- Filler type optimization
- Omya surface filling technology
- Chemical treatment
- New technologies

Each step can help you to increase the filling level of your paper. The maximum increments are visualized in the following graph:

<table>
<thead>
<tr>
<th>Step</th>
<th>Filler Optimization</th>
<th>Surface Filling</th>
<th>Chemical Treatment</th>
<th>New Technologies</th>
</tr>
</thead>
<tbody>
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![Graph showing additional filling levels](graph.png)
**Filler type optimization**

The first step within the Omya Multifill® concept is to ensure that the actual filler type is properly adjusted to the paper grade.

Should the evaluation show that this is not the case, an alternative filler with different pigment characteristics like morphology, particle size distribution or surface area will be recommended to meet the requirements.

Thanks to their flexibility, the PCC and GCC plants of Omya are generally prepared to undertake such changes.

Depending on the paper grade, this first step alone can often help lifting the filler level in the sheet by 1 to 3 %.
Omya surface filling technology

The second step towards higher filler levels is to introduce the surface filling technology. In this case fine calcium carbonate is applied to the metering size press. The benefit of this technology is that the application of additional pigment is not interfering with the hydrogen bonds responsible for the strength properties of the paper. The pigment particles penetrate through the surface into the sheet, thereby filling the voids between the fiber matrix. Surface filling is therefore a convenient way of rising the paper’s mineral content up to additional 3 % in average.

For a 80 g/m² woodfree copy paper quality the surface filling technology was applied with the following results:

- Energy savings
- Basic system with no additional chemistry
- Reduced porosity
- No impact on strength (initial wet web and final)
- No negative impact on stiffness
- Slightly improved printability (offset and inkjet)
Chemical treatment of fillers

The third step involves a review of the wet-end chemical strategy, including an evaluation of the technical/eco-
nomical feasibility of pre-flocculating the filler from step 1 with a polymer, e.g. starch or synthetic binder prior

to the wet-end addition.

The concept of this technology is to form calcium carbonate aggregates which are resulting in a reduced dis-
turbance of the fiber-fiber bonds and thus leads to a higher strength potential which can be utilized to increase

the filler load further.

When properly combined with step 1 and 2, the filler pre-flocculation has a potential of increasing the calcium
carbonate content in the paper sheet up to additional 8 %.

For a 80 g/m² woodfree copy paper quality the pre-flocculation technology was applied with the following
results:

- Slightly reduced stiffness
- Reduced bulk at equal roughness
- Similar opacity and light scattering
- Similar internal bond
- Unchanged formation and brightness
- Unchanged tensile and tear
- Reduced energy and fiber consumption
- Optimized productions costs
Application Examples

New technologies

With its new family of Omya Multifill® high-performance pigment polymer hybrids as the Omya PPH, Omya is able to push the limits of the possible mineral content in papers to previously unseen levels. Omya PPH uses, specially designed polymers which are bonded permanently to the calcium carbonate particles. These stable complexes can better withstand the shear forces typical during the paper making process, compared to what was possible with previous technologies.

The following application study demonstrates the usage of the mineral based additive as a tool to increase filler level by 10 %. The mill scale trial was done on a single coated and calendered quality at a final weight of 100 g/m²:

- Improved internal bond
- Slightly lowered retention
- Reduced blade load
- Energy savings (refining and drying)
- Creation of barrier properties
- Improved smoothness
- Identical calendar load
- Improved gloss
- Reduced dusting
- Reduced total costs

The first generation of pigment polymer hybrids, Omya PPH, is already available. Stay tuned for new developments with the Omya Multifill® concept.