

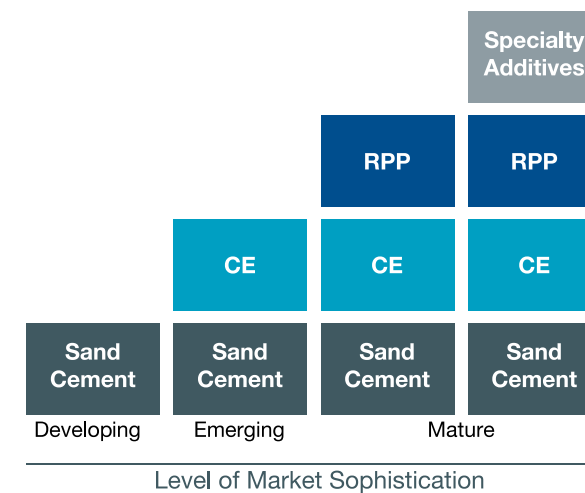
Living in green buildings
Our sustainable solutions



Experience the difference

The rapid pace of change in today's construction industry requires the continuous development of new high performance products which improve the quality and sustainability of building materials.

The dry mix mortar industry has experienced a continuous change over the years in meeting the ever increasing needs of the modern construction industry. The change is most visible in the evolution of the dry mix mortar formulations and several steps in formulation complexity development can be clearly seen:



As an integrated supplier of the essential ingredients for dry mix mortars components (cellulose ethers, redispersible polymer powders and specialty additives), Akzo Nobel understand the technical and sustainable benefits these products provide to our customers and to the en-

tire construction industry; benefits which we summarize in three pillars and which we integrate into our product development process. It is our understanding that these three pillars also drive the growth of the construction chemicals industry:

- Ecology and prolonged lifetime
- Consistency of Quality
- Efficiency in application and logistics



The three pillars that define sustainability for the Building & Construction business of AkzoNobel.

Flooring – smooth surfaces and excellent indoor air quality



Building and construction development worldwide stimulates demand for more thin, smooth, and durable flooring materials with low chemical emissions that contribute to a more sustainable future for our planet. As an innovative leader, AkzoNobel Performance Additives for Building & Construction are constantly developing sustainable products with improved performance features that not only reflect the use of energy-efficient manufacturing technologies, but also meeting green building requirements.

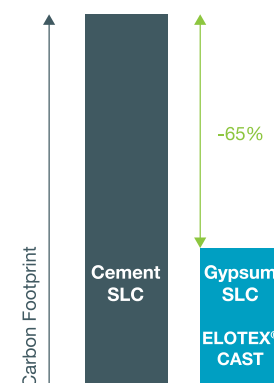
Reducing CO₂ emission

Considering that cement production is highly energy intensive and accounts for around 8% of global carbon dioxide (CO₂) emissions, integrating environmentally friendly building materials, such as gypsum, into building projects helps to reduce greenhouse gas emissions. Gypsum, with its low carbon footprint and large availability, allows builders and architects to achieve green building objectives associated with the transport, fabrication, recycling, and disposal of these building materials.

However, the usage of calcium sulfate like beta-hemihydrate, multiphase gypsum and synthetic anhydride for self-leveling compounds and screeds has been very limited since it was not possible to reach the proper flow and leveling properties. AkzoNobel provides a unique solution to implement these gypsum types to flooring applications.

ELOTEX® CAST specialty additives in powder form have been launched with a view to facilitate dry mortar producers to use – for the first time – all types of calcium sulfate gypsums. This is a clear step towards sustainable flooring applications and reduction of CO₂ footprint of dry mortar flooring formulations.

Use of gypsum based flooring reduces the CO₂ footprint by 65% compared to cement based systems.



ELOTEX® CAST700 and CAST710 provide multiple benefits:

- The use of sustainable raw materials
- Save time, costs and logistics
- Excellent self-leveling properties
- Ideal rheology profile
- Stabilizing effect and a smooth surface
- Improved strength
- Simplified product formulations and ease of handling

Indoor air quality

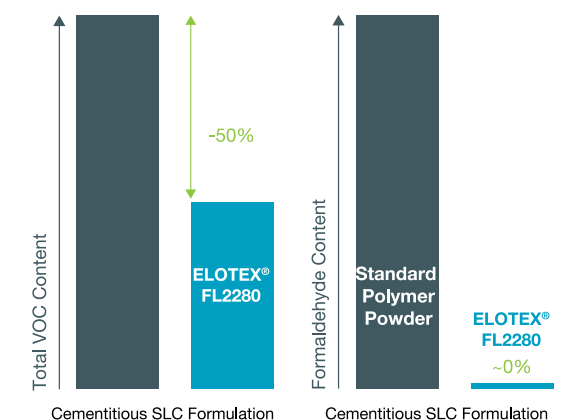
Modern societies, on average, spend the vast majority of their time indoors where they are repeatedly exposed to indoor air pollutants. Floors take up a huge surface area in buildings and thus the emitted Organic Volatile Compounds (VOC) will have an outsized effect on indoor air quality. Our flooring additives will help you reaching the highest indoor environmental requirements and may support your building projects meeting international green building standards, e.g. LEED, BREEAM.

ELOTEX® FL2200 and FL2280 redispersible polymer powders for self-leveling dry mix flooring compounds will ensure excellent self-leveling effect, surface appearance and hardness. Both products are manufactured using formaldehyde free technology, making it an environmentally friendly industrial process, and making the products ideal for indoor use. The enable users to formulate finished

products with very low VOC emission in compliance with highest environmental standards, e.g. European eco-labels such as EMICODE® EC1^{PLUS} and Blue Angel.

ELOTEX® FL2200 and FL2280 provide multiple benefits:

- Formaldehyde free RPP product with extremely low VOC emissions
- Allows to formulate according to EMICODE® EC1^{PLUS} requirements
- Excellent leveling effects and high surface abrasion resistance
- Good rheology and workability
- Superior surface appearance
- Good compatibility to differing qualities of other formulation ingredients



Tiling and Grouting – environmentally friendly



As the pressure to reduce CO₂ emissions in cement production increases, the trend to produce and use different cement qualities with lower CO₂ footprint intensifies. This trend is visible in the dry mix mortar production by the use of composite cements. Use of AkzoNobel's redispersible polymer powders and cellulose ethers ensures the same, high performance of tile adhesives, no matter what cement quality is used for the formulation.

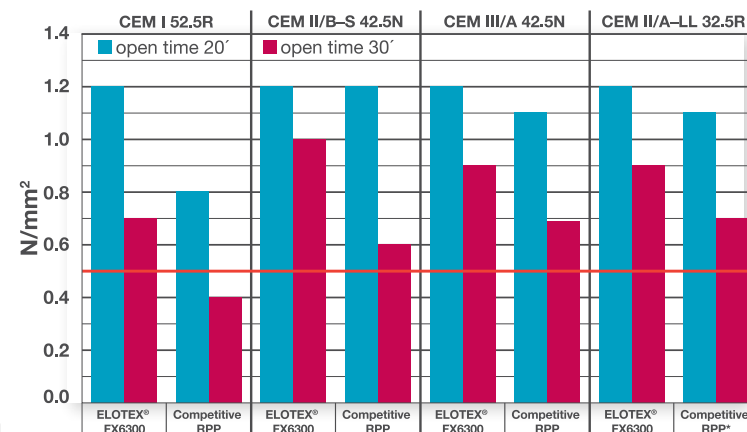
The powerful combination of ELOTEX® FX6300 polymer powder and Bermocoll® MT 500 cellulose ether allows you to achieve an easier formulation with high end product performance, no matter what cement quality you use. Here are a few of the extensive opportunities you can reach when using ELOTEX® FX6300 and Bermocoll® MT 500 are:

- Excellent adhesion bond strength onto different substrates including plywood, cement boards, tiles and other materials
- High wet strength adhesion values
- Increase of elastic behavior and increased flexibility
- Prolonged open time of the adhesive ensuring efficient and simple application of the tiles

Furthermore, the combination of ELOTEX® FX6300 and Bermocoll® MT 500 allows you to reach optimum performance on the next generation of Tile Adhesive Mortars. Aligning with our sustainability drive, you are able to obtain longer open time and increased adhesion and meet the

new tough ANSI and ISO specifications – ensuring durability and the lifetime of the bond, eliminating the need for frequent refurbishment and saving on raw materials.

ELOTEX® FX6300 in combination with different cement qualities



* RPP = Redispersible Polymer Powder

Waterproofing – resistant and durable



The need for efficient infrastructure is rising, and further challenges like sufficient supply of drinking water or intelligent use of limited water resources are part of everyone's sustainability values. Waterproofing solutions come as a very important aspect for safe and durable construction, as well as environmental protection. Polymer modified dry mix 1-component cementitious waterproofing membranes are state of the art waterproofing solutions. They are durable solutions superior to traditional cement-only and bitumen seals, and demonstrate environmental benefits over 2-components dispersion based systems.

As a leader in the Dow Jones Sustainability Index, we are committed to deliver sustainable solutions. Therefore we have designed state of the art ELOTEX® redispersible polymer powders for waterproofing applications.

With the use of our ELOTEX® FX2322 in flexible waterproofing membranes you will achieve environmental benefits such as:

- APEO-free binder formulation
- Very low VOC content, allowing to reach EMICODE® EC1^{PLUS} requirements even at higher level of polymer
- Compliance for use in contact with potable water

Waterproofing powder dry mix formulations based on AkzoNobel's ELOTEX® redispersible powders offer:

- Excellent resistance to water and water pressure
- High flexibility and crack bridging performance
- Good abrasion resistance
- Good water vapour permeability
- Good long term weathering characteristics
- Ease of application compared to bitumen based materials, even at low temperatures
- Reduction of waste on site, as no plastic buckets are used as compared to 2-component dispersion based systems
- No use of biocides as there is no need for in-can preservation

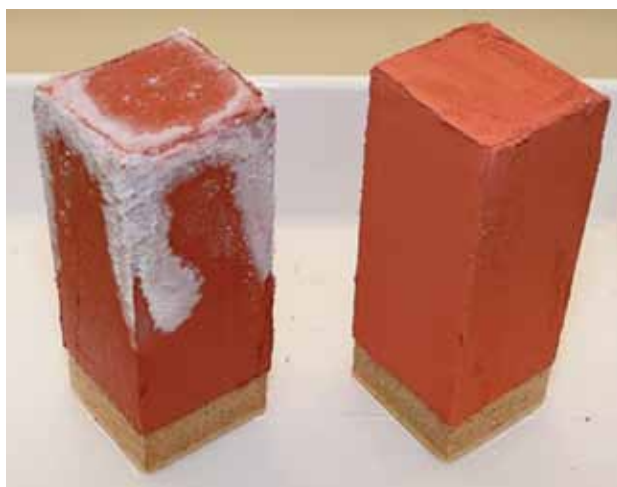
Façades – as bright as new



Colour is in our lives, 24/7; we believe that colour has the power to change people's lives; colour is designed to make a positive difference to residents and communities. Whether it is through protecting the colour of the façades, or eliminating cement from powder based decorative coats, AkzoNobel delivers solutions with a sustainable advantage.

Aligning with our Sustainability program and Human Cities initiative, AkzoNobel presents technical solutions to help maintain colours as bright as on the first application day for prolonged periods of time.

Our ELOTEX® ERA products, based on a natural resin, help to reduce efflorescence of coloured cement finishes, resulting in less need for building renovation.



Our ELOTEX® SEAL products, based on encapsulated silane which are used in dry mortars, help to keep building surfaces and structures dry. This means more durable applications and less renovation work. ELOTEX® SEAL products are also very efficient against secondary efflorescence. By forming solid long lasting structures in the mortar the water is kept out by still having a breathable structure for the natural vapor flow.

Left: Non modified render formulation
Right: Render formulation modified with 0,2 % ELOTEX® ERA

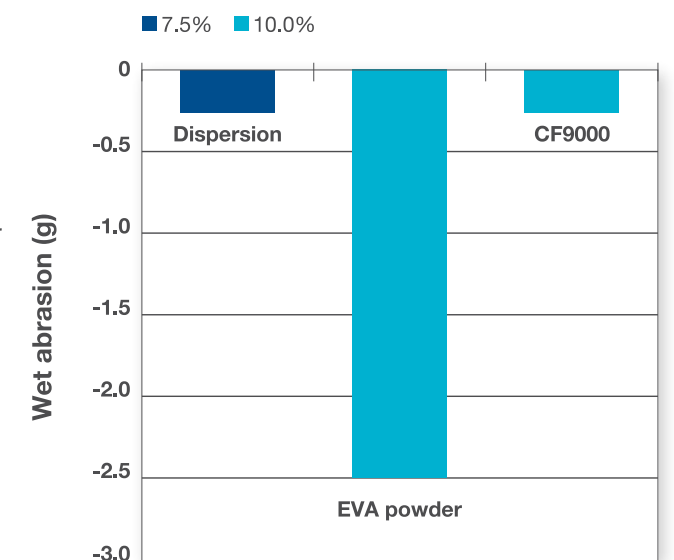
Sustainability performance of the smooth or decorative façade coats can further be increased by replacing dispersion based with powder based dry mortar finishing coats. Further environmental benefit is achieved by eliminating cement from the formulation.

This is where ELOTEX® CF9000 formaldehyde free polymer powder makes the difference. It allows you not only to eliminate cement from your formulations but also ensures high water resistance and weathering (UV) stability of finishing coats.

Cement free decorative finishing coats formulated with ELOTEX® CF9000 are a real sustainable alternative to the ready-to-use pasty systems. A move to dry mortar powder based systems will bring the following benefits:

- Less, lighter and lower cost packaging material (paper bags instead of plastic buckets)
- Less waste and easier handling of packaging waste
- Less transportation and storage costs
- No freeze/thaw issues
- No biocides in the final powder formulation (normally needed for in-can preservation)
- Consistency of the finishing coat can be easily varied by the amount of added water – one powder formulation for different application methods (hand or machine)

For smooth cement free finishing render, 10% of ELOTEX® CF9000 leads to an equivalent wet scrub resistance to 7.5% of dispersion (based on polymer solids content in the dispersion). The conventional redispersible polymer powder based on EVA copolymer show 10 fold worse result compared to formaldehyde free acrylic ELOTEX® CF9000 redispersible polymer powder.



Gypsum – New opportunities as an alternative binder to cement



Gypsum is one of the most versatile and sustainable building material. The CO₂ footprint of gypsum is very low, it is naturally occurring, and is also generated as a by-product of power stations, as well as the the fertilizer and detergent industry. Gypsum is infinitely recyclable (albeit some energy is used in its processing and transportation).

Due to its versatility, gypsum based materials allow architects, building owners and decorators to design attractive features for modern interiors. The use of gypsum products also allows earning credits or points towards achieving a higher Green Building Rating. Our commitment to sustainability throughout the globe helps our customers confidently meet the demanding requirements of LEED-certified construction in addition to the added technical performance to differentiate themselves from the commodity product. Gypsum based products are highly sustainable and AkzoNobel Performance Additives technologies help improve final performance of the gypsum based dry mix mortars.

As an example, ELOTEX® SEAL712 opens more possibilities by widening the areas of applications for gypsum based products. Use of ELOTEX® SEAL712 allows the application of gypsum based products in indoor wet areas (as an alternative to cementitious systems) and as final coatings with a decorative function.

Not only does the use of ELOTEX® SEAL712 open doors for new application areas for gypsum, as an alternative mineral binder to cement, but it also has the following benefits:

- Water repellence and Mass hydrophobic of gypsum products
- Increased durability of gypsum building materials
- Reduced need for priming before painting or wall paper coating (excellent paintability, coatability and repair)

AkzoNobel's Eco-premium solutions



It won't be long before the world's population reaches nine billion. How will we cope? Can the planet handle so many people? Yes it can, but we have to do things differently: we have to use our ambition and imagination and deal more efficiently with the world's limited resources. This is why AkzoNobel has adopted a Planet Possible approach to sustainability. We know only too well that our future hinges on our ability to do radically more while using less.

That's why we are working with customers and suppliers to open up infinite possibilities in a finite world. It's our commitment to finding opportunities where there don't appear to be any.

We are finding more innovative solutions; we're using more renewable energy and materials and less fossil-based sources; we're focusing more on our entire value chain; and we are actively enhancing lives in the many communities in which we operate as well as inspiring and equipping our employees to recognize new possibilities.

Welcome to Planet Possible. Our commitment to doing more with less.

And here is one: AkzoNobel's Eco premium solutions

Eco-premium solutions (EPS) are products and processes that offer an improvement in sustainability, delivering either environmental or social benefits. They are measured via a quantitative analysis or a qualitative assessment of performance in seven categories:

- Energy efficiency
- Use of natural resources/raw materials
- Land use
- Emissions and waste
- Risks (e.g. accidents)
- Toxicity
- Health and well-being

When assessed across the entire value chain against currently available solutions in the market, the eco-premium solution must be significantly better in at least one of the above criteria, and not significantly worse in any.

Year-on-year progress will be impacted not only by our own improvements, but also by competitor activity and legislation changes. For example, the introduction of new products into the market whose performance is equal to our current range of eco-premium solutions will redefine the standards that we will have to surpass to acquire EPS status.





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AkzoNobel creates everyday essentials to make people's lives more liveable and inspiring. As a leading global paints and coatings company and a major producer of specialty chemicals, we supply essential ingredients, essential protection and essential color to industries and consumers worldwide. Backed by a pioneering heritage, our innovative products and sustainable technologies are designed to meet the growing demands of our fast-changing planet, while making life easier. Headquartered in Amsterdam, the Netherlands, we have approximately 45,000 people in around 80 countries, while our portfolio includes well-known brands such as Bermocoll, Elotex, Sikkens, International, Interpon and Eka. Consistently ranked as a leader in sustainability, we are dedicated to energizing cities and communities while creating a protected, colorful world where life is improved by what we do.

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