

Functional Materials

Construction

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This information is based upon Unger Fabrikker's experience and knowledge in this field. The information is only a guide for application of the products and Unger Fabrikker give no guarantee for the results from the application of the product, which lies outside Unger Fabrikker's control. Unger Fabrikker's responsibility and guarantee in selling this products are covered at all times by the relevant general sales conditions.

Plasterboard

Foaming agents for plasterboard production
The UFAPORE GP product range are liquid surfactants used as foaming agents for plasterboard production. They lower the surface tension in aqueous solutions and generate air bubbles.

Foaming agents play a major role in reducing the density of the board, which allows for:

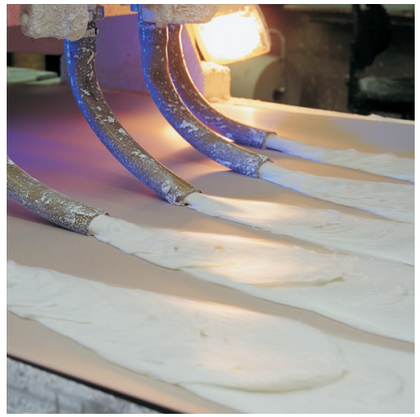
- Ease of handling
- Thermal insulation
- Sound proofing
- Shorter drying time
- Reduced raw material cost

The conditions at different gypsumboard plants vary with the raw materials used and production methods. Due to the environmental differences in every gypsumboard plant, Unger has developed several foaming agents called UFAPORE GP. Each product has outperforming properties and are excellent foaming agents in their own environments.

By choosing the right type of UFAPORE GP foaming agent, you are able to improve performance and production capacity and at the same time reduce the consumption of aggregates in standard board, hydrophobic boards and lightweight board production.

Product name	Chemical composition	Active Content	Character
UFAPORE GP 3	Fatty alcohol Ether Sulphate, Sodium Salt	~ 30%	Foam for standard board robust processing
UFAPORE GP 413	Fatty alcohol Ether Sulphate, Sodium Salt	~ 30%	Stable foam for standard board and water-resistant board. Good performance in hard water
UFAPORE GP XP	Fatty alcohol Ether Sulphate, Ammonium Salt	~ 75%	Stable foam for standard board and water-resistant board
UFAPORE GP LV01	Fatty alcohol Ether Sulphate, Sodium Salt	~ 38%	Unstable foam for light weight board
UFAPORE GP BDG	Fatty alcohol Ether Sulphate, Ammonium Salt	~ 55%	Stable foam for standard board and water-resistant board
UFAPORE GP LV02	Mixture of surfactants	~ 37%	Unstable foam for medium to light weight board.

Foam is usually produced by vigorously mixing a diluted solution of foaming agent which is then introduced into a mixer together with the other ingredients. The UFAPORE GP product range are readily compatible with other additives in wallboard production.



Application
During production it is important that the foam generated is as compact and stable as possible to avoid intolerable variations in bubble sizes. Large bubbles will create big voids in the finishing gypsumboard, thereby decreasing both surface finish and the strength of the gypsumboard. Air-Entrainers for gypsumboard manufacturing have very strict requirements both in terms of foam stability, foam ability and solubility (in water). To ensure such product quality, the development of our foaming agent has been based on thorough research and product control.

Mortar / Plaster

In different types of mortar, plaster and renders, the controlled formation of air entrainment will greatly improve the final product.

Besides reducing weight and costs, entrapment of air with the UFAPORE dry product range will increase work-ability, compatibility and durability of the final product. Depending on local conditions and type of mortar or plaster, we highly recommend our UFAPORE dry product range for various mortar/plaster applications.

Air-Entrainers for dry mix mortar, plaster and concrete

UFAPORE dry product range

Product	Description	Physical form	Active Content	pH
UFAPORE TFA	Sodium Lauryl Sulphate	Ivory white powder	92%	9.0 - 11.0
UFAPORE TCO	Alfa Olefin Sulphonate	Ivory white powder	94%	7.0 – 9.0
UFAPORE TAE	Sodium Lauryl Sulphate	Ivory white agglomerate	95%	9.0 – 11.0
UFAPORE TLA	Sodium Lauryl Sulphate	Ivory white agglomerate	96%	9.0 – 11.0

Zero VOC emissions | Biodegradable | Light color | Low dosage

An air-entraining additive allows a controlled quantity of small uniformly distributed air voids to be incorporated into a mortar.

Air-entrainers, once added into a mortar mix-design, do not chemically react with the other mix-design components. The mortar's setting time and hardening are not altered, but there may be some change in the rate of water loss into the masonry units due to better control of "bleeding".

The addition of an air-entraining agent into a mortar can significantly improve the workability of slurry and enhance the permeability and frost resistance of hardened mortar. Air pores reduce density and better yield is achieved. By reducing water tension, air-entrainers help other particles to disperse faster in water, reduce mixing time and thereby save working time. They also work as a wetting agent to improve workability and pump ability.

Although the dosage of air-entrainers is small, it has great impact on the performance of mortar, with main roles including:

- Improving the workability of mortar
- Enhancing the permeability, frost resistance and durability of mortar
- Reducing the strength of mortar
- Increasing the volume of mortar

Air-entrainers respond differently depending on the mortar components. Using the most suitable air-entrainer based on the binders present is critical. Air entrainment depends on:

- Cement quality
- Content of pozzolans and lime in cement
- Graining of cement and fillers
- Sand particle size

Addition of lime and fly ash in the mortar will have an impact on the air content. Fly ash content will decrease the air entrapment and give varying levels of air content. Lime addition in the cement will increase the air content. Portland cements with a content of lime and fly-ash in different ratios will have an influence in the additives behaviour. Our UFAPORE air-entrainers are suitable for all types of cement mix-designs.

It is recommended to keep the pore structure as small and uniform as possible, this improves frost and thaw resistance, the density is reduced, and strength is easier to achieve. A uniform micropore structure also has an impact on the finish and helps to prevent efflorescence or bleeding of the mortar.

Unger has been a producer of air-entrainers for many years and we have applied our experience and knowledge to incorporate improvements into our UFAPORE dry product range. Our UFAPORE products are compatible with other additives such as plasticizers, superplasticizers, retarders, viscosity modifiers and other. Our UFAPORE dry product range is available in both powder form and free-flowing agglomerates to provide easier and accurate dosaging.

Concrete Admixture

UFAPORE products for concrete admixture are surfactants created to add air voids to the concrete and make the hardened concrete frost resistant. The addition of surfactants will improve several properties in the mixing process and in the hardening of concrete.

Admixture for concrete
Addition of an air-entraining admixture will significantly improve the workabillity of the concrete during mixing and reduce mixing time. Air voids reduce the density and a better yield is achieved. Introduction of an air-entrainer into the concrete will reduce the density and strength of the concrete and introduce controlled quantity of small uniformly distributed air bubbles.

Although the dosage of air-entraining is small, it has great impact on the performance of concrete, with main roles including:

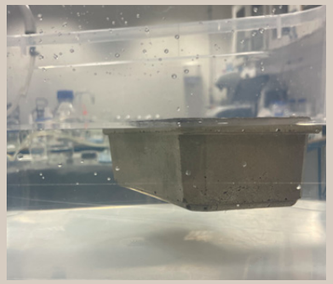
- Improving the workability of concrete
- Enhancing the permeability, frost resistance and durability of concrete
- Reducing the strength of concrete
- Increasing the volume of concrete
- Reduced raw material cost

It is important that the most suitable air-entrainers are applied, dependent on type of concrete:

- Cement quality
- Content of fillers in cement
- Graining of cement and fillers
- Aggregate particle size

UFAPORE products are compatible with other admixtures such as dispersing agents, retarders, accelerators etc.

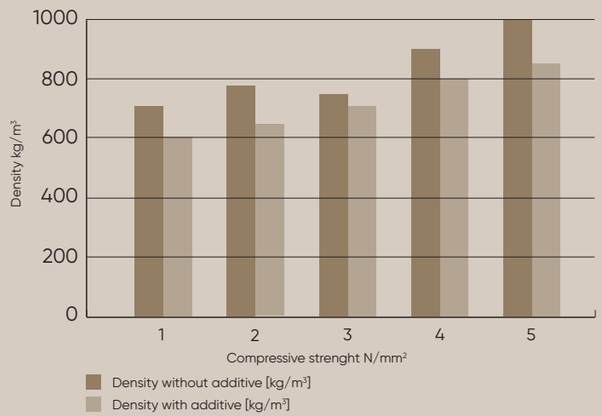
Light weight concrete
Advantages in using low-density lightweight concrete in construction are due to:



- Weight reduction, low density,
- Improve insulation values, low thermal conductivity
- Sound reduction
- Improved workability
- Low shrinkage and high heat resistance

UFAPORE LC has been developed specifically for improving the weight efficiency without changing the strength. It's function as an additive in the formulation, is to create an homogeneous distribution of cement particles in the matrix. UFAPORE LC will also create a fine distribution of air voids in the matrix.

The processing of light weight concrete containing UFAPORE LC allows better weight consideration and workability but does not change the strength categorization. UFAPORE LC will rapidly dissolve when water is added and create stable air voids and improved workability during mixing. When mechanical forces cease, the mass becomes cohesive. The mass can be moulded and shaped as required.



Air-Entrainers for Concrete Admixtures

Trade name	Chemical composition	Physical form	Active matter	Application
Air-Entrainers for concrete				
UFAPORE CC	Mixture of anionic and nonionic	Clear mobile liquid	30%	Air-Entrainer concrete/ ready mix
UFAPORE CC 1 A	Mixture of nonionic	Amber liquid	95%	Air-Entrainer concrete/ ready mix
Air-Entrainers for light weight concrete				
UFAPORE LC	Mixture of anionic surfactants	Golden Liquid	32%	Disperse /wetting agent for light weight concrete





Sustainability is central in our culture, being a key element in our strategy for future development and growth.

Unger have defined three focus areas; climate footprint, respect for the human being and innovative and environmentally friendly solutions – then chosen five from the United Nations sustainable development goals to give extra attention across these focus areas. Unger pursue solutions and products that are climate-friendly, maintain biodiversity and showing a transparent value chain.

Unger firmly believe that the successful use of a product in any application derives from a comprehensive and mutual understanding of the possibilities in the technology offered, the purpose of the end-use as well as total transparency within our sustainable efforts. Therefore, we offer a life cycle analysis (LCA) on all the products in our portfolio upon request.

Pure
Nordic
Quality

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