



Borregaard

TECHNICAL BULLETIN

BORRESPERSE LIGNOSULFONATES - PERFORMANCE IN CONCRETE

GLOBAL

Borregaard is the world's leading producer of lignin-based products, offering a global network of production plants and sales offices, ensuring optimal service to global and local customers. Our highly skilled and dedicated R&D teams have extensive technical expertise in lignin technology to provide a continuous strive for improvement of existing and developing product lines. Additionally, significant investments were made by Borregaard to ensure stable supply.

SUSTAINABLE

Borregaard's lignosulfonates represent a green alternative to petrochemical based polymers. Derived from wood, as a renewable resource, they offer a beneficial carbon dioxide (CO₂) balance. Each kilogram of lignosulfonate utilized captures 1.5 kg of CO₂ and withdraws it from the atmosphere. Thus the Lignin polymer conserves 7.5 times more CO₂ than is required to process the raw material to its final utilization quality. Additional CO₂ reductions are achieved from water and cement reduction in the concrete mix design, while maintaining the required concrete performance.

COST EFFICIENT

Especially in the low to medium strength concrete segment C20-40, chemical admixture formulations based on Borregaard lignosulfonates are most cost-effective.

COMPATIBLE

Borresperse lignosulfonates are compatible with most chemical co-formulants utilized for admixture formulation; specific products have been developed to meet the customer's specific formulation requirements.

CONSISTENT

The Borresperse product lines are created to meet the varying and demanding needs of the construction industry. These products all deliver unique performance characteristics with the utmost consistency.

ROBUST

Borresperse lignosulfonates achieve high cohesiveness of the concrete mix without being sticky. This results in improved performance characteristics such as reduced bleeding and segregation, improved pumpability and creaminess, as well as finishability. An added advantage known to the construction industry is the resilience of lignosulfonates regarding temperature, mixing time and total water content variations, moisture content and batch to batch variations of the raw materials as well as the ability to cope with contaminants such as clay and silt.

RETARDATION

Concrete treated with lignosulfonates will additionally exhibit lower heat development during the hardening phase resulting in reduced shrinkage and creep.

TOOLBOX

Borregaard offers a wide range of lignin-based products to the construction industry. This toolbox is applicable for low, mid and high-range water reducers as well as retarders for concrete, mortar and cement slurries.

WATER REDUCTION CAPABILITY

Water reduction (Fig 1) of Borresperse lignosulfonates* as a function of dosage given as “% solid by weight of cement (% sbwc)” (concrete C 20-60, 325 kg, CEM I 52.5 N, w/c = 0.53, d_{max} = 20 mm, initial slump = 100 mm ± 5 mm).

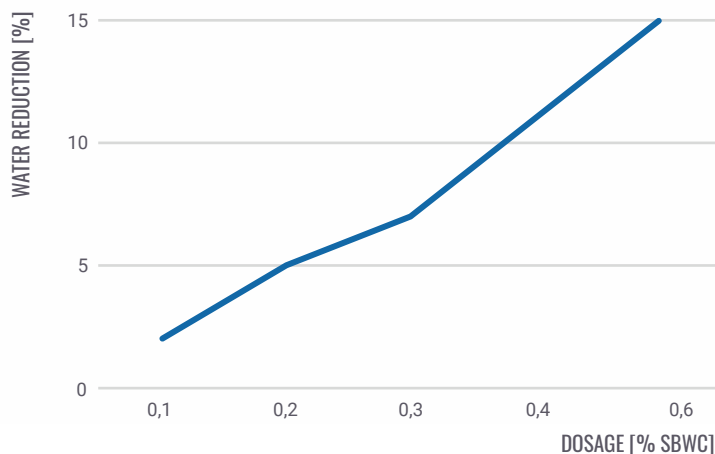


Figure 1: Water reduction capability

SLUMP AND WORKABILITY RETENTION

Initial slump (Fig 2) and workability retention (Fig 3) of concrete with Borresperse lignosulfonates* as a function of dosage (concrete C 30, 325 kg, CEM I 52.5 N, 75 kg Fly ash, w/c = 0.53, d_{max} = 20 mm).

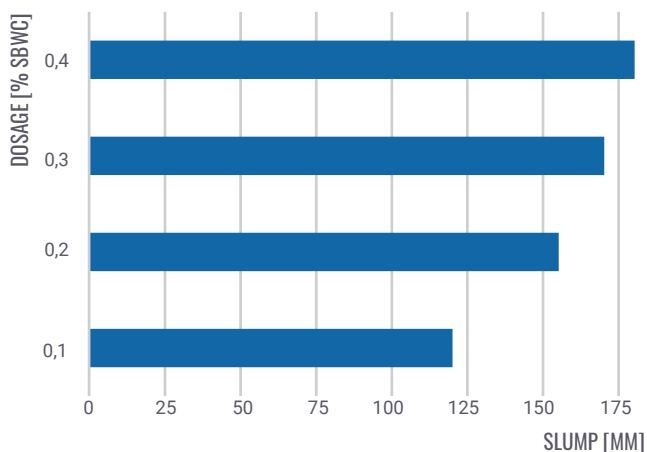


Figure 2: Initial Slump

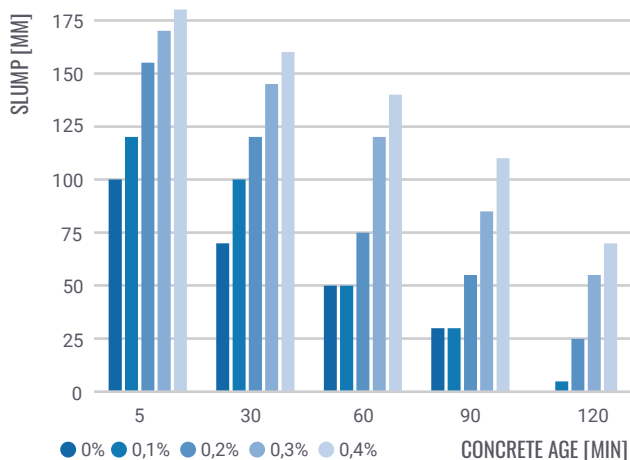


Figure 3: Workability

SETTING TIME AND COMPRESSIVE STRENGTH

Set time (Fig 4) and compressive strength development (Fig 5) of concrete with Borresperse lignosulfonates* as a function of dosage.

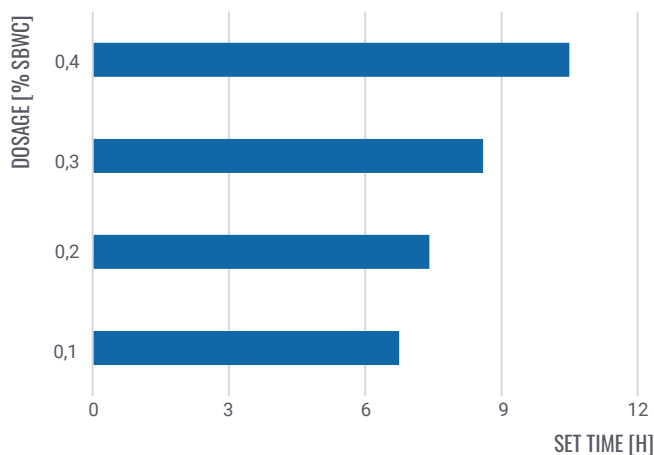


Figure 4: Set time

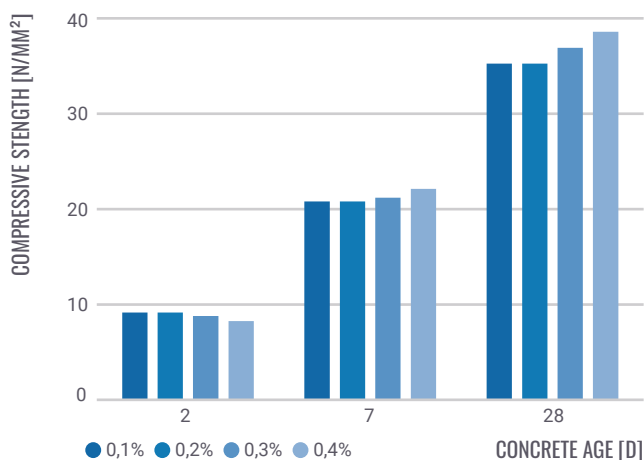


Figure 5: Compressive strength

*Borresperse NA



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CONTACT US



construction@borregaard.com



www.borregaard.com