



Fosroc Solutions for On-shore Wind Turbines

www.fosroc.com



constructive solutions

ABOUT FOSROC INTERNATIONAL

Since the company's beginnings over 80 years ago, Fosroc has developed into an International leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, utilities, industrial and general buildings.

Fosroc's commitment to customer service and technical support is second to none. We work closely with architects, structural engineers, contractors and owners to best understand their requirements. Together we can develop a bespoke solution for a construction project, adding value and becoming more than just a materials supplier, but a solution provider.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, Africa, India, North, South and East Asia, and is further represented in other regions across the world by distributor and licensee partners.

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

- > Admixtures
- > Adhesives
- > Protective Coatings
- > Concrete Repairs
- > Industrial Flooring
- > Grouts & Anchors
- > Joint Sealants
- > Surface Treatments
- > Grinding Aids
- > Waterproofing

FOSROC DELIVER SOLUTIONS NOT JUST PRODUCTS

CAD Details

A library of standard CAD details are available, bespoke CAD details can be created for your specific project

Project Specifications

Dedicated specification managers on hand to assist with correct system choices and tailored solutions

Site Support

Expert product and application support made available from our specialist teams.

Seminar & Training

Comprehensive programme of seminars and training courses designed to expand and reinforce your knowledge.



The need for energy to meet increasing global demand is driving more and more innovative solutions. The world needs to utilise natural energy resources with solutions that can be installed quickly, close to where they are needed.

Wind turbines meet this requirement, and the growing industry demands products that ensure the successful and durable operation of these critical pieces of equipment.

Fosroc's experience in concrete and grouting enables us to provide bespoke solutions designed for practical application in challenging situations. We have been working in the wind industry for many years and have supplied most of the leading turbine manufacturers supporting projects in Europe, India, Latin America, Africa and Asia.

Leader in delivering
Constructive Solutions
Worldwide!

CONCRETE TECHNOLOGY

The construction of wind farms begins with casting the huge base foundations. These structures present a technical and practical challenge to engineers and contractors. Problems in casting bring high costs and problematic time delays.

Concrete bases require high strength concrete, Fosroc are familiar with providing admixtures that will help produce high strengths and also control cracking even when cast in mass. The concrete must also be fluid to flow around the heavy reinforcement without the formation of voids and honeycombing.

Many wind farms are constructed in areas that can be difficult to access, this means that the concrete may have to spend a long time in transit before it is cast. Workability retention is critical in this environment, project requirement that Fosroc can help with.

Fosroc's range of admixtures and expert technicians can develop a site specific mix design to ensure that the concrete will achieve the design strengths required as well as meeting the challenge of application.

We can also offer high efficiency curing compounds, mould release oils, repair mortars, bonding agents and finishing mortars to create a durable and blemish free concrete finish.



A state-of-the-art PLC (programmable logic controller) installed in Fosroc Denmark's admixture plant providing a number of benefits to the production of admixtures. The new process control system will allow for higher capacity, greater stability and uniformity of the finished products.

TAILOR MADE GROUTING SOLUTIONS



Because Fosroc understands grouts and understands wind turbines, we know that a single solution is not appropriate for all.

Fosroc's team of materials engineers have designed a range of cementitious grouts that meet the strength, depth, fatigue and durability requirements that are required by the major turbine manufacturers.

Depending on the product, strengths range above 100MPa. Grouts can flow to depths of 400mm and with annulus cross sections of many metres, with no cracking or shrinkage.

Fatigue resistance and durability results are excellent for Conbextra Wind Turbine grouts due to their high quality and excellent strengths.



CONTRACTOR SUPPORT

We firmly believe products that are market leading in their application properties, deliver the best real-life performance. Conbextra products have been developed and tested in conjunction with manufacturers and experienced applicators to ensure that the systems are robust and will achieve the right results on site as well as in the laboratory.

Fosroc runs certification schemes, sponsored by leading manufacturers, where contractors can learn the skills that they will need to correctly apply Conbextra grouts to the specifications laid down by the client. This is because we know that the skills of the contractor are key to successful application.

Fosroc travels the world supporting and overseeing application, providing contractors, engineers and clients with peace of mind.



CONCRETE SEGMENTAL TOWERS

Where concrete segmental towers are being used, Fosroc's experience in practicality and material handling is invaluable.

Our Epoxy sealer/adhesive can be used to create a very strong line to bond the segments together and prevent gout escaping when pumped under pressure.

We have bespoke grouts for the vertical sections of the rings, requiring lower strength but good workability.

Our grouts for the horizontal sections can be pumped as high as 100m without segregation, bleeding or voiding.



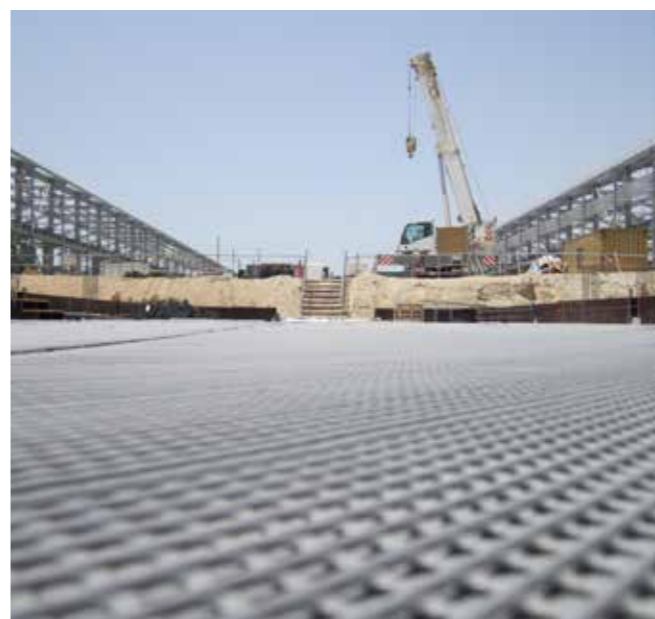
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PROTECTIVE COATINGS

Fosroc has a wide range of protective coatings suitable for use protecting concrete bases. They can be used above or below ground level, providing resistance and protection from water, chlorides, sulphates, carbonation even physical damage.

Coatings can provide an excellent enhancement to durability in harsh environments and improve the visual finish at the same time.



WATERPROOFING

Fosroc can waterproof substations with its unique waterproof membrane Proofex Engage or a whole variety of other membranes to protect the infrastructure from unexpected water infiltration that can lead to power outages.

If soil contaminants are an issue, turbine bases can also be protected, with our range of liquid, adhesive and mechanically bonded membranes.



CONCRETE REPAIR

Fosroc are experts in repairing concrete we have a range of products to repair nearly every issue.

Whether the damage is caused by long term deterioration or is new as a result of casting, lifting or cracking. Mortars, injection resins, re-profiling products are all available to help restore the concrete to its intended state.

CONSTRUCTIVE SOLUTIONS IN ACTION

Fosroc has been supplying to wind turbines projects in over 20 countries on five continents. Our solutions are based around practicality and meeting the unique challenges that construction in a tough environment brings. Below is a small selection of them.



Bothe - India

The project in India used Conbextra BB92-0 grout, specified for high strength and fatigue resistance. Materials were imported from our manufacturing base in Spain, but later locally produced to reduce the shipping time and carbon footprint.

Fosroc was locally supporting the project ensuring the successful application of our grouts in hot and challenging conditions.



Ventica - Mexico

A complete system of grouting has been applied to this precast tower. The sections were sealed and bonded using Nitobond PC20, epoxy adhesive and sealer. sections were grouted using Conbextra BB92, selected for its strength and workability.



Pen y Cymoedd - UK

This project in the south Wales Valleys spans 130 km² and the challenge was to cast over 50,000m³ of concrete and transport it over hilly terrain.

Fosroc Auramix 740SR was an ideal solution, providing workability retention for 4 hours with high early and ultimate strengths.



Bornholm - Denmark

Fosroc developed Conbextra SG specifically to meet the design specification laid out by the manufacturer. The superior flow characteristics of Conbextra SG, means that the material is easily pumped and worked into place, with less requirement to move pumps and hoses mid-works. The material is suitable for the deeper section grouting requirements often required for >3MW turbines.

PRODUCT RANGE SELECTOR

A selection of common Fosroc Grouting and Fixing Products and their application. More products are available, consult your local Fosroc Company.

| Application | Product | Material Characteristics |
|---|------------------|---|
| Turbine Base Grouting & Concrete Tower Grouting | Conbextra BB92 | Cementitious Thickness 10-150mm Ultimate Strength > 90MPa |
| Turbine Base Grouting | Conbextra BB92-0 | Cementitious designed to meet Siemens Gamesa specification Thickness 10-150mm Ultimate Strength > 90MPa Fatigue tested |
| Turbine Base Grouting | Conbextra VG | Cementitious designed to meet Vestas specification Thickness 25-400mm Ultimate Strength > 120MPa Fatigue tested |
| Turbine Base Grouting | Conbextra TA | Cementitious Thickness 25-400mm Ultimate Strength > 120MPa |
| Turbine Base Grouting | Conbextra SG | Cementitious designed to meet Siemens Gamesa specification Thickness 10-400mm Ultimate Strength > 100MPa |
| Concrete Tower Grouting | Conbextra BB72 | Cementitious Thickness 10-100mm Ultimate Strength > 70MPa |
| Concrete Tower Segmental Adhesive | Nitobond PC20 | Epoxy Resin Ultimate Strength > 100MPa |
| Super Plasticiser for Concrete Bases | Auramix 740 | High Early Strengths Excellent Surface Finish |
| Curing Agent | Concure WB | High efficiency water based curing agent for concrete and cementitious grouts |
| Repair Mortars | Renderoc Range | Various thickness and strength repair systems for damaged concrete bases |

A POWERFUL FUTURE

Fosroc is literally building the foundations for a green powered future. Our product range, quality and service will ensure your projects are built to last and strengthen the works you construct. We are proud to partner and work with some of the leading producers of global wind energy and travel the world to support it.



Fosroc offers a full range of construction chemical solutions, helping to protect structures throughout the world. Please refer to our brochures, which include:



Details of your local Fosroc office can be found at www.fosroc.com

Important Note

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.



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