FOSROC INTERNATIONAL

SOLUTIONS FOR ON-SHORE WIND TURBINES

www.fosroc.com

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**

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

LEADER IN DELIVERING CONSTRUCTIVE SOLUTIONS WORLDWIDE

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.

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, and Fosroc are familiar with providing admixtures that will help produce high strengths and 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 - a 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.

Fosroc 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.

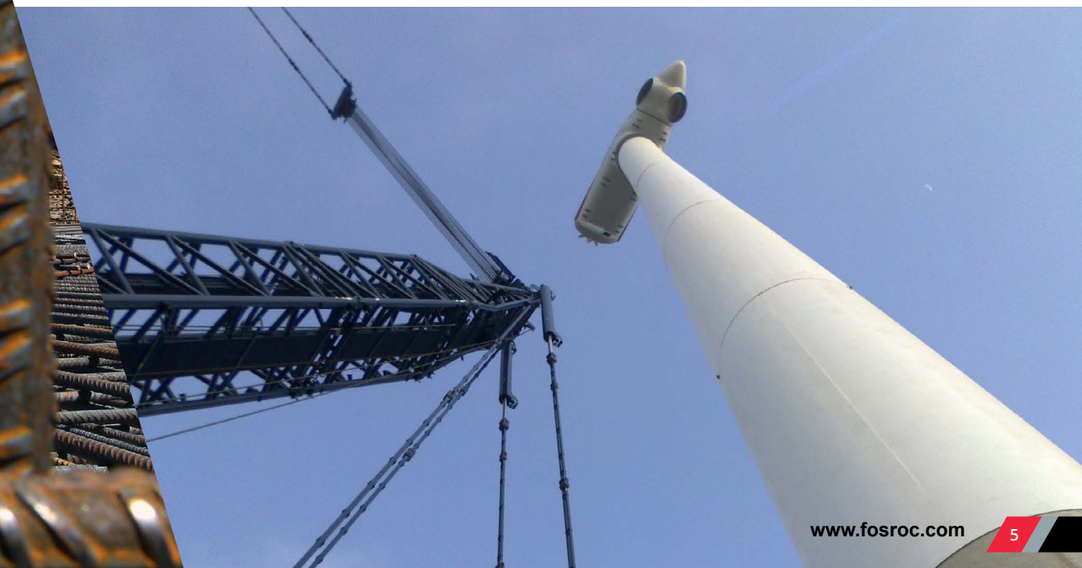
CONCRETE SEGMENTAL TOWERS

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 lining by bonding the segments together and preventing grout 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.



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, compressive strengths above 100MPa can be achieved.

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 the skills of the contractor are key to successful application of the products.

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

NEW CARBON NEUTRAL CERTIFIED PRODUCTS

Five key products in Fosroc's Concrete Repair and Grouts range have achieved **CarbonNeutral®** certification in accordance with The CarbonNeutral Protocol, the leading global framework for carbon neutrality:

- Conbextra GP
- Conbextra HF
- Renderoc HB45
- Renderoc LA60
- Patchroc 250

To provide a relatable example, with every bag of Conbextra GP purchased, the equivalent to the CO_2 from an 80 mile car journey is being saved.

CarbonNeutral.com

48 HOUR SITE SUPPORT PROMISE

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Fosroc's 48 hour site support promise provides first class customer support when it's needed, with dedicated site support managers available for a rapid response.

ADMIXTURES

From high range water reducers to slump retention and accelerating solutions, Fosroc concrete admixtures help modify and improve the properties of fresh and hardened concrete or mortar.

Fosroc has developed a range of technically superior, innovative products to assist concrete manufacturers achieve their goals in the production of high quality, highly durable concrete elements.

In the most challenging and aggressive environment, from ready-mix and precast concrete manufacturing, to underground tunnelling and dam constructions, manufacturers turn to Fosroc admixtures to add value to their concrete and provide solutions to their problems.

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 and re-profiling products are all available to help restore the concrete to its intended state.

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 and even physical damage.

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

This project in the South Wales Valleys spans 130km² 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.

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.

GLEN KYLLACHY WIND FARM

Glen Kyllachy Onshore Wind Farm comprises of 20 turbines and will have a capacity of 50MW (megawatts) to power the equivalent of around 40,000 UK homes annually with renewable energy.

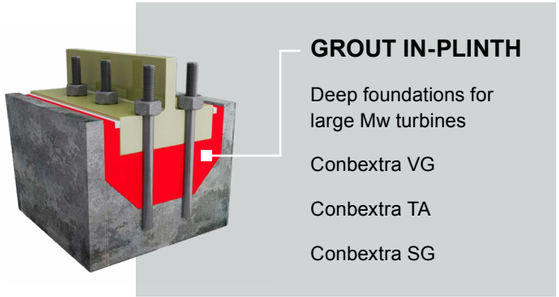
Fosroc specified three products for the build project: Conbextra BB92 grout was used underneath the base plate, waterproof sealant Thioflex 600 for application to the top of the elastomeric joint, then the final stage was to apply Nitocote EP403 two pack solvent-free epoxy coating across the top of the foundation braces to prevent cracking from moisture or frost.

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 VG	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 Thickness 10-400mm Ultimate Strength > 100MPa
Super Plasticiser for Concrete Bases	Auracast 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
Unfilled Epoxy Base Plate Grout for Dynamic Loads	Conbextra EP10	Gap size 0.25 – 10 mm High strength 100 MPa at 7 days Low viscosity for narrow gaps
Slump retaining superplasticiser for concrete	Auramix 740sr	Excellent slump retention ideal for ready mix deliveries in isolated locations Use with Self Compacting Concrete Slump retention up to 4 hours
Low Viscosity Superplasticiser for concrete	Auramix 480lr	Works over a wide range of slump classes Excellent performance with GGBS and PFA concrete Reduced sensitivity to aggregate moisture content

APPLICATION	PRODUCT	MATERIAL CHARACTERISTICS
Curing membrane	Nitobond AR	Polymer emulsion for curing Renderoc range of repair materials
Ultra-high efficiency curing membrane	Fosroc Cure B	90% efficiency Degrades naturally over time so no need to remove manually Water based
Form release Oil	Auramol H15	Biodegradable Superior release properties
Epoxy resin injection materials	Nitofill range	Low viscosity and thixotropic epoxy resins for crack repair Crack width 0.3 – 9 mm High strength
Surface protection	Nitocote range	Chemical resistance and carbonation/chloride protection
Below ground waterproofing	Proofex range	Pre and Post applied waterproofing membranes for below ground Prevents water ingress and protects reinforcement



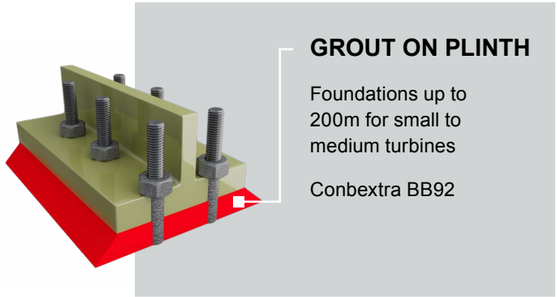
GROUT IN-PLINTH

Deep foundations for large Mw turbines

Conbextra VG

Conbextra TA

Conbextra SG



GROUT ON PLINTH

Foundations up to 200m for small to medium turbines

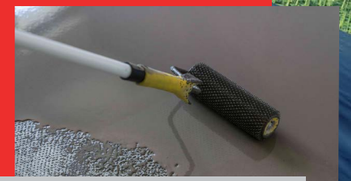
Conbextra BB92

WIND TURBINE CONCRETE SOLUTIONS

CONCRETE ADMIXTURE
Auramix 740SR

CRACK/CONCRETE REPAIR
Nitofill LV/TH
Renderoc HB45

TURBINE GROUT
Conbextra BB92
Conbextra VG
Conbextra TA



BASE WATERPROOFING
Nitodek FS (PMMA)
Nitoflor PAFS (Polyaspartic)
Nitocote CM210 (Cementitious)
Nitocote EP403 (Epoxy)

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