



YOUR TRUSTED PARTNER FOR
ONSHORE WIND CONSTRUCTION



BUILDING TRUST

CHALLENGES IN ONSHORE WIND FARMS

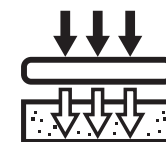


YOUR TRUSTED PARTNER

Wind energy is a key driver in the global shift toward renewable power. In recent years, the onshore wind sector has experienced strong growth in the demand for **reliable and efficient construction solutions**.

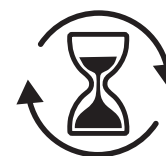
Wind energy is generated by converting the kinetic energy of moving air into electricity using wind turbines. These turbines must withstand not only static loads but also dynamic forces caused by the rotation of the blades. Additionally, they operate in some of the harshest and most isolated environments on the planet.

To maximize the efficiency and reliability of wind turbines, Sika has developed a comprehensive portfolio of solutions for wind power construction. With deep expertise in construction technologies, Sika offers a complete suite of products and services for wind energy projects – from the foundation of the wind tower to the blades of the turbine.



ACHIEVING RELIABLE LOAD TRANSFER

Onshore wind turbines face extreme static and dynamic forces, combined with challenging environmental conditions. Ensuring that towers remain stable under these stresses is a major challenge, especially as turbines grow taller and more powerful. Reliable load transfer from the tower to the foundation is critical to prevent structural failures and maintain safe operations.



DURABILITY AND LONG-TERM PERFORMANCE

Wind turbine foundations and tower components are constantly exposed to harsh environmental conditions, including moisture, temperature fluctuations, and chemical agents. Over time, these factors can degrade materials, corrode reinforcement, and weaken the structural integrity of the wind farm. Maintaining long-term durability under such conditions is a critical challenge for onshore wind energy projects.



OPERATIONAL EFFICIENCY AND LIFECYCLE MANAGEMENT

Managing the ongoing operation of wind turbines over decades presents significant challenges. Damage to foundations due to dynamic loads and settlement, and unexpected component failures can impact energy production, safety, and overall efficiency. Ensuring reliable performance throughout the turbine's lifecycle requires careful planning and proactive management of long-term operational risks.

YOUR CHALLENGES, OUR SOLUTIONS



CONTACT YOUR
SIKA EXPERT FOR
ADDITIONAL
INFORMATION

1

1

Robust, fatigue-resistant grouting solutions engineered to deliver exceptional load transfer, fast installation, and long-term stability for steel and hybrid tower foundations. Built to perform in the demanding realities of modern wind farms.

ULTRA-HIGH PERFORMANCE SOLUTIONS FOR STEEL & HYBRID TOWERS

Cementitious grouts & mortars
Epoxy grouts & adhesives

2

2

Comprehensive systems for durable, sustainable, and high-performing concrete towers. Engineered to withstand harsh climates and dynamic loads while enabling greater hub heights and optimized long-term strength.

TAILOR MADE SOLUTIONS FOR CONCRETE TOWERS

Cementitious grouts & mortars
Epoxy adhesives
Concrete protection

4

4

4

3

High-performance protection systems that enhance structural integrity, safety, and service life. By reducing deterioration and repair needs, they support continuous energy production with minimal downtime and maximum reliability.

MAINTENANCE, REPAIR & LIFECYCLE EXTENSION

Concrete repair Corrosion protection
Crack repair Structural strengthening
Waterproofing

4

Next-generation admixture technologies designed to enhance strength, production efficiency, and long-term durability of precast tower segments and cast-in-place concrete. Perfect for building higher, stronger, and more resilient wind turbine structures.

ADVANCED ADMIXTURES FOR PRECAST SEGMENTS & FOUNDATIONS

Superplasticizers	Retarders & accelerators
Macro & micro fibers	Water reducers
Pumping agents	Mould release agents
Antifreeze agents	Air entraining agents
Curing compounds	



ULTRA-HIGH PERFORMANCE GROUTS FOR TOWERS

AS ONSHORE WIND TURBINES grow taller and more powerful, the demands placed on their foundations continue to rise.

At the heart of every safe and reliable installation lies a material that often goes unnoticed.

Ultra-high performance grout is the critical link between the wind turbine tower and its foundation. It ensures reliable load transfer, absorbs extreme static and dynamic forces, and provides the long-term stability every wind farm depends on.

For all types of onshore wind turbines with steel, hybrid and concrete towers, the right grout enables fast installation, high early strength, and durable performance, even under

demanding onshore conditions. Outstanding flowability, pumpability, and shrinkage-compensated formulations allow efficient application and long-lasting, fatigue-resistant foundations.

Hybrid and concrete towers require grout to be pumped over 100 m to internal joints, an extreme challenge that demands exceptional stability and long-distance pumpability. Sika's proven formulations ensure consistent performance at height, enabling safe and reliable installation for next-generation tower designs.

BENEFITS OF SIKA SOLUTIONS



HIGH COMPRESSIVE STRENGTH



EARLY STRENGTH DEVELOPMENT



HIGH FLOW



HIGH FATIGUE RESISTANCE



CERTIFIED BY OEMs



HIGH APPLICATION THICKNESS



FOR EVERY WIND TURBINE DESIGN



LONG SERVICE LIFE



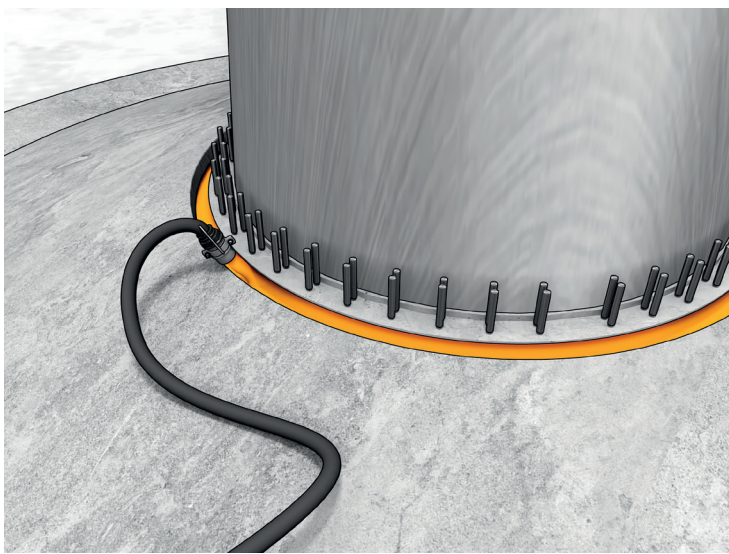
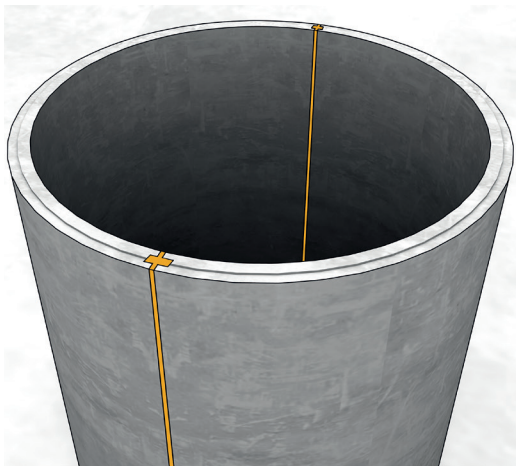
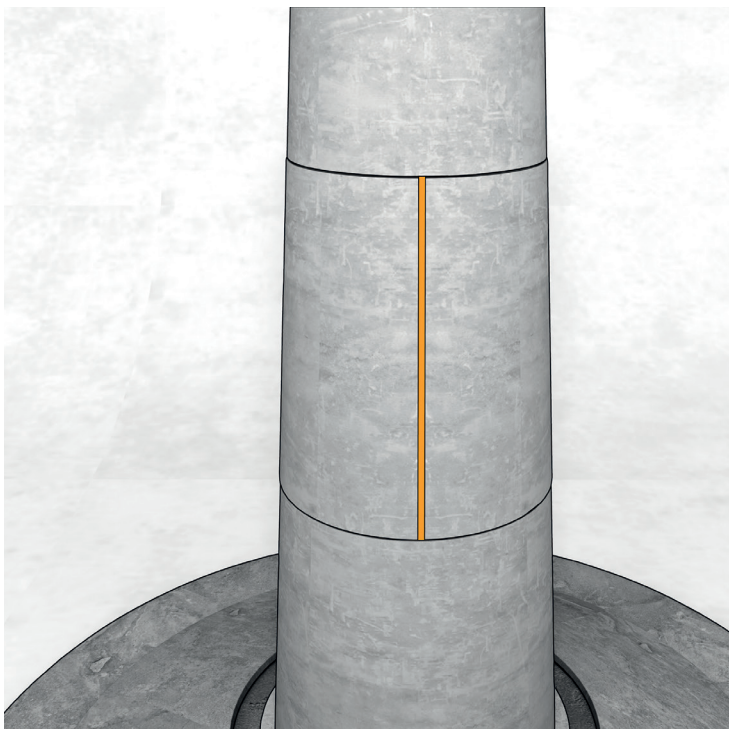
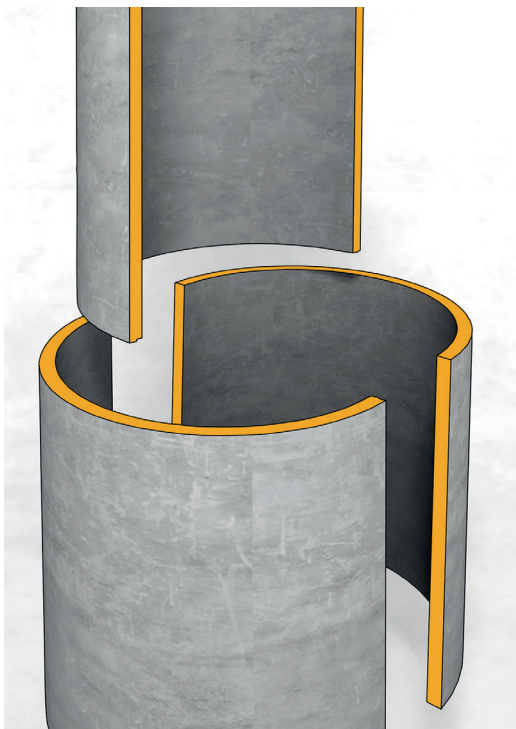
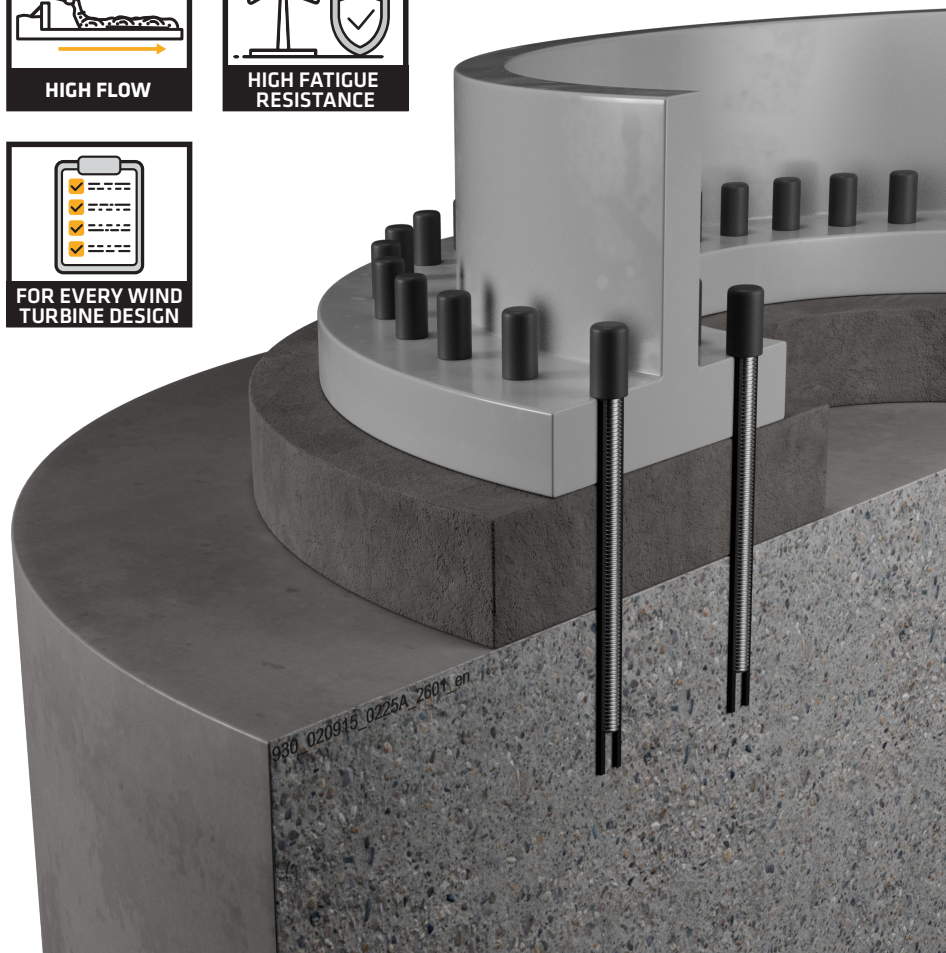
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EASY TO APPLY



PUMPABLE TO HIGH LOCATIONS



Sika solution	Main Characteristics
SikaGrout®-9110/9130/9140	Ultra-high strength, fatigue resistant cement-based grout for onshore wind turbines with steel towers
SikaGrout®-9320 BE	Ultra-high strength, fatigue resistant cement-based grout designed for steel & hybrid towers with reduced CO ₂ footprint
SikaGrout®-295	High performance, cementitious grout for onshore wind turbines with concrete towers
Sikadur®	Epoxy adhesives for precast segment bonding

18 STEPS TO SUCCESSFUL GROUTING



1. CALCULATE THE QUANTITY OF GROUT

Calculate the number of bags to ensure that the right amount of grout is available before starting the mixing of the material. This value needs to be recorded by the grouting contractor before the procedure begins.

An extra 10% amount must be taken into account for the quantity of grouts calculation



2. CHECK WEATHER FORECAST

Temperatures and weather conditions have a major role on application of cement based materials, such as

- Start and finish times
- Substrate preparation
- Water dosage (pot life, workability time)
- Setting time and strength development (slower development at colder temperatures)
- Special precautions (e.g. conditioning water in case of cold or warm conditions, heated curing blankets, etc). Refer to sections of hot weather and cold weather condition in method statement.

- Protecting application area and equipment
- Curing technique

During the application, the substrate and ambient temperatures must be recorded and controlled. Ambient humidity and wind speed will also need to be recorded and taken into consideration for the water ratio and the curing methods.



3. BREAKS

Breaks shall be planned so that there is no interruption in mixing; maintain a continuous pouring process per foundation and no stop-go during the application.



4. CONTINGENCY PLANS

Some contingencies may be planned in advance in case of mechanical failure, grout

underestimation, formwork leak etc. For some equipment it may not be possible to have two on every project, however knowing where the next available equipment and who to contact in emergency is useful. It is recommended to have the following material available to minimize contingencies and delays:

- Additional amount of grout (~+10- 20%) (IMPORTANT)
- Spare mixer
- Sealant / foam
- Spare generator (when possible)
- Spare hoses (in case of blockages). It is recommended to have at least double the pumping distance of hoses available.

Blockages are time consuming and can break equipment.



5. POWER AND WATER

Power for equipment shall be approved for use on job site. Always conform to local laws and restrictions when using diesel powered equipment. When using an electric motor check the voltage requirement is available on job site. Check there is an adequate supply of clean water on job site to fill bowser or IBC containers.



6. PREVIOUS WORKS

- Set-up of mixing and pumping equipment. Place it as close as possible to the base of the tower
- Check of the correct functioning of the equipment, including power and water supply, before starting the grouting operations
- Verify that the right amount of grout and potable water are available. Make sure there is enough material on job site to carry out the work. Take into account at least 10% of extra material.
- Check the QC devices are ready, including the number of moulds for QC specimens
- Verify the hose lengths, arrangement, couplings. If possible use only one single hose length. It is mandatory to not have any reduction of diameter at the couplings. Do not use hydraulic hoses.
- Prepare grout lines: Lubricate them with cementitious slurry made of cement and water. The recommended hose length to avoid moving the pumping equipment is

at least twice the diameter of the pedestal (check project specifications).

- Verify that the substrate is properly prepared and pre-wet before starting the pumping procedure.



7. SUBSTRATE PRE-INSPECTION

The concrete substrate in the area to be grouted shall be inspected in advance to check for cracks and other defects. Any damaged surfaces detected must be notified to the Supervisor.

The clearance distance between foundation and baseplate shall be checked at regular intervals from inside and outside and reported to the Supervisor for re-checking the grout consumption. The application thickness shall be within the recommended values. Do not exceed the maximum layer thickness.



8. SUBSTRATE PREPARATION

The concrete substrate shall be thoroughly clean, in a good sound condition and free from dust, loose material, surface contamination and materials which reduce bond. Delaminated, weak, damaged and deteriorated concrete shall be removed by suitable means (e.g. soft scarifying and high-water jet pressure >200 bar).

It is mandatory to pre-wet the concrete substrate before the application of the grout. Check the temperatures of the elements (refer to the PDS and/or the method statement)



9. THREADED BARS OR ANCHOR BOLTS

In order to prevent cracks when post-tensioning the anchors during the erection of the tower, verify that the upper part of the threaded bars have been properly covered with a de-bonding tape (~6 mm thick) before starting the grouting operations. For this, prefabricated sleeves or duct tape may be used.



10. SHIMS AND LEVELLING PLATES

The Specifier's and Manufacturer's recommendations shall always be followed over any statement indicated in this document.

Use round shims when possible to minimize the entrained air and cracking risks. Use the shims to warranty the grout thickness, defined by the difference of level between the pedestal and the top face of the shims. Check the horizontality of all support points with a transit level. It is recommended to mark where the levelling shims are places to pay special attention during the grouting operations to minimized empty spots.



11. FORMWORKS

Formwork shall be higher than the underside of the baseplate to prevent overspill, allow water curing and if possible create a pressure head typically >20 cm, as directed by the Specifier. The formwork shall not absorb water or moisture.

Release agents shall be applied to the formwork before placing into position so not to contaminate the substrate. Formwork shall be watertight and designed with means to remove excess water after pre-wetting. Use expansive foam Sika Boom® to seal gap between the formwork and foundation. The exposed substrate shall be protected to prevent ingress of debris or contamination until ready for grouting. An isolation tape can be adhered around the perimeter of the baseplate to allow some thermal expansion of the tower against the grout - as directed by the Specifier.



12. PRE-WETTING SUBSTRATE

Concrete surfaces shall be saturated with clean water 24 hours before the application of SikaGrout® until a saturated surface dry (SSD) is obtained. Just before application, remove excess water, e.g. using a clean sponge for small areas or air pressure for large areas. Ensure there is no standing water on the surface. The surface shall achieve a dark matt appearance

without glistening and surface pores and pits shall not contain water (SSD). Use pressurised air (oil free) to blow away excess water in difficult to reach areas. The surface shall not be allowed to dry before application.



13. MIXING

The mixing of the SikaGrout® must be done only with clean potable water, without any other additional product. Do not use water beyond these stated maximum and minimum limits. Use precise techniques to measure the water amount.

Mixing shall always be carried out in accordance with the recommendations contained in the latest product data sheet (PDS).

For suitable mixing equipment refer to the method statement.



14. QUALITY CONTROL

The following recommendations for quality control must be done the grouting process (before, during and after). All results must be recorded.

- [A] Substrate Quality Control - Before and After Preparation
 - [B] Climatic Conditions - Before and During Application
 - [C] Grout Quality Control - During Mixing and Application
 - [D] Grout Quality Control - After Application
- Refer to the method statement



15. PUMPING PROCEDURE

- Grout should be placed as quickly as possible after it has been properly mixed and discharged. Use the grout ~5' - 15' minutes after mixing to take advantage of the optimum flow properties. The grout is placed in the machine's hopper and pumped through a hose to the point of placement. The placement of the grout has to be finished within the pot life of the first mix.
- Place the grout through the hose from the bottom to the top to push out air and

maintain a momentum.

- Start the pumping process against the temporary formwork installed underneath the T-flange and radial in the trench for preventing the grout to flow in two directions. Once nearly all the required grout has been poured, this temporary formwork must be carefully removed so we can finish pouring the grout.
- Do not try to alter the direction of the grout as pumping from different positions can trap air. Always maintain sufficient pressure head while pumping.
- Ensure a process of continuous pumping to avoid air entrapment and prevent the grout flow from coming to a stop. Keep pumping until the grout level is above the underside base plate as indicated.
- Do not vibrate the formwork or the grout
- Cover the area will be grouted by using burlap, geotextile etc. from all sides during grouting to prevent early drying of the grout surface due to wind under base plate.



16. CURING

Curing is essential to avoid premature drying that could lead to cracking and de-bonding problems. The curing procedure must be approved by the Supervisor following the manufacture of the turbine instructions.



17. CLEANING TOOLS & EQUIPMENT

Clean all tools and application equipment with water immediately after use. Hardened material may only be removed mechanically.



18. WASTE DISPOSAL

Dispose unwanted material responsibly through licensed waste disposal contractor in accordance with local legislation and/or regional authority requirements.

FOR DETAILED INFORMATION REFER TO THE MATERIAL SAFETY DATA SHEET

MAINTENANCE, REPAIR & LIFECYCLE EXTENSION

Extending the service life of wind turbines is essential as renewable energy demand grows. Foundations face weather, dynamic loads, and long-term wear, making proactive maintenance key to preserving structural integrity and minimizing downtime. By protecting foundations early and effectively, operators reduce repair needs, lower lifecycle costs, and keep energy production running smoothly. With Sika's proven solutions for protection and repair, wind farms can operate safely, reliably, and sustainably for many years.



CONCRETE REPAIR SOLUTIONS

ONSHORE WIND TURBINE FOUNDATIONS endure extreme environmental conditions and continuous mechanical loads throughout their lifespan.

Over time, these factors can lead to structural deterioration, including cracking in concrete, corrosion of reinforcement, and overall weakening of foundation components. If left unaddressed, these issues can compromise structural integrity and safety, potentially reducing the turbine's operational efficiency and lifespan. Therefore, timely damage assessment and repair are essential to maintaining the foundation's strength and reliability.

Effective structural repair restores the foundation's stability, ensuring long-term performance and operational safety. By applying advanced repair and reinforcement techniques, existing damages can be mitigated while preventing future deterioration. This proactive approach not only enhances structural safety but also reduces maintenance costs and extends the service life of wind energy infrastructure. Regular monitoring and timely interventions are key to ensuring the continued efficiency and sustainability of onshore wind farms.



BENEFITS OF SIKA SOLUTIONS



FULL PRODUCT RANGE

Includes all material technologies and accessories.



COMPATIBILITY

Compatible with other Sika systems.



EFFICIENCY

Comprehensive solutions for all types of damage – even the smallest cracks.



DURABILITY

High quality materials offering long-lasting protection.

Sika solution	Main Characteristics
Sika MonoTop® and SikaEmaco®	1-component, fiber-reinforced, low shrinkage structural repair mortars for re-profiling damaged concrete and restoring structural integrity
Sikadur®	2-component, epoxy-based adhesives to ensure structural bonding during repair
Sikadur® and SikalInject®	2-component, epoxy- and PU-based injection resins to structurally repair cracks
Sikacrete®-560	Prepackaged, quick setting mortar suitable for repairing application by dry spray methods

WATERPROOFING SOLUTIONS

WATERPROOFING IS ESSENTIAL TO ensuring the longevity, durability, and structural integrity of onshore wind turbine foundations.

Exposure to moisture, freeze-thaw cycles, and harsh environmental conditions can lead to concrete deterioration, reinforcement corrosion, and costly repairs. By implementing advanced waterproofing solutions, wind farm operators can proactively prevent water infiltration, protect against chemical and mechanical damage, and enhance the resilience of turbine foundations, ultimately reducing maintenance needs and maximizing operational efficiency.

Sika's comprehensive range of waterproofing technologies is designed to meet the demanding conditions of wind energy infrastructure. From flexible membrane systems and liquid-applied coatings to waterproofing admixtures, joint sealants, and high-performance injection grouts, our solutions provide superior protection against water ingress. Engineered for easy application and long-lasting durability, these watertight systems ensure seamless performance and extended service life, even in the most challenging environments.

BENEFITS OF SIKA SOLUTIONS



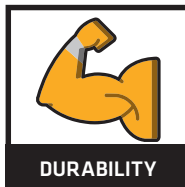
FULL PRODUCT RANGE

Includes all material technologies and accessories.



COMPATIBILITY

Compatible with other Sika systems.



DURABILITY

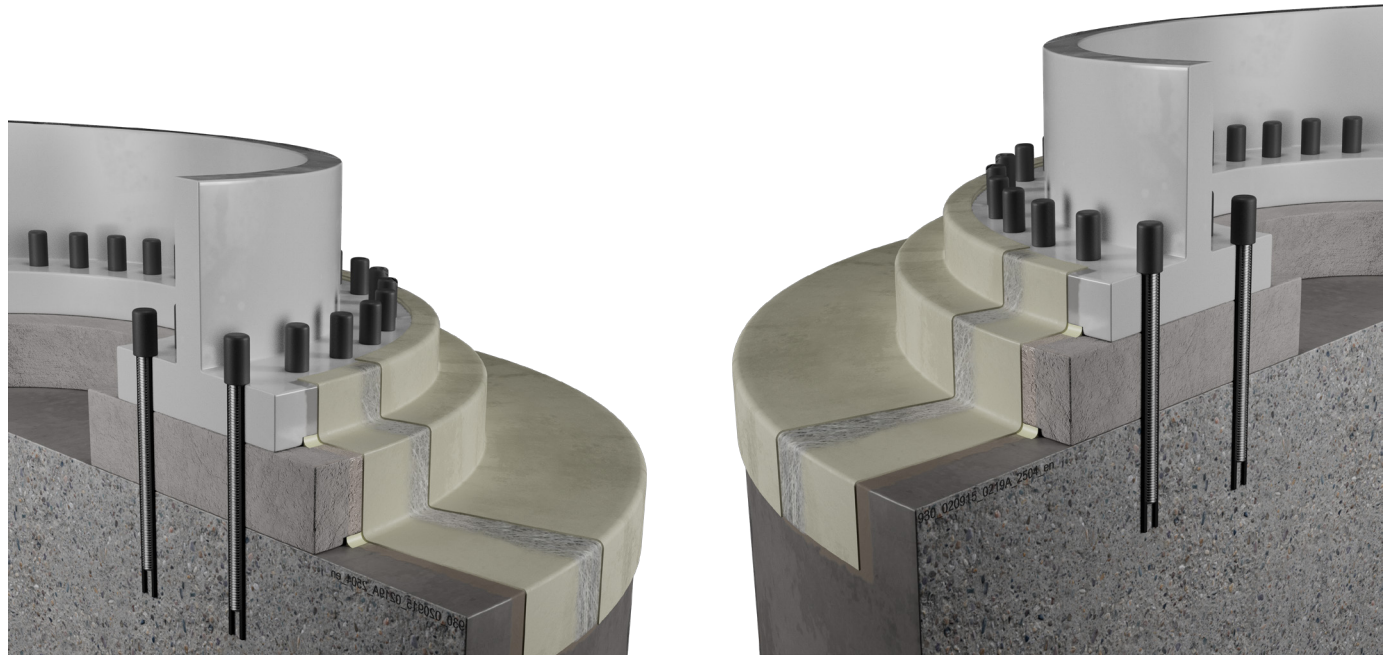
Resistant to harsh climatic conditions at wind farms.



EASY APPLICATION

No need for special equipment.

Sika solution	Main Characteristics
Sikalastic®	High-performance, liquid-applied polyurethane or cementitious waterproofing membranes
Sikaflex®	Moisture-curing, elastic polyurethane sealants

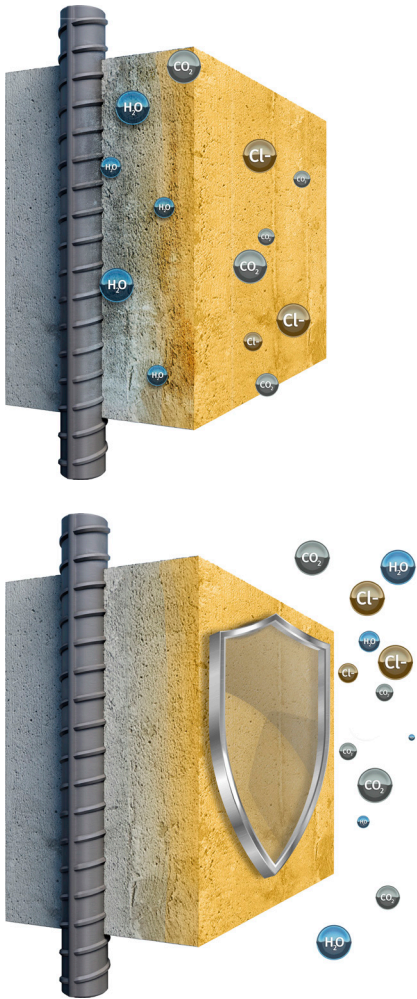


SOLUTIONS FOR CORROSION PROTECTION

STEEL REINFORCEMENT IS THE backbone of wind turbine foundations and precast tower elements, but it is also highly vulnerable to corrosion caused by carbonation, chloride ingress, and moisture penetration.

Once corrosion sets in, it can rapidly compromise structural integrity, safety, and service life, leading to costly repairs or even premature failure. Proactive corrosion protection is therefore critical in extending the lifespan of wind energy infrastructure, ensuring that turbines continue to perform reliably in demanding onshore environments.

Our advanced corrosion protection solutions provide a comprehensive approach to safeguarding steel reinforcement in concrete. From corrosion-inhibiting admixtures and protective coatings to galvanic anodes and hydrophobic treatments, these technologies effectively block aggressive agents, mitigate corrosion cells, and maintain the passive layer around steel bars. Designed for long-term durability, ease of application, and sustainability, our systems deliver a robust defense that ensures wind turbine foundations and tower components remain safe, resilient, and efficient throughout their entire service life.



BENEFITS OF SIKA SOLUTIONS



No need for special equipment. Minimize downtime.



Offers maximized service life to structures.



Compatible with other Sika systems.



Solutions for every type of corrosion risk. Low CO₂ footprint. Available in different colors.

Sika solution	Main Characteristics
Sikagard®	Silane-based corrosion inhibitors and water repellents
Sikagard®-550 W Elastic/550/300	1 component, plasto-elastic coating based on UV-curing acrylic dispersion with excellent crack-bridging properties even at temperatures below 0 °C.. Complying with the requirements of EN 1504-2 as protective coating

SOLUTIONS FOR STRUCTURAL STRENGTHENING

WITH THE GROWING DEMAND for renewable energy, extending the service life of existing wind turbines has become more important than ever.

Full replacements are costly and resource-intensive, while strengthening existing foundations offers a sustainable, economical, and efficient way to ensure continued reliability and safety. By reinforcing foundations, operators can maintain performance, adapt to higher loads, and support the transition toward a cleaner energy future.

Sika's advanced CFRP strengthening systems offer a proven solution for upgrading existing foundations with speed and efficiency. Lightweight yet extremely strong, these materials are easy to transport and install and they significantly reduce downtime during the strengthening process. Backed by a comprehensive portfolio and decades of global experience, Sika ensures that wind energy infrastructure remains strong, resilient, and ready for the future.



BENEFITS OF SIKA SOLUTIONS



Fast application and curing. Minimal downtime for energy production.



Does not increase weight during strengthening.



Durable systems for extended service life.

Sika solution	Main Characteristics
Sika® CarboDur®	Carbon fiber plates for structural strengthening
SikaWrap®	Carbon fiber fabric for structural strengthening
SikaDur®	2-component epoxy adhesives for structural strengthening



SOLUTIONS FOR CONCRETE ADMIXTURES

PRECAST CONCRETE ELEMENTS PLAY a crucial role in the construction of concrete and hybrid wind turbine towers as well as their foundations, offering precision, efficiency, and durability.

However, to meet the demanding conditions of wind energy infrastructure, advanced concrete admixtures are essential in optimizing the performance of these precast components. By improving workability, strength development, and durability, admixtures enable superior crack resistance, reduced shrinkage, and enhanced load-bearing capacity, ensuring the long-term stability of wind turbine structures.

Sika's specialized admixtures such as high-range water reducers, accelerators, and durability-enhancing additives significantly improve concrete quality, production efficiency, and sustainability. These solutions allow for faster demolding, reduced curing times, and increased early strength, which are vital for the rapid and cost-effective production of precast components. Additionally, by enhancing freeze-thaw resistance, mitigating shrinkage, and reducing permeability, admixtures contribute to longer service life and reduced maintenance needs, ensuring reliable performance in even the harshest environmental conditions.



BENEFITS OF SIKA SOLUTIONS



FASTER PRODUCTION

High early strength for rapid demolding.



SUPERIOR WORKABILITY

Optimized mixing and placement performance.



ENHANCED DURABILITY

Improved resistance to cracking and shrinkage.



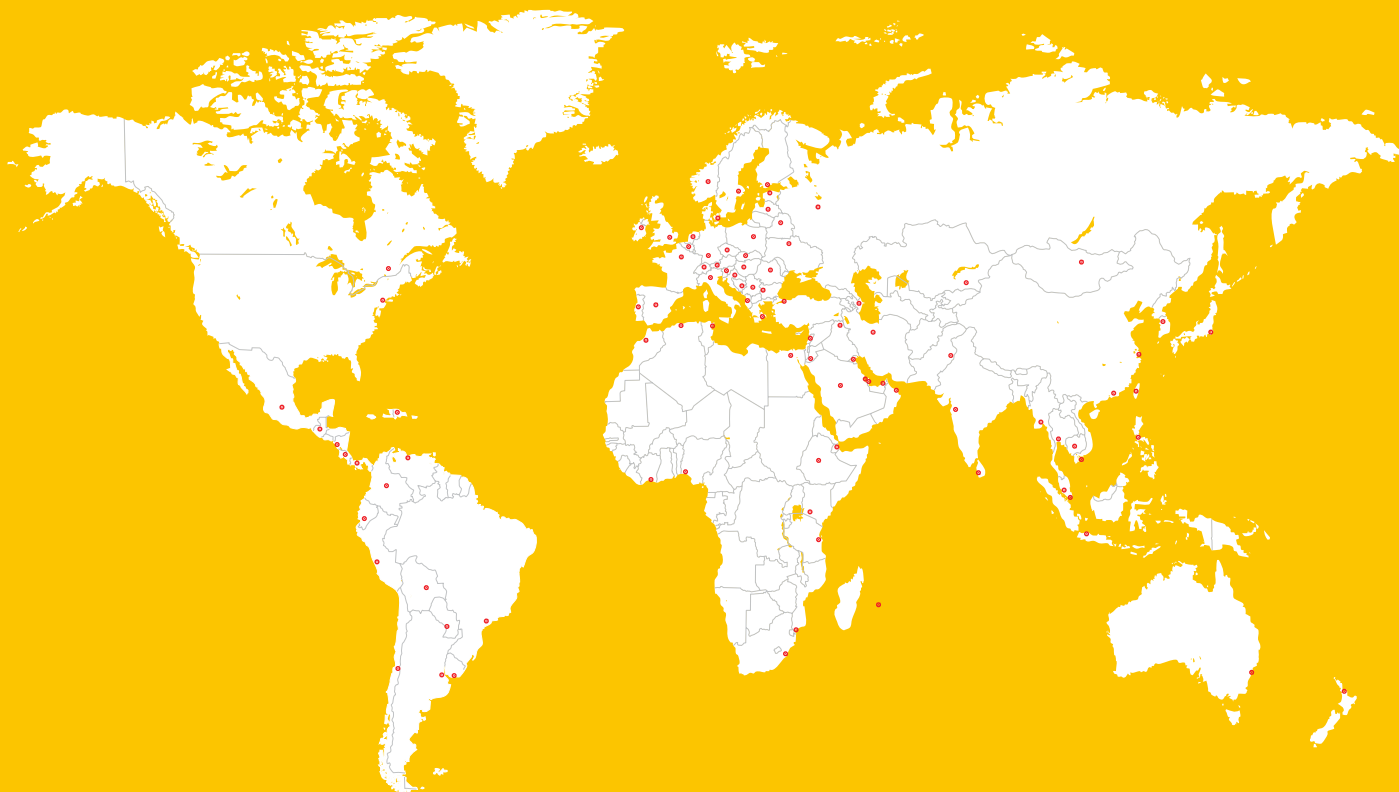
LONGER SERVICE LIFE

Improved performance with fibers and reduced permeability.

Sika solution	Main Characteristics
Sika® ViscoCrete®	Superplasticizer to improve workability and increase strength and durability of high performance concrete
SikaPump®	Pumping agent to enhance pumpability and reduce pumping pressure, especially in case of difficult mix designs and unfavourable grading curves
Sika® ViscoFlow®	Superplasticizer for production of mass concrete and realization of extended workability times
SikaFume®	Additive based on silica fume to enhance durability
SikaFiber®	Micro- and macrofibers for enhanced durability and reinforcing of concrete



BUILDING TRUST



**Visit our Solutions
for onshore wind
construction webpage**

WE ARE SIKA

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

The information contained herein and any other advice are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. The information only applies to the application(s) and product(s) expressly referred to herein. In case of changes in the parameters of the application, such as changes in substrates etc., or in case of a different application, consult Sika's Technical Service prior to using Sika products. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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