

**Project:**  
ENERGY PARK FIFE  
SAMSUNG 7MW Test Turbine

**Location:**  
Scottish area of the North Sea,  
UK, Europe

**Project completed:**  
2013

**Owner/s:**  
Energy Park Fife

**Applicator/Contractor:**  
FoundOcean Ltd.

**Market sector:**  
Offshore wind energy

**Products used & amounts:**  
MasterFlow 9500  
909 tons

## ENERGY PARK FIFE SAMSUNG 7MW Test Turbine



Our reference in Methil (United Kingdom): Energy Park Fife

### The background

The Scottish government gave the green light to Samsung Heavy Industries (SHI) to test its first 7MW offshore wind turbine at Fife Energy Park in Methil. The project has the backing of the Scottish government and energy minister Fergus Ewing granted consent for an offshore demonstration wind turbine with an installed capacity of up to 7MW. Samsung Heavy Industries hopes this prototype testing will boost the reliability and efficiency of its offshore turbines, planned for use in other offshore windfarm projects.

### The challenge

The four-legged steel jacket foundation, weighing over 500 tons, needed to be permanently secured to the seabed. Samsung's 7MW offshore wind turbine, the world's largest offshore turbine weighing itself several hundreds of tons, was installed on top of the foundation shortly thereafter. Each rotor blade measures 83.5 meters, longer than the wingspan of an Airbus A380, making them the longest ever installed to date. This massive structure, with the tips of the blades stretching 196 meters above the sea, is situated 50 meters offshore in the Firth of Forth. A walkway connects the wind turbine to shore for easy access of visitors.

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# ENERGY PARK FIFE

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### Our solution

The steel jacket structure was secured to the seabed using a technique known as rock socket grouting. Piles were inserted into 30 meters deep pre-drilled rock sockets and FoundOcean, our specialist grouting contractor, then deployed its Super Pan Mixer, which is proven to double current grout output rates when compared with other high strength grout mixers on the market. A pump delivered MasterFlow 9500 ExagROUT down a flexible hose and injected it into the annulus. Grouting was done from bottom up, and continued until good quality grout returns were observed from each rock socket.

The second stage involved grouting the annuli between the jackets stab in legs and piles, forming the structural connection. The grout was again, pumped into the annuli from bottom up via the primary grout inlet. Grouting continued until good quality grout was overflowing from the top of the pile. All grout mixing took place onshore with grout being pumped directly to the jacket, 50 meters offshore.

The massive turbine is connected to shore via a walkway to enable visitors to get up close to the structure. This part of the structure was also fixed to the seabed and grouted by FoundOcean.

### The customer's benefit

- MasterFlow 9500 was chosen for this project as it is the only ultra-high strength grout specifically designed for grouting offshore wind turbines with proven fatigue resistance
- Proven and certified quality, which is independently tested
- Proven fatigue resistance, ensuring long durability
- Zero autogenous shrinkage
- Faster, more cost-effective installation
- Rapid strength gain, even at very low temperatures, for fast mounting of towers
- Installation cost considerably reduced due to faster overall installation
- Earlier operation of the wind farm and return on investment
- Wind turbines securely installed
- Easier and more secure design with high safety factor
- High early and final strengths

### Projects facts at a glance

- Number of turbines: 1 × Samsung 7 MW
- Homes equivalent: 3914
- CO<sub>2</sub> reduced per year 7910 tons
- Turbine tip height: 196 meters above mean sea level
- Hub height: 110 meters
- Rotor blade diameter: 171.2 meters
- Typical water depths: 5 meters
- Construction period: June 2013 – September 2013
- Foundation type: Jacket
- MasterFlow 9500: 909 tons

### Master Builders Solutions from BASF

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Master Builders Solutions is built on the experience gained from more than a century in the construction industry. At the core of the Master Builders Solutions brand is the combined know-how and experience of a global community of BASF construction experts, who connect with you to solve all of your construction challenges.

Further information is available at:

[www.master-builders-solutions.basf.co.uk](http://www.master-builders-solutions.basf.co.uk)