

**Project:**

West of Duddon Sands  
Offshore Windfarm

**Location:**

Irish Sea, UK  
Europe

**Project completed:**

2013

**Owner/s:**

Dong Energy in joint venture  
with Scottish Power  
Renewables

**Applicator/Contractor:**

FoundOcean Ltd.

**Market sector:**

Offshore wind energy

**Products used & amounts:**

MasterFlow 9500  
4,770 tons

## West of Duddon Sands

### MasterFlow 9500 for a 389 MW offshore windfarm



Our reference in the Irish Sea (United Kingdom): West of Duddon Sands

#### The background

The West of Duddon Sands offshore Windfarm, one of the larger European offshore projects, was constructed by DONG Energy and Scottish Power Renewables in the east Irish Sea, approximately 14 km from Walney Island and west of Blackpool. This project required 108 monopile foundations for the turbines and will ensure clean renewable energy for more than 300,000 UK households.

#### The challenge

The West of Duddon Sands Windfarm involved one of the biggest offshore grouting contracts in UK waters built to date. The foundation installation contract was carried out by Offshore Wind Force, a joint venture of Dutch-based contractors Volker Stevin Offshore and Boskalis Offshore. The 108 turbines will be housed on mono pile foundations and will require specialist grouting works to fill the annular gaps between the mono pile and transition pieces. The installation of the foundations and grouting of the annuli was done under difficult offshore conditions, with short weather windows and large tide differences of just over 8 meters.

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## MasterFlow 9500 for a 389 MW offshore windfarm



Source: ©FoundOcean  
Our reference in the Irish Sea (United Kingdom): West of Duddon Sands

### Our solution

After installation of the monopile foundations into the seabed, transition pieces are positioned over the monopiles and lined out for verticality of the turbines to be installed.

Fixed grout lines fabricated on the transition pieces allowed for connection of flexible hoses at the access platform. These flexible hoses then extended to the turbine deck to allow the grouting contractor to connect grout hoses via a flexible boom arm from the vessel.

Over 4,770 tons of MasterFlow 9500 ExagROUT was pumped into the monopile transition piece connections using the FoundOcean Super Pan Mixer which is proven to double current grout output rates when compared with other high strength grout mixers on the market.

The project to install the 108 foundations, including the grouting works, took just 5 months to complete, averaging 21 foundation installations per month. A world record in the industry, and a new benchmark for future offshore windfarms.

### The customer's benefit

- The high mixing and delivery system helped set a record for the fastest foundation installation: a total of 8.8 hours including the monopile installation, levelling of the transition piece, and the grouting
- Because of the early strength development of MasterFlow 9500, the permitted weather window, which is necessary for the installation operation, was reduced by 25% to only 18 hours
- Project efficiency was thereby significantly improved

### Projects facts at a glance

- Number of turbines: 108 × Siemens 3.6 MW
- Windfarm total capacity: 389 MW
- Homes equivalent: 300,000
- CO<sub>2</sub> reduced per year 43586 tons
- Turbine tip height: up to 150 meters above mean sea level
- Typical water depths: 18 – 24 meters
- Area of the windfarm: 67 km<sup>2</sup>
- Construction period: April 2013 – November 2013
- Foundation type: Monopile / Transition Piece
- MasterFlow 9500: 4,770 tons

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Further information is available at:  
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