

# SUCCESS STORY

Equinor successfully tests latest ABB technology for reliable temperature measurement in challenging offshore conditions



**ENGINEERED  
TO OUTRUN**

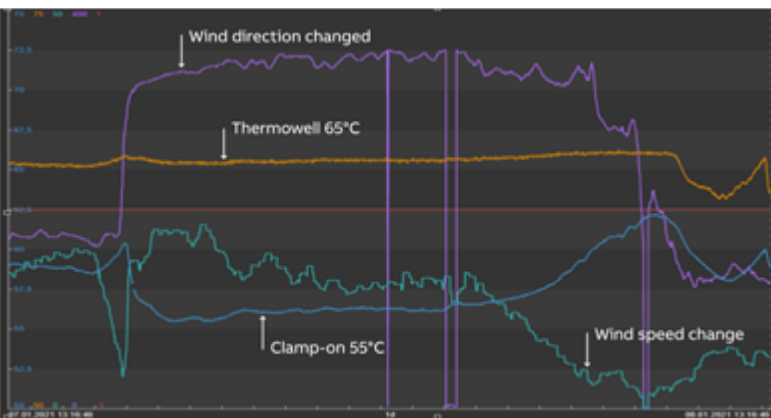
**High accuracy temperature measurement is crucial in all stages of oil production, from initial extraction all the way to final distribution. Find out how ABB's latest technology is helping Equinor with reliable temperature monitoring in the Johan Sverdrup oil field in the North Sea.**

Johan Sverdrup is the third largest oil field on the Norwegian continental shelf, and a major supplier of energy to Europe. The entire field is now on stream, and accounts for roughly a third of Norway's oil production.

The field is located in the Utsira High area in the North Sea, 160 kilometers west of Stavanger, in water depths of 110-120 meters, and covers an area of 200 square kilometers.



# ROBUST AND RELIABLE TEMPERATURE MEASUREMENT FOR OFFSHORE CONDITIONS



“We observed that with wind from the north or south, above a certain wind speed, the deviation increased up to 10°C in worst conditions. We could see that the wind tunnel between the first and second stage separators led to an external cooling of the piping.”

- Equinor

Temperature is one of the most fundamental and essential measurements in the oil and other process industries, vital for both safety and efficiency of operations. To monitor and control upstream oil and gas processes, operators need robust and reliable temperature measurement.

In wellhead applications, the mixture of oil, water, and gas flowing at high speed makes the use of conventional invasive thermowell measurements difficult. Given the importance of temperature, operators resort to using clamp-on temperature transmitters to measure pipe temperature as a proxy for process temperature. However, under the challenging ambient conditions at offshore locations these measurements can be subject to unpredictable errors.

A comprehensive study and evaluation by Equinor on their Johan Sverdrup oil platform highlighted the extent of these errors in typical applications. Comparisons between invasive and conventional clamp-on temperature measurements showed that the latter is affected by factors such as wind speed, the amount and type of thermal insulation, and the design of the clamp-on sensor.

This resulted in deviations of up to 10°C with typical process temperatures of 65°C.

# NEED FOR STABLE CLAMP-ON TEMPERATURE MEASUREMENT SOLUTION FOR JOHAN SVERDRUP

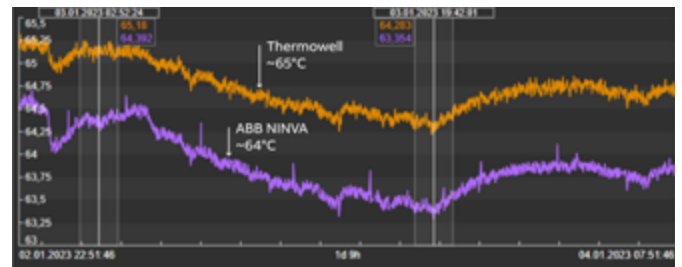
The team at Equinor was on the lookout for a stable clamp-on temperature sensor for reliable temperature measurement in the challenging offshore conditions of the North Sea.

Equinor conducted trials using ABB's NINVA clamp-on non-invasive temperature sensor, comparing it against invasive measurement solutions in the field under long-term conditions.

As a first step, the team used ABB's performance predictor to estimate the expected difference between the pipe surface temperature and the bulk process temperature at the process location. Considering that the difference was minimal even under challenging conditions, Equinor installed NINVA, monitoring it for approximately six months in the winter period. The measurement was on a large diameter pipe using ABB's unique remote mount TSP341-N non-invasive sensor connected to a TTF300 Field Transmitter.

With a dual sensor tip and proprietary approach to compensate for typical errors of conventional surface sensors, NINVA accurately measured the surface temperature of the pipe and matched the predicted performance.

The deviation between the invasive and non-invasive measurements was between 0.8 and 1.5°C under nominal process conditions, regardless of weather conditions. During the test, the engineers used 10 cm insulation over the sensor covering an area of approximately 0,5 meters in each direction.



“With NINVA, we see a stable, plug-and-play clamp-on temperature measurement solution that can be used to infer the process temperature in some of our challenging applications.”

- Equinor

NINVA installed in a remote sensor configuration in the Johan Sverdrup oil field in the North Sea.

# INNOVATIVE ENGINEERING, DEPENDABLE TEMPERATURE MEASUREMENT

**ABB's NINVA offers a safer and simpler approach to temperature measurements, eliminating the costs and risks of installing an invasive thermowell. NINVA is SIL2 certified, meaning that it can be used in applications where safety is paramount.**

Find out if NINVA can support you with your next temperature measurement challenge by checking NINVA's expected performance in the performance predictor on ABB's [My Measurement Assistant platform](#).

Top photo by Jonny Engelsvoll and Lizette Bertelsen © Equinor

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