

Innovative measuring technology for the former

## OnQ FormingSens opens up new perspectives

Changes in the forming section have a far-reaching impact on paper moisture and consequently on the entire paper manufacturing process. Now, for the first time ever, it has been possible to develop an online sensor that determines the water weight in the former in a reliable, reproducible and consistent manner.



*OnQ FormingSens: small tool, big impact.*

An important parameter in the former is the volume of water, which can be modified using foils, vacuum or wet suction devices. Until now, determining the water weight or dry content in the former was almost exclusively the domain of hand-held measuring instruments. These provide data sporadically and therefore constitute merely a snapshot of the processes taking place in the former. However, process conditions such as vacuum settings or the condition of the forming fabrics change constantly and affect the entire downstream paper manufacturing process. This is why the water weight has to be measured continuously to ensure consistently favorable former settings.

The OnQ FormingSens now provides additional leverage for determining water weight online and for optimizing the former. When developing the OnQ FormingSens there was close

cooperation from the very start between Voith Paper's process technologists, fabric specialists and automation engineers. This meant, for example, that initial tests of working models (pre-prototypes) and prototypes could be carried out beforehand on the former test rig and pilot facilities VPM 5 and VPM 6 at the Paper Technology Center in Heidenheim under realistic machine conditions. This not only substantially reduced development time but also played a key role in enabling a reliable and fully functioning product without 'teething troubles' to be installed prior to the first trial run at the customer's premises. In addition, endurance tests on the pilot machines and in the field have demonstrated that the low-wear, low-abrasion ceramic sensor surface does not affect either the forming fabric or the paper.

### Simple process in a complex environment

The OnQ FormingSens is a sensor that enables accurate measurement of water weight in the former by means of high-frequency microwave technology. In the process, the natural frequency of a resonator specially fabricated for this application is measured. The natural frequency of a system capable of oscillating, and that includes water molecules, is the frequency with which the system can vibrate once set in motion. This complex process can be compared with playing the guitar. The vibration of the string produces a sound in the resonance chamber (soundbox) of the guitar. Depending on its thickness, each string has a different natural frequency. The thicker the string, the deeper the sound, at the same string tension.

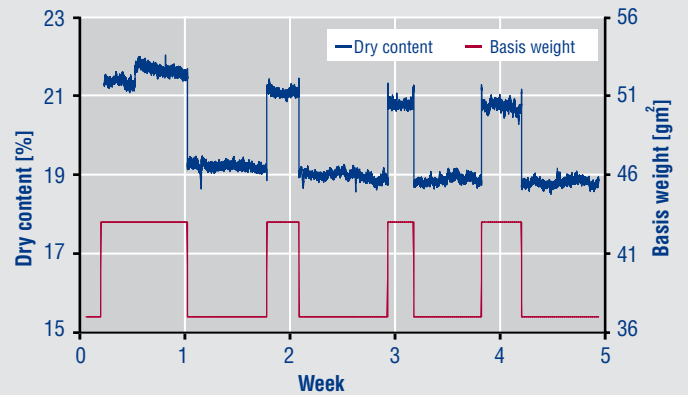
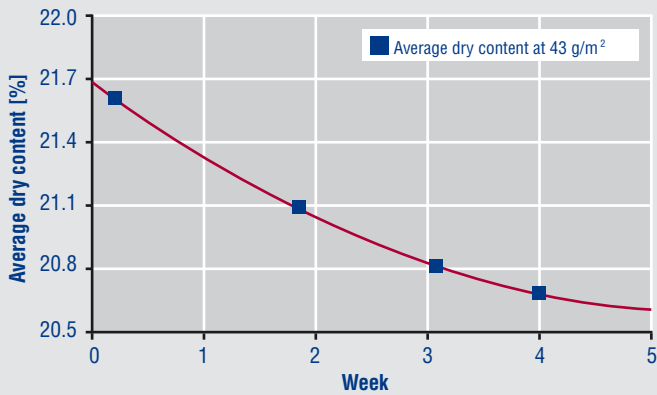
The measuring process in the former works in a similar way. The greater the volume of water above the sensor, the lower the resonance frequency. Therefore, the natural frequency clearly depends on the volume of water above the resonator. The electronic evaluation unit used allows this value to be measured accurately and reliably. Automatic temperature compensation in the sensor itself ensures that secondary influences are also minimized.

### Numerous applications with great benefits

The readings supplied by the OnQ FormingSens are the basis for numerous optimizations in the former. The sensor's technical



*The sensor does not leave any marks on the forming fabric or paper.*



In future papermakers will be able to monitor dry content over the entire lifetime of the forming fabric.

The mean dry content allows the ideal fabric to be selected.

features allow it to be used for all types of former and paper grades. For the first time, for example, the dewatering behavior of forming fabrics can be analyzed in depth over their entire service life. The measurements from the OnQ FormingSens can therefore assist in analyzing the performance of the forming fabrics used. Using the data provided, Voith Paper specialists can analyze the performance of the fabrics over their entire service life and determine the best choice of fabric in consultation with the customer.

The OnQ FormingSens enables the papermaker to take suitable measures to adapt the runability of the paper machine to the operating characteristics of the fabric. It is no longer necessary to rely on 'gut feeling' or indirectly measured variables. If the sensor is installed at the appropriate location in machine cross direction, the threading process from former to press section following shutdowns or web breaks can also be shortened. As the tear strength of the paper depends on the moisture content and largely determines the

threading process, an accurate measurement of water weight is the crucial key to success here too. A further distinctive feature is the sensor's measuring accuracy. Hand-held measuring devices are designed to determine the greatest possible volumes of water. Although this allows for an extremely large measuring range, this is always at the expense of accuracy. If, in the case of graphical paper machines, the dry content at the end of formers is to be determined to the nearest 0.1%, the measurement has to be able to detect differences of less than 1 g/m<sup>2</sup> water weight. The OnQ FormingSens is capable of doing this and also offers a sufficiently large measuring range of 100 to 5,000 g/m<sup>2</sup>. This means, for example, that the dewatering of graphical paper machines can be controlled continuously to determine the optimum dry content. This enhances runability and helps to save vacuum or drive energy.

Last but not least, online measuring techniques improve occupational safety. The completely safe microwave

technology can replace the radiation used in many hand-held measuring devices. In addition, operators using hand-held devices on a working paper machine are exposed to quite considerable risks, which are completely avoided when using the no-maintenance OnQ FormingSens for continuous measurement.

**On focus: OnQ FormingSens**

- ProSafety +++
- ProRunability +++
- ProQuality +++
- ProSpeed ++
- ProSpace ++

Section: former  
Paper grade: all

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