

## NomaSense O<sub>2</sub> P300&P6000

### *What is the technology used for the NomaSense O<sub>2</sub> analyzers?*

NomaSense O<sub>2</sub> analyzers are based on luminescence technology which allows for precise, accurate and non-destructive measurement of oxygen in wine.

### *How does the luminescence technology work?*

The instrument generates a blue light (high Energy) which is sent to the oxygen sensor via the optical fiber. The light energy is absorbed by the sensor, which leads to an excitation of the electrons in the sensor dot to a higher energy state level. As this state is not stable, the electrons go naturally back to the basic ground state. This loss of energy is materialized by the emission of a red light which is returned to the device through the optical fiber. The delay between the emission of the blue light and the recovery of the red light is correlated to the concentration of oxygen in the environment surrounding the sensor. The NomaSense O<sub>2</sub> analyzers measures this delay (and not the intensity of the light) which provides a better robustness of measurement over time.

### *Where can I use NomaSense O<sub>2</sub> analyzers?*

Oxygen can be measured both in gas phase or liquid phase. NomaSense analyzers allow measuring dissolved oxygen in wine (tank, barrel, pipe, bottle or Bag-in-Box<sup>®</sup> for example) as well as oxygen present in a gas phase (headspace in bottle, BIB, tank, etc.). Different accessories had been developed to help performing these different measurements (to know more contact us).

### *What is Total Package Oxygen?*

Total package oxygen is the total amount of oxygen present in the packaging after conditioning. It is the sum of the oxygen dissolved in the wine and the oxygen present in the headspace, as follows:

$TPO = DO \text{ (dissolved oxygen amount)} + HSO \text{ (headspace oxygen amount)}$

DO levels in the bottle can often reflect oxygen pickup during bottling operation, for example during bottling system's filling and filling operations, while HSO values are mostly linked to the performance of the inerting devices that are active on a bottling line (e.g. nitrogen sparging, vacuum, etc).

### *How do I calculate TPO (Total package oxygen) with NomaSense O<sub>2</sub> P300 or P6000 analyzers?*

TPO calculation is integrated and automatically done by the device for bottles as well as for Bag-in-Box. After entering the sample details (volume of the bottle or the BIB and size of the headspace), you can measure oxygen in the headspace and dissolved oxygen. NomaSense analyzer will directly calculate the TPO and display the result in mg/L. For more information please download Application Note N°1 (for bottle) and N°2 (for Bag-in-Box).

### *Can I measure HSO directly in ppm?*

Oxygen in the headspace (HSO), and generally in a gas phase, has to be measured in hPa in order to avoid biases induced by pressure change (vacuum, overpressure...). By definition, the partial pressure measurement in hPa is not dependent on the atmospheric pressure used for the calibration. It is therefore not possible to measure HSO directly in ppm with the NomaSense device because in that case the calculation done by the software would be for O<sub>2</sub> dissolved in water.

### *How can we express TPO in ppm if we measure HSO in hPa?*

TPO is the sum of DO (expressed in ppm) and HSO (expressed in hPa). HSO in ppm is directly calculated by the TPO calculator embedded in the NomaSense O<sub>2</sub> analyzers. First the HSO content in mg is calculated from the ideal gas law. The mass of O<sub>2</sub> obtained is then divided by the volume of wine in the bottle to obtain a result in ppm (mg/L).

### *Do I need to open bottle to measure its TPO?*

Measurement can be totally non-invasive using oxygen remote sensors into flint glass bottles.

### *Can the TPO measurement be done in brown, blue or green bottles?*

Yes. To do measurement in a dark bottle we have developed a “piercing system” which allows measuring headspace oxygen. To know more about the piercing device please download the application note N°5.

### *Do I need to wait for stabilization before measuring dissolved oxygen in a bottle or a BIB?*

Stabilization is required in case of measurements done in a static liquid. In such conditions, oxygen has to diffuse through the oxygen sensor to allow measurement. We recommend waiting for 30-40 min to measure dissolved oxygen in a bottle or a BIB.

### *Is it possible to accelerate stabilization?*

Stabilization is only required when oxygen sensors are into a static liquid. During a dynamic process, the flow of liquid reduces response time and dissolved oxygen can be measured instantaneously. When using a dipping probe, stirring is recommended to accelerate stabilization.

### *What factors can affect Oxygen measurement?*

Temperature, atmospheric pressure, ethanol and sugar content can influence oxygen readings. All of these parameters can be compensated thanks to either different tools or integrated formulas in the device. Temperature effect is compensated using the temperature probe PT100 or after entering manually a known temperature. Atmospheric pressure is compensated via an integrated barometer. Ethanol and sugar contents are compensated thanks to integrated formulas built in the devices.

### *Are the sensors specific to oxygen?*

Oxygen Sensors PSt3 and PSt6 do not have any cross sensitivity for carbon dioxide (CO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), pH, any ionic species like sulfide, sulfate, chloride or salinity. Turbidity and flow rates have no influence on the measurement. The sensors can also be used in methanol – and ethanol –

water mixtures as well as in pure methanol and ethanol. We recommend avoiding organic solvents, such as acetone, chloroform or methylene chloride, which may swell the sensor matrix.

### *What is the weight of the device?*

NomaSense O<sub>2</sub> P300 and P6000 are very light, only 700 g.

### *Is the device waterproof.*

No, it is not. However, the device can tolerate some liquid sprayed on it.

### *What is the accuracy of the temperature probes?*

Temperature probes PT 100 have an accuracy of 0.5°C.

### *What can I do when my dipping probe is broken?*

Unfortunately, broken dipping probe cannot be repaired. You can order a new dipping probe on our website following this link.

### *What is the response time for the dipping probe?*

Dipping probe response time depends on the environment in which the measure is done. In gas phase, probe needs a few seconds to stabilize. In a liquid, without stirring, the probe will take 5-10 minutes to stabilize. To speed up stabilization, stirring the probe is recommended. To have more information please download Application Note N°4.

### *Is it possible to transfer data logged in the NomaSense O<sub>2</sub> analyzer?*

All data logged in different files in the analyzer can be transferred to a PC/notebook via USB connection using Datamanager software. Datamanager software also allows you to manage calibration parameters.

### *When should I use single scan or interval scan?*

For routine use, we recommend to choose interval scan. Common settings are settled to 2 seconds between each scan. Measurements can be stopped by pushing "OK" on the device. Single Scan is used for a single measurement.

### *How do I calibrate my oxygen sensors?*

With NomaSense O<sub>2</sub> P300 and P6000, sensors (PSt3 and PSt6) and dipping probe are pre-calibrated. Each batch of sensors has a corresponding QR code which is used to enter calibration. To know more, please download the NomaSense Quick Guide

### *Are my sensors working properly? Is my calibration still good?*

To verify if oxygen sensors are still working well with the current calibration, you just have to read the sensor in air. Please make sure to have the right temperature on your device. If values are between 20 and 22% of oxygen, oxygen sensors are still well calibrated. If not, we recommend you to

re-calibrate them or to replace them if needed. For more information please download the Application Note N°3 or contact-us to buy new sensors.

### *Which side of the oxygen sensors must be glued to the bottle wall?*

The oxygen remote sensor has a pink side and a black side. The pink side has to be glued to the container wall (bottle, sight glass etc...). The black side of the sensor foil has to face the sample surface. Please download Application Note N°1 and N°2 or watch the video N°2.2.2 or N°2.2.3.

### *Where can I glue my oxygen sensors?*

The sensors can be integrated in any kind of transparent, non-fluorescent container (glass or plastic). Slightly milky containers are also appropriate. The thickness of the container wall should not exceed 8 mm.

### *What kind of glue should be used?*

We provide you with the appropriate Silicone glue in the NomaSense O<sub>2</sub> starter kit. To order this product, please contact us.

### *Can I touch my oxygen sensors with my fingers?*

In case of an accidental skin contact, oxygen sensors should not be too much affected, but we recommend avoiding skin contact because skin acidity can damage the stability of the sensors.

### *Do the oxygen sensors resist cleaning practices?*

Oxygen sensors are non-autoclavable (NAU). They are resistant to cleaning up to 70 °C, 3% H<sub>2</sub>O<sub>2</sub> and up to 4-5% for acidic agents (HCl, H<sub>2</sub>SO<sub>2</sub>). Avoid exposure to more than 70-80 ° C frequently and avoid organic solvents (acetone, toluene ...).

### *Are oxygen sensors reusable?*

Yes, they are.

### *What is the PSt3 and PSt6 sensors' shelf-life ?*

The PSt3 and PSt6 sensors calibration is guaranteed for a 2 years period. After this period, the sensors must be changed to ensure the reliability of the measurements. This remark applies to all consumables and accessories using PSt3 or PSt6 sensors: dots, dipping probes, piercing system.

### *Are the oxygen sensors food grade compliant?*

Yes, they are.

### *What is the difference between PSt3 and PSt6 oxygen sensors?*

The PSt3 sensors are designed for the NomaSense O<sub>2</sub> P300 with a limit of detection of 15 µg/L (measurement range for dissolved oxygen: 0 – 22 mg/L). PSt6 type is suitable for the NomaSense O<sub>2</sub> P6000 with a limit of detection of 1 µg/L dissolved oxygen (measurement range for dissolved oxygen: 0 – 1.8 mg/L).

**For any questions concerning older analyzer generation, NomaSense Prime or Trace, please contact us directly.**