

## Fail-safe Oxygen Measurement in Additive Manufacturing

OXYGEN  
MEASUREMENT  
SOLUTIONS





## Who we are

We, at Ntrion, are proud of the reputation we have developed since our foundation in 1987. We have established ourselves as market leaders in the design and manufacture of oxygen measurement systems for process and people safety, in a wide variety of industrial applications.

Today, Ntrion strives to exceed customer expectations by continuous innovation, developing better, more efficient gas analysis and control solutions to help maximize process efficiencies, improve product quality, protect the health and safety of personnel and the environment, as well as, preserve capital equipment and investments.

Our experienced team provides customized solutions across a wide range of sectors internationally. Our aim is to ensure a qualitative and efficient oxygen measurement solution can be delivered to every customer's specific requirements.

## Providing fail-safe oxygen measurement across a range of industries since 1987

Ntrion is the market leader for the supply of oxygen analysis-based inerting control systems for safety critical applications.

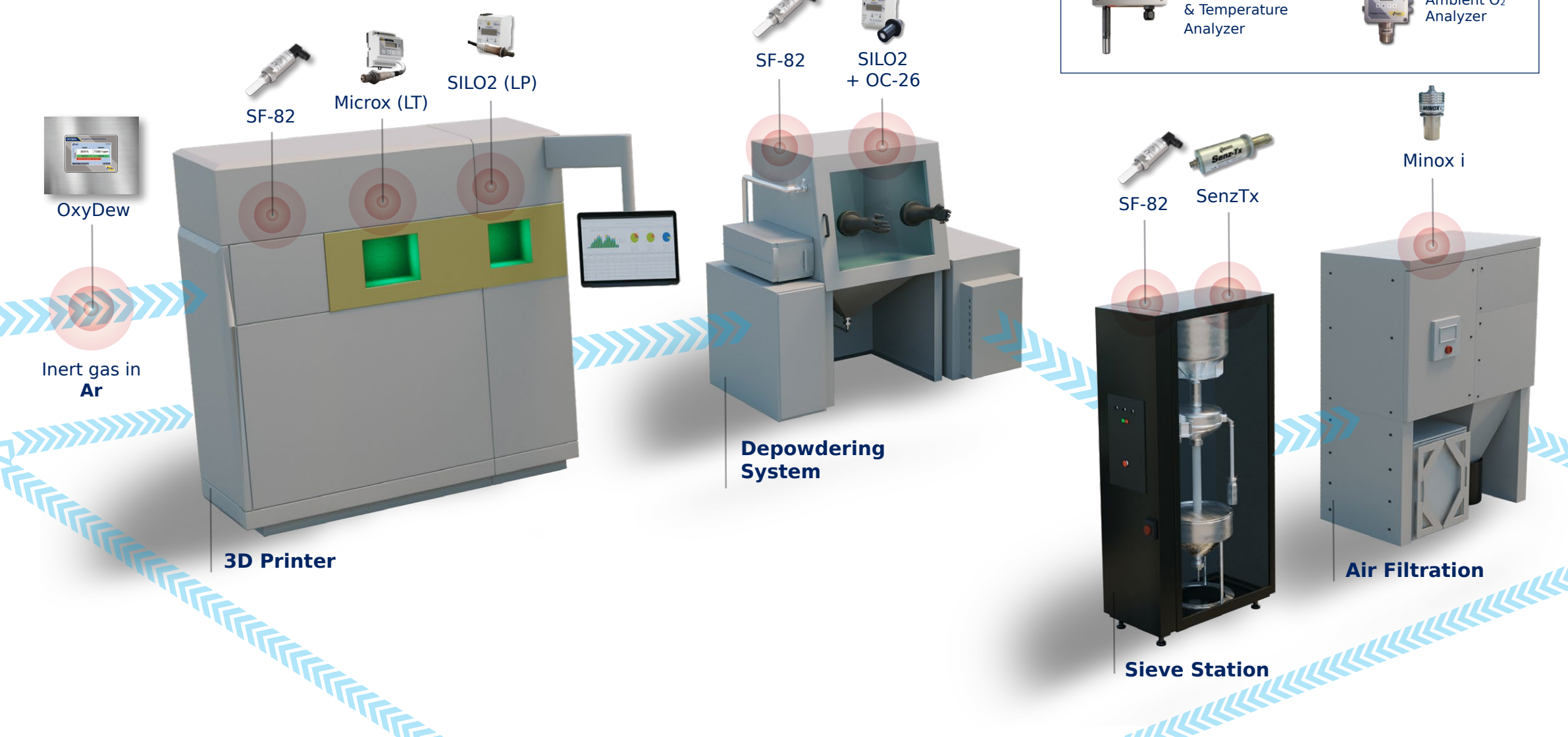
We have the ability to supply either in-line or extractive oxygen measurement systems designed to maintain an inert environment for product quality and process safety applications.

We have developed successful relationships with OEM manufacturers within the Additive Manufacturing (AM) industry for both Selective laser sintering systems (SLS) and Direct metal laser sintering systems (DMLS).

Our success is based on supplying reliable and fail-safe oxygen measurement on harsh applications within the AM industry.

Assuring our customers through cross-industry experience and SIL 2 (IEC 61508) rated products that Ntrion can provide the most suitable solution to their individual needs.





## Application

Metal additive manufacturing is the process of creating a 3D object from a CAD model by building it up from metal powder, layer by layer. This technology can produce complex shapes that are not possible with traditional manufacturing methods.

The most common industries to commission production of specific components are aerospace, defense and transport, so reducing the chances of oxidization of the metal during the build process is essential as this can lead to a build failure, stress test failure or also a density test failure due to low quality standards. Interstitial absorption of any oxide embrittles the weld and may render the component useless.

The future adoption of this technology in many industries depends on the measurement and control of oxygen concentration within the manufacturing process.

Ntron have been working alongside some of the industry leaders in AM machine manufacturing to supply high performance oxygen analyzers measuring from 1 ppm up to 25% oxygen within the process.

Ntron's unique range of OEM oxygen analyzers have been specifically designed to be integrated into the AM machine manufacturer's control and safety systems.

Ntron employs zirconia sensor and solid state technology which has been specially developed for harsh process applications.

We have the ability to supply a SIL2 rated oxygen analyzer designed to comply with the requirements of IEC 61508 for the fail-safe oxygen measurement on inert gas blanketing applications.

## Safety

- Ntron fail-safe solution (Analyzer & Sensor) meets the requirements of IEC61508 (SIL2)
- SIL-O<sub>2</sub> is rated to SIL2, with a probability of failure on demand (PFD) of less than 0.01
- Software is validated to EN50271

## Reliability

- Zirconia sensor with long life and no drift
- Robust performance proven in harsh environment of AM build chamber
- Suited to inert gas blanketing applications

## Accuracy

- Capable of detecting 1ppm O<sub>2</sub>
- Operating ranges from 0-10ppm to 0-25%
- Response time T90 <5 seconds

## The Ntron solution

Ntron has developed an in-line SIL2 rated oxygen analyzer designed specifically for harsh applications within the additive manufacturing industry.



SIL O<sub>2</sub> is a SIL2 rated oxygen analyzer that has been developed specifically for the measurement of oxygen for safety critical applications.



SenzTx zirconia oxygen transmitter which has a long life and fast response time. This has a measurement range of 1ppm up to 25% oxygen



The OxyDew is a wall mounted instrument designed to measure the quality / purity of the inlet gas (argon).



The Minox i intrinsically safe oxygen transmitter utilizes advanced galvanic fuel cell technology and it also incorporates a one touch calibration system by means of the MagTip calibration tool.



The AM Trace is a lightweight portable oxygen and moisture analyzer designed to measure the internal atmosphere in the build chamber of an additive manufacturing machine.

## SenzTx Oxygen Transmitter



The SenzTx is a compact and robust O<sub>2</sub> transmitter that utilizes zirconia or electrochemical technology to give a reliable measurement of oxygen concentration.

The zirconia sensor offers fast response time and a long service life with virtually no drift, whilst the electrochemical sensor allows measurement in background gases containing hydrocarbons.

The minimum output range of 0 to 10ppm is ideal for nitrogen generation or glove box monitoring. The SenzTx transmitter can also be supplied with measurement ranges up to 0 to 96% O<sub>2</sub> for oxygen concentrators.

The flexibility is further enhanced by a choice of process connection / output options.

## SIL O<sub>2</sub> Oxygen Analyzer

The SIL O<sub>2</sub> Safety Integrity Level oxygen analyzer is highly reliable for the measurement of oxygen for safety critical applications.

This device is designed to measure oxygen concentration on safety critical applications within the chemical, pharmaceutical and additive manufacturing industries.

## Microx Oxygen Analyzer

The Microx is a compact and robust oxygen analyzer that utilizes zirconia or electrochemical technology to give a reliable measurement of oxygen concentration.

The zirconia sensor offers fast response time and a long service life with virtually no drift, whilst the electrochemical sensor allows measurement in background gases containing hydrocarbons.

The minimum output range of 0 to 10ppm is ideal for nitrogen generation or glove box monitoring. The Microx analyzer can also be supplied with measurement ranges up to 0 to 96% O<sub>2</sub> for oxygen concentrators.

The flexibility is further enhanced by different mounting options and multiple sensor types.

## AM Trace AM Chamber Atmosphere Analyzer



The AM Trace is a lightweight portable oxygen and moisture analyzer designed to measure the internal atmosphere in the build chamber of an additive manufacturing machine.

The electrochemical oxygen sensor can measure from 1 PPM up to 25% oxygen. This sensor is unaffected by hydrocarbons or volatile atmospheres and is specifically designed for low oxygen measurement (<100 PPM) on additive manufacturing machines. The AM Trace has a fast response time from 20.9% to low PPM oxygen.

The AM Trace also incorporates a moisture sensor which allows measurement of moisture in the range of 0-1000 PPM.

The AM Trace utilizes touchscreen technology and front facing inputs / outputs to integrate into any system with ease.

## Minox i Intrinsically Safe Oxygen Transmitter



The Minox i is a highly reliable and cost-effective two-wire, loop-powered transmitter with a linearized 4 to 20 mA output. The standard offering has a measurement range of 0-25% oxygen.

This compact transmitter utilizes advanced galvanic fuel cell technology that provides a long sensor life with a high level of accuracy and stability.

The Minox i incorporates a one touch calibration system by means of the MagTip calibration tool.

## OxyDew Oxygen & Moisture Monitor



The OxyDew is a wall mounted instrument designed to measure oxygen and moisture concentration of the argon gas supply.

This analyzer utilizes zirconia oxygen sensor and advanced ceramic moisture sensor technology to give a reliable solution for the measurement of trace oxygen and moisture in the argon gas supply. The Oxydew has onboard data logging, 4 to 20 mAmp outputs for both oxygen and moisture and configurable alarm contacts.

## Related products



**Gasenz**  
Ambient oxygen analyzer



**TXi**  
Communication & diagnostics terminal



**Rotronic**  
Relative humidity / temperature analyzer



**SF82**  
Dew point and trace moisture transmitter



## Contact Information

### IRELAND

Mullaghboy Industrial Park, Navan, Co. Meath, C15 VFP2, Ireland.

Phone: +353 46 907 1333 | Fax: +353 (0) 46 907 1331 | Email: [sales@ntron.com](mailto:sales@ntron.com)

[www.ntron.com](http://www.ntron.com)

[www.processsensing.com](http://www.processsensing.com)



OXYGEN  
MEASUREMENT  
SOLUTIONS