# Press Release



## Linde launches advanced oxygen measuring technology to improve additive manufacturing

**Munich, 20 September 2016 –** Linde Gases, a division of The Linde Group, today announced the launch of ADDvance™ $O_2$ precision, the first-of-its-kind measuring and analysis unit which will enable metal additive manufacturers to analyse and control more precisely the level of oxygen ($O_2$) and humidity within the printer chamber.

The new technology, developed in response to a need identified by aerospace company Airbus Group Innovations, can detect $O_2$ levels up to 10 parts per million (ppm) within the printer chamber and then modify the gas atmosphere by adjusting the level of argon or nitrogen. The presence of too much oxygen or humidity can pose a challenge to additive manufacturers as it can negatively impact the quality and performance of the item being printed. In addition to ADDvance™ $O_2$ precision allowing for more accurate levels of oxygen and humidity, it does so without cross-sensitivity effects and ensures a constant level of oxygen during the process.

The launch of ADDvance™ $O_2$ precision comes on the back of Linde's recent opening of a dedicated industrial gases laboratory for additive manufacturing in Unterschleissheim, near Munich, Germany. The focus of the laboratory is to research the effect of different atmospheric gases and gas mixtures on the different metal powders used in additive manufacturing in order to optimise the various layering processes. Reproducibility is one of the most important parameters for industries requiring strict consistency in end product, such as the aerospace and automotive industries. ADDvance™ $O_2$ precision is an effective solution to improve reproducibility and through its new research facility Linde will continue to lead research into how oxygen and humidity impact the additive manufacturing process.

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"Linde has always played a leading role in developing new technologies for our customers in order to improve the efficiency of their production processes and quality of output," said Pierre Forêt, responsible for additive manufacturing R&D at Linde. "That Airbus Group Innovations selected Linde to work with them to overcome such a challenge in the pioneering area of additive manufacturing is testament to Linde's technical competence and innovative spirit."

The additive manufacturing process operates within a closed chamber filled with high purity inert gas such as argon or nitrogen. However, impurities due to incomplete purging, small machine leakages and metal powder can have an influence on the oxygen level. A variation in oxygen content in the chamber can result in differences in mechanical properties or chemical composition of the end product – for example a decrease in fatigue resistance.

ADDvance™ $O_2$ precision will be unveiled at Linde's stand 121-123 at World PM from October 9-13 in Hamburg, Germany and then at EuroBlech on stand 142, hall 13, from October 25-29 in Hannover, Germany.

## About The Linde Group

In the 2015 financial year, The Linde Group generated revenue of EUR 17.944 bn, making it one of the leading gases and engineering companies in the world, with approximately 65,000 employees working in more than 100 countries worldwide. The strategy of The Linde Group is geared towards long-term profitable growth and focuses on the expansion of its international business with forward-looking products and services. Linde acts responsibly towards its shareholders, business partners, employees, society and the environment in every one of its business areas, regions and locations

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across the globe. The company is committed to technologies and products that unite the goals of customer value and sustainable development.

For more information, see The Linde Group online at www.linde.com.

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