

OE750

ROLF SANDVOSS INNOVATION CENTER – SAMSON AG

Additive manufacturing and Hitachi's OE750 OES: A perfect combination for SAMSON AG

SAMSON AG was founded in 1907, with headquarters in Frankfurt, Germany. Today, they have 16 production sites and 4,500 employees worldwide. Samson's core business is manufacturing valves, butterfly valves, and modular automation units for use in all areas of process engineering, as well as self-operated regulators for simple control systems with a constant reference variable. Sophisticated transmitters, controllers, and automated systems are also part of the SAMSON product range.

QUALITY ALWAYS COMES FIRST

At the end of February 2021, SAMSON achieved certification as a materials manufacturer for additive manufacturing (AM) in compliance with the Pressure Equipment Directive (PED). This certification requires precise control of the chemical composition of manufactured parts. The various norms and standards that cover the certification recommend different analytical methods. OES (optical emission spectroscopy) analysis is the most simple and elegant for SAMSON and they chose the OE750 spark spectrometer from Hitachi High-Tech Analytical Science for their OES material analysis.

OBJECTIVES

Customer: SAMSON AG

- | Precise control of AM parts for PED compliance
- | Chemical composition analysis, including oxygen

RESULTS

- | Accurate determination of oxygen levels in AM parts
- | Fast and efficient metals analysis

“The OE750 from Hitachi is the best way for us to perform analysis quickly and efficiently.”

Dr. Martin Klein, Development Engineer at
ROLF SANDVOSS INNOVATION CENTER –
Materials Lab SAMSON AG





3D printed valve

“The OE750 from Hitachi is the best way for us to perform analysis quickly and efficiently. We especially liked the robust design and sophisticated software, and these convinced us from the beginning.” Says Dr. Martin Klein, the main user of the spectrometer. “Hitachi’s sales and service responded very quickly, and were courteous and helpful. It is really very easy to do business with Hitachi. The support team at the application centre was also very knowledgeable and helpful.”

SAMSON currently manufactures valve parts from stainless steel 1.4404/316L. Eventually they intend to use other standard metal powders for components in process engineering. By applying the laser beam powder bed fusion method for metals (LB-PBF-M), SAMSON can make pressurized valve parts from the stainless steels 1.4401/316 and 1.4404/316L. Their 3D printer, a TruPrint 3000 by TRUMPF GmbH + Co. KG, produces valves in sizes up to DN 100/ NPS 4 that weigh up to 250 kg.

3D printing makes it possible to rapidly produce parts with complex shapes or geometries that cannot be manufactured using traditional methods. By implementing bionic design, this method also enables SAMSON to create valve parts with novel, optimized topologies, flow paths and functions.

The importance of analyzing oxygen content for 3D metal printing

Many new metal 3D printer accessory systems maintain correct oxygen levels within the build chamber. Unfortunately, for some printers this is not the case. Every machine has small leakages that allow unwanted oxygen to enter the build chamber. In addition, residual humidity within the build chamber can react with laser energy to create oxygen that is not detected by typical sensors within a metal 3D printer.

This means that during a print job, oxygen levels can gradually rise undetected. This must be avoided. Therefore, it is important to monitor the oxygen content within individual samples after printing to evaluate any possible oxygen contamination, and it’s for this crucial measurement that Samson uses the Hitachi OE750.

The OE750 has been designed with a brand-new optical concept (patents pending), plus a newly developed spark stand and spark source give the OE750 its high performance. The optical system offers a gapless wavelength coverage from 120-766 nm. Furthermore, it is very easy to extend the standard calibrations of the OE750, therefore it was possible for Hitachi’s application team to develop a method to monitor the oxygen content in printed samples. This is not possible with other instruments in the price range of the OE750.

So, thanks to the analytical performance of the OE750, Hitachi offers an easy and affordable solution for oxygen monitoring, making it ideally placed to support the growing need for quality control within additive manufacturing in metals.



Dr. Martin Klein (right), Development Engineer at SAMSON AG and Michael Molderings (left), OES Product Manager at Hitachi High-Tech Analytical Science

Hitachi High-Tech Analytical Science

This publication is the copyright of Hitachi High-Tech Analytical Science and provides outline information only, which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or regarded as the representation relating to the products or services concerned. Hitachi High-Tech Analytical Science’s policy is one of continued improvement. The company reserves the right to alter, without notice the specification, design or conditions of supply of any product or service.

Hitachi High-Tech Analytical Science acknowledges all trademarks and registrations.

© Hitachi High-Tech Analytical Science, 2021. All rights reserved.