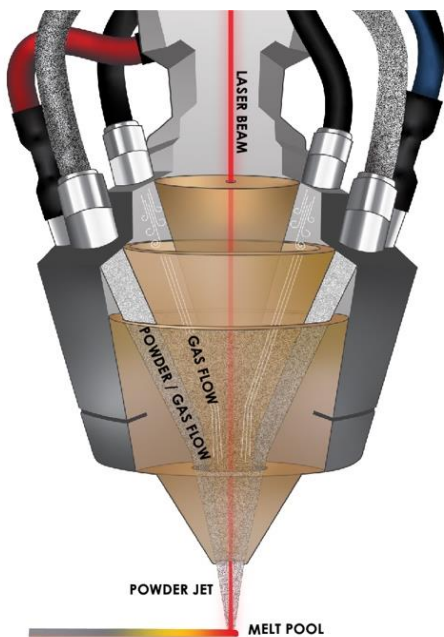


BeAM machines to integrate In-Process Standoff Distance control in partnership with Precitec and Siemens

Strasbourg, Gaggenau, Nürnberg - November 15th, 2019 – The standoff distance sensor will be presented at Formnext, the leading global exhibition and conference on additive manufacturing, which takes place on November 19-22, 2019 in Frankfurt.

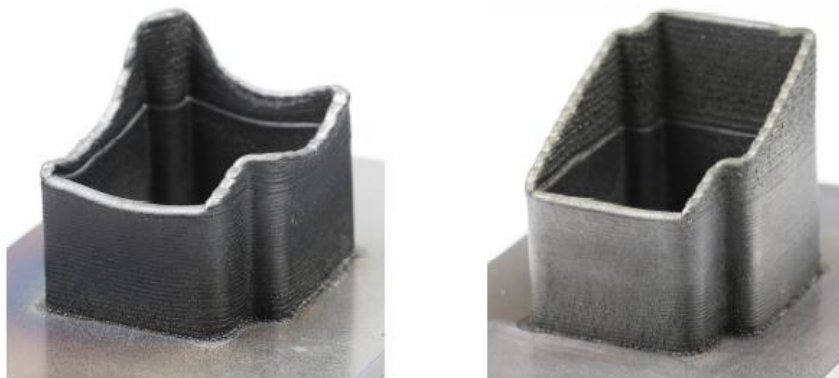
BeAM Hall 12.0 – Stand #C22 | Precitec Hall 12.0 – Stand #A115 | Siemens Hall 12.1 – Stand #D81



Directed Energy Deposition (DED) is an Additive Manufacturing (AM) process where focused thermal energy is used to fuse materials by melting them as they are deposited with a nozzle.

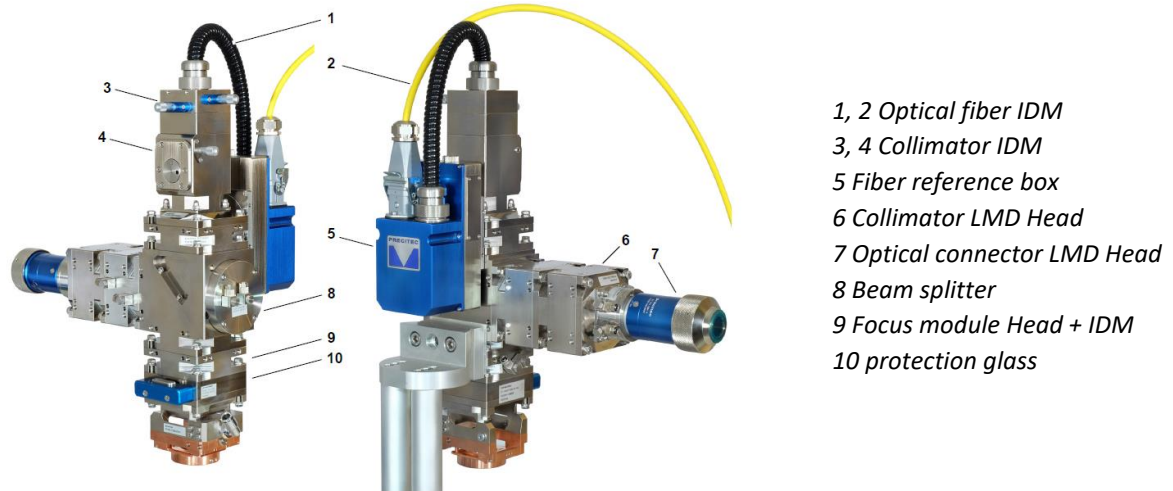
A **key process variable** is the standoff distance between the part and the nozzle tip, which defines the optimal spot for the laser and the powder to form a stable layer. Controlling this distance allows the system to compensate for any deviation of the other process variables, to simplify the programming and to make the process even more robust.

Precitec has pioneered adapting **Optical Coherence Tomography (OCT)** to laser material processing as **innovative sensor technology**. The unique feature of this approach is that process light and radiation does not disturb the measurement process unlike other imaging technologies. By adapting this sensor to DED processes where the particle stream is transparent enough to quickly and accurately measure the nozzle standoff in μm resolution enables control of the deposition process.



Deposition without/with standoff distance control

Initially developed for welding applications, this technology has been further expanded for Directed Energy Deposition in the frame of the PARADISE collaborative project funded by the EU. BeAM is the first AM machine manufacturer to integrate this sensor in its machines, which are already equipped with Precitec optical heads and Siemens Sinumerik 840D sl or the new Sinumerik One CNC for class-leading machine automation.



Standoff distance sensor integrated on the Precitec optical head

Thanks to the support from Precitec and Siemens, BeAM will integrate and adapt the control cycle that reads the standoff distance from the sensor and keeps this value constant in a closed-loop control by varying the deposition speed with high frequency.

This feature will be available in the BeAM machines in 2020 to process non-reactive as well as reactive materials.

About BeAM



BeAM, created in December 2012, is a pioneer in designing and producing industrial metal additive manufacturing machines using the DED technology (Directed Energy Deposition). BeAM works closely with its customers and business partners to develop and industrialize manufacturing and repair processes with feasibility assessments, pilot production, sales of systems, training and technical support. BeAM is headquartered in Strasbourg, France and has two Solutions Centers, one in

Cincinnati, Ohio and one in Singapore. This global presence of engineers trained by BeAM contributes to accelerating the adoption of its innovative technology, while offering engineering services for local industrial companies.

In June 2018, BeAM joined the AddUp Group, a manufacturer of 3D printing machines and production lines based in Clermont-Ferrand. AddUp is a joint-venture between Fives and Michelin, which employs more than 380 people.

More information: www.beam-machines.com.

About Precitec



Precitec Group with headquarters located in Gaggenau (laser material processing) and Neu-Isenburg (optical measuring technology) was founded in Baden-Baden, Germany in 1971. Precitec is the market leader and specialist for laser material processing and optical measuring technology. Precitec is not only a system and component supplier, but also a recognized professional partner for smooth processing including highly trusted industrial systems in the machining process: measurement, control, processing, checking, in order to

provide the best solutions to match your application. Based on decades of experience but also from our high-quality products in the form of laser machining heads, quality monitoring systems as well as optical measuring system, our optical sensors are characterized by the highest precision and dynamic and also provide exact values even at high measuring speeds.

More information: www.precitec.de.

About Siemens

Siemens Digital Industries (DI) is an innovation leader in automation and digitalization. Closely collaborating with partners and customers, DI drives the digital transformation in the process and discrete industries. With its Digital Enterprise portfolio, DI provides companies of all sizes with an end-to-end set of products, solutions and services to integrate and digitalize the entire value chain. Optimized for the specific needs of each industry, DI's unique portfolio supports customers to achieve greater productivity and flexibility. DI is constantly adding innovations to its portfolio to integrate cutting-edge future technologies. Siemens Digital Industries has its global headquarters in Nuremberg, Germany, and has around 76,000 employees internationally.

Siemens AG (Berlin and Munich) is a global technology powerhouse that has stood for engineering excellence, innovation, quality, reliability and internationality for more than 170 years. The company is active around the globe, focusing on the areas of power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization in the process and manufacturing industries. Through the separately managed company Siemens Mobility, a leading supplier of smart mobility solutions for rail and road transport, Siemens is shaping the world market for passenger and freight services. Due to its majority stakes in the publicly listed companies Siemens Healthineers AG and Siemens Gamesa Renewable Energy, Siemens is also a world-leading supplier of medical technology and digital healthcare services as well as environmentally friendly solutions for onshore and offshore wind power generation. In fiscal 2019, which ended on September 30, 2019, Siemens generated revenue of €86.8 billion and net income of €5.6 billion. At the end of September 2019, the company had around 385,000 employees worldwide.

More information: www.siemens.com.

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