



Electron Beam Melting

An investigation of new players on the market










BACKGROUND

The Electron Beam Powder Bed Fusion process is clustered into the category “Powder”, such as L-PBF (Laser Powder Bed Fusion), Laser Metal Deposition (LMD) or Binder Jetting. In 2019 around 10.000 machines, both in Laser and Electron beam, have been installed worldwide. Nevertheless, only about 6 % are EB-PBF machines. Where is this big gap coming from? Electron beams have been known for around 120 years in different markets and already in 1991 it was proven that it can be used for melting metal powder. Since this process requires high investment costs, it is important to get an understanding of the possibilities and limitations.

SCOPE

During spring 2021, the increased relevance and number of soon announced Electron Beam Melting (EBM) systems have led AMEXCI to initiate this pre-study about EBM aiming at providing an overview of different suppliers available for Additive Manufacturing (AM) processes with a focus on various industries like aerospace, energy, automation, etc. This pre-study aimed to provide a general overview of available suppliers offering EBM, including information about the process, machine specifications, headquarters and typical applications. It summarizes the key characteristics of the technology.

INSIGHTS

COMPANY	HEADQUATER	SYSTEM
	SWEDEN	ONE
	SWEDEN	A2X
		Q10PLUS
		Q20PLUS
		SPECTRA L
		SPECTRA H
TADA ELECTRIC 	JAPAN	EZ300
	CHINA	S200 PRODUCTION
	CHINA	LAB200
		MED 200
		AERO350
	JAPAN	JAM-5200EBM*
	UK	CALIBUR3
	INDIA	NOT SPECIFIED*
RUSELECTRONICS 	RUSSIA	NOT SPECIFIED*

*under development

At the moment nine different machine suppliers are available on the market offering several systems with varying specifications.

General advantages of EB-PBF in comparison to L-PBF is that less supports are needed, crackfree processing of brittle materials due to high temperature is possible and parts are stackable along the z-axis. Disadvantages are high investment costs, expensive helium is required and the technology struggles with building internal cooling channels.

Mainly applications in Titanium are currently seen on the market but the new systems might lead to new materials and therefore new applications.

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The full version is available for participants of this project within AMEXCI's shareholder companies.

Picture from www.ge.com