

### Technological Innovations

## New technologies used in manufacturing complicated industrial components

New technologies are used to manufacture many complicated industrial parts and components. One of these technologies is SLM (Selective Laser Melting). This article introduces the technology and its applications in various industry sectors.

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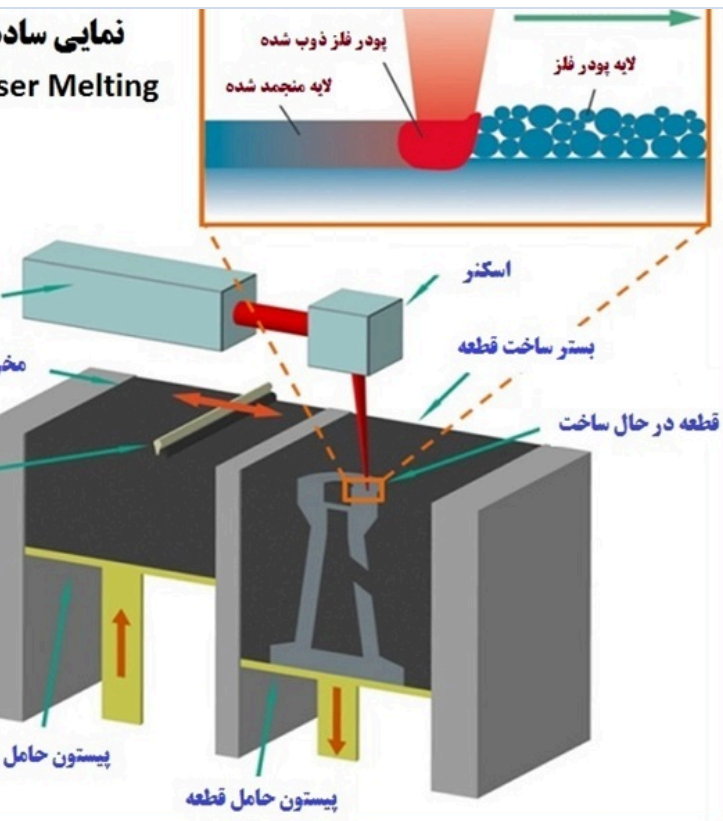


New technologies are used to manufacturing many complicated industrial components. One of these technologies is the Selective Laser Melting technology which is classified by the nature of the technology of additive manufacturing technologies. With using this most sophisticated industrial parts of all types of alloys can be manufactured without the need for molds and tools. This article briefly introduces the technology in various industry sectors.

### Technology?

According to ASTM's definition, the process of adding materials in a layer by layer manner together to create a solid shape using information is called "additive manufacturing". This technology itself is divided into several categories.

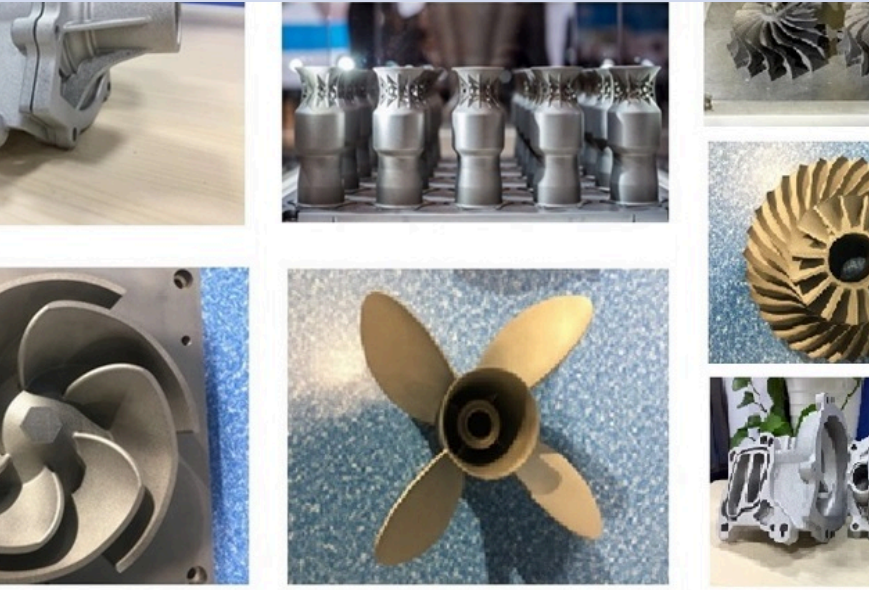
One of these categories is SLM technology. By using a high-power laser beam, the metal powder melts point by point and then solidified. In this process, the material which is used to make the piece is metal powder. Due to the heat from the laser radiation and fusion of the metal powder particles is created. This action is repeated layer by layer until the piece is shaped. The laser beam movement is controlled by a computer from a 3D model by the machine's central computer.



#### Materials from which materials can be produced by SLM

This technology is ideal for producing parts from materials such as copper, titanium, aluminum and nickel as well as many other metals. The SLM technology is widely used in many hi-tech industries such as aerospace, oil and gas, marine, automotive, and medical. The market of this technology is expected to exceed \$ 20 billion in the next few years. Many countries with hi-tech industrial technology are investing in this technology and now, it is the time for the leading countries to adopt and apply this technology.

Due to the capability of this technology, some of the parts made using this technology are shown in the following picture:



**Advantages of SLM compared with common technologies?**

It has many advantages over conventional manufacturing of which are described as follows:

1. Designing and producing parts in very complex shapes impossible to accomplish with other manufacturing technologies.

2. No need for multiple machines as well as tools, jig and fixtures for each part.

3. Time saved due to the elimination of multiple operations and associated costs;

4. Waste reduction of scrap material near zero;

5. Weight and saving raw materials consumed;

6. Reduced workshop space due to the small size of the SLM machines.

7. Reduced inventory parts due to reduced time and simple design.

8. That SLM machines do not require much work space due to the small size of machines, and so a production facility with SLM machines requires less area than workshops with conventional manufacturing technologies.

The following is an overview of two types of industrial SLM machines offered by **Wiiibox 3D Technology Company**:

**Wiiibox SLM250 3D PRINTER**

Easy Operation

Technical Parameters	
Laser Power	200W
Scanning System	High Accuracy Scanning Goniometer
Scanning Speed	8m/s
Build Size	250*250*300mm
Layer Thickness	0.02-0.2mm
Printing Materials	Stainless steel, Coe steel, Cobalt chromium alloy, High temperature nickel based alloy, Aluminum alloy, Titanium alloy and other metal powders
Operation System	Win 7
Gas Supply	Ar/N <sub>2</sub> Protection
Data Formats	STL and other formats
Power	20000Watt
Machine Size	2500 x 2000 x 2 1000mm
Working Temperature	15-30°C



**Wiiibox SLM150 METAL 3D PRINTER**

Security High Printing Accuracy Easy Operation

Technical Parameters	
Laser Power	1000W
Scanning System	High Acc
Scanning Speed	8m/s
Build Size	1200*1200
Layer Thickness	0.02-0.1
Printing Materials	Stainless steel, Coe steel, Cobalt chromium alloy, High temperature nickel based alloy, Aluminum alloy, Titanium alloy and other metal powders
Operation System	Win 7
Gas Supply	Ar/N <sub>2</sub> Protection
Data Formats	STL and other formats
Power	22000Watt
Machine Size	1800 x 1800
Working Temperature	15-30°C

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Laser Power	1000W
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