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España – Portugal

3D PRINTING TECHNOLOGIES

Advantages y Disadvantages

FDM (Fused Deposition Modelling) o FFF (Fused Filament Fabrication) TECHNOLOGIES (MEX) Characteristics: this is one of the most common and accessible technologies. It works by extruding plastic materials in filament or pellet forms through a hot nozzle, layer by layer. Applications: fast prototyping, non-functional parts (aesthetic applications), parts with limited functionality (load resistance, temperature, etc. but with limitations). Reduced Precision Low cost Issues with complex geometry Easy to use Limited mechanical properties Range of material Anisotropy of materials Wide Ecosystem Limited machinery size **SLA** (Sterolithography) Characteristics: it uses an ultraviolet laser to solidify photosensitive liquid resin layer by layer, resulting in intricate details and smooth surface finishes **Applications:** jewellery, dentistry, prosthetics, high precision engineering parts. High precision High - cost Low equipment costs Fragile materials Smooth surfaces Post - curing process Specialised applications Toxicity **DLP** (Digital Light Processing) Characteristics: similar to SLA, but instead of a laser, a digital projector is used to cure whole layers of photosensitive resin at once. **Applications:** high precision models, jewellery, dentistry. High - cost Speed High precision **Limited materials** High - quality surface Fragility **SLM** (Selective Laser Meeting) *Characteristics:* it uses a laser to melt metal powder, layer by layer, to form a 3D object. Applications: functional parts for aerospace, medical (orthopaedic implants), and automotive industries. High resistance High - cost **Precision and control** Post - treatment needs • High densities **EBM** (Electron Beam Melting) **Characteristics:** similar to SLM, but in EBM an electron beam is used to melt metal powder, layer by layer to form a 3D object.

Applications: functional parts for aerospace, medical (orthopaedic implants) and automotive industries.

MATERIAL EXTRUSION



- High resistance



Use of advanced metals



- Controlled environment
- **Limited materials**

SLS (Selective Laser Sintering)

Characteristics: it uses a laser to sinter powder particles, usually plastics, but also metals, creating a solid object.

Applications: functional parts, robust parts for industrial prototypes, tools and end-use components.



- Mechanical resistance
- No need for supports
- Material versatility



- High cost
- Rough texture
- Specialised equipment



Characteristics: based on the injection of UV-curable liquid polymers to create parts with a high degree of detail and smooth surfaces

Applications: functional prototypes, end-use parts in small series.



- High speed
 - High quality finish



- High cost
- **Durability of parts**
- Post processing required

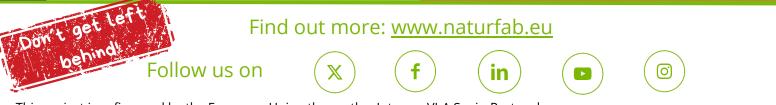
MJF (Multi Jet Fusion)

Characteristics: ink or fusion agent jets are projected onto a powder bed. Heat from infrared lamps interacts with the agents and the powder is selectively fused.

Applications: functional prototypes, end-use parts, small series manufacturing.

- High speed
 - Uniform mechanical properties
 - High quality finish

- High cost
- Lower variety of materials
- Post processing required



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SION TECHNOLOGIES (PBF)

BINDER JETTING TECHNOLOGIES

(BJT)