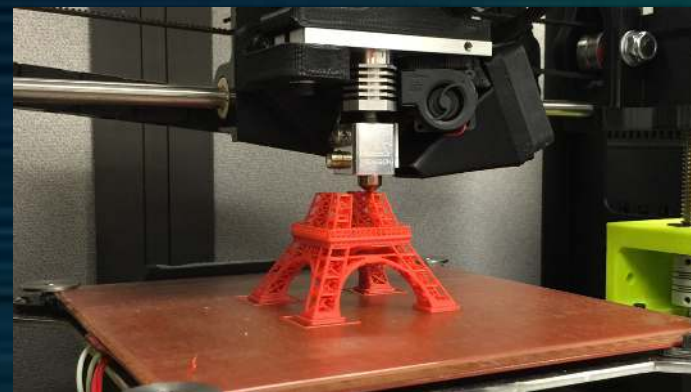


# Additive manufacture

## What is Additive Manufacturing?

Traditionally products have been made from a large piece of material which ends up being cut, chiselled, filed and sanded down to size until the end product has been made. This results in waste being produced.

Additive manufacturing is where material is added layer by layer until the entire product has been made.



Process	Description	Advantage	Disadvantage	Image
Sintering	This process requires a mould Mould is filled with metal powder An industrial press then compresses the powder along with heat. This makes the particles join together below the metal powders melting point.	Reduced energy needed Lower density – lighter in weight Different metals can be combined.	Equipment needed	<p>The diagram illustrates the sintering process in three stages. On the left, four separate red circles represent 'Powder particles'. An arrow points to the middle stage where the particles are closer together, with gaps between them labeled as 'Pores'. A second arrow points to the final stage where the particles have fused into a single, larger red shape, representing a sintered part.</p> <p>www.substech.com</p>
Rapid prototyping for Polymers	Uses Additive manufacturing processes to make 3D models that can be tested	Models can be tested before mass manufacture Quicker design process	Cost of equipment Limited range of materials that can be used.	
Fused deposition modelling	Process used in 3D printers 3D model produced and cut into layers. First layer deposited on the bed. Nozzle moved up and next layer deposited.	Accurate model No waste Automated	Most of 3D printer	
Stereo lithography	This process a computer 3D model that has been split into thin layers. A moveable platform is lowered into resin and a laser draws the first layer solidifying the resin. The bed moves down and the next layer drawn with the laser etc. Once complete the bed raises revealing the model.	Accurate model No waste Automated	Very expensive equipment needed. Needs a finish to be applied.	<p>The diagram shows a cross-section of a resin tank. A platform is lowered into the tank, and a laser beam (from a 'Laser' source) is used to cure a thin layer of 'Liquid resin' into 'Solidified resin'. A 'Scanner system' is positioned above the tank. After curing, the platform moves down, and the process repeats for the next layer.</p>

# Additive manufacture

Explain what is meant by additive manufacturing?

---

---

---

---

State two factors that influence the strength of a metal part made by sintering

1,

---

---

2,

---

---

Name two materials that can be used to make a part by fused deposition modelling

1,

---

---

2,

---

---

Describe the process of making a part using Stereolithography?

---

---

---

---

Sketch diagrams to show each additive manufacturing process