

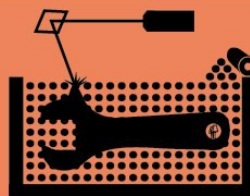
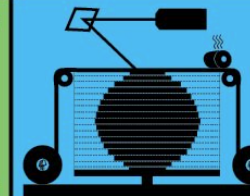
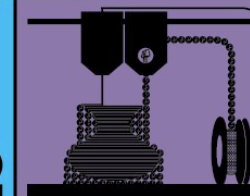
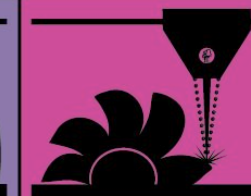
Introducción Impresión 3D



Tecnologías de fabricación aditiva

7 Families of Additive Manufacturing

According to ISO/ASTM52900-15 (formerly ASTM F2792)

						
VAT PHOTOPOLYMERIZATION	POWDER BED FUSION (PBF)	BINDER JETTING	MATERIAL JETTING	SHEET LAMINATION	MATERIAL EXTRUSION	DIRECTED ENERGY DEPOSITION (DED)
Alternative Names: SLA™ - Stereolithography Apparatus DLP™ - Digital Light Processing SSP™ - Scan, Spin, and Selectively Photocure CLIP™ - Continuous Liquid Interface Production Description: A vat of liquid photopolymer resin is cured through selective exposure to light (via a laser or projector) which then initiates polymerization and converts the exposed areas to a solid part. Strengths: • High level of accuracy and complexity • Smooth surface finish • Accommodates large build areas Typical Materials UV-Curable Photopolymer Resins	Alternative Names: SLS™ - Selective Laser Sintering; DMLS™ - Direct Metal Laser Sintering; SLM™ - Selective Laser Melting; EBM™ - Electron Beam Melting; SHS™ - Selective Heat Sintering; MJF™ - Multi-Jet Fusion Description: Powdered materials are selectively consolidated by melting it together using a heat source such as a laser or electron beam. The powder surrounding the consolidated part acts as support material for overhanging features. Strengths: • High level of complexity • Powder acts as support material • Wide range of materials Typical Materials Plastics, Metal and Ceramic Powders, and Sand	Alternative Names: 3DP™ - 3D Printing ExOne Voxeljet Description: Liquid bonding agents are selectively applied onto thin layers of powdered material to build up parts layer by layer. The binders include organic and inorganic materials. Metal or ceramic powdered parts are typically fired in a furnace after they are printed. Strengths: • Allows for full color printing • High productivity • Uses a wide range of materials Typical Materials Powdered Plastic, Metal, Ceramics, Glass, and Sand.	Alternative Names: Polyjet™ SCP™ - Smooth Curvatures Printing MJM™ - Multi-Jet Modeling Projet™ Description: Droplets of material are deposited layer by layer to make parts. Common varieties include jetting a photocurable resin and curing it with UV light, as well as jetting thermally molten materials that then solidify in ambient temperatures. Strengths: • High level of accuracy • Allows for full color parts • Enables multiple materials in a single part Typical Materials Photopolymers, Polymers, Waxes	Alternative Names: LOM - Laminated Object Manufacture SDL - Selective Deposition Lamination UAM - Ultrasonic Additive Manufacturing Description: Sheets of material are stacked and laminated together to form an object. The lamination method can be adhesives or chemical (paper/plastics), ultrasonic welding, or brazing (metals). Unneeded regions are cut out layer by layer and removed after the object is built. Strengths: • High volumetric build rates • Relatively low cost (non-metals) • Allows for combinations of metal foils, including embedding components. Typical Materials Paper, Plastic Sheets, and Metal Foils/Tapes	Alternative Names: FFF - Fused Filament Fabrication FDM™ - Fused Deposition Modeling Description: Material is extruded through a nozzle or orifice in tracks or beads, which are then combined into multi-layer models. Common varieties include heated thermoplastic extrusion (similar to a hot glue gun) and syringe dispensing. Strengths: • Inexpensive and economical • Allows for multiple colors • Can be used in an office environment • Parts have good structural properties Typical Materials Thermoplastic Filaments and Pellets (FFF); Liquids, and Slurries (Syringe Types)	Alternative Names: LMD - Laser Metal Deposition LENS™ - Laser Engineered Net Shaping Description: Powder or wire is fed into a melt pool which has been generated on the surface of the part where it adheres to the underlying part or layers by using an energy source such as a laser or electron beam. This is essentially a form of automated build-up welding. Strengths: • Not limited by direction or axis • Effective for repairs and adding features • Multiple materials in a single part • Highest single-point deposition rates Typical Materials Metal Wire and Powder, with Ceramics

Tecnologías de impresión 3D por material



Filamento

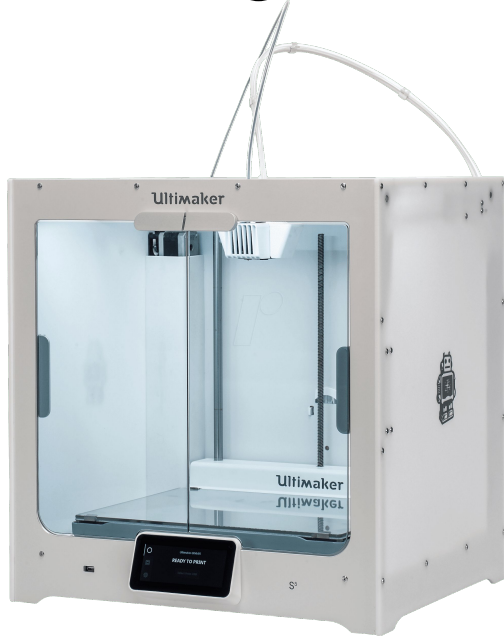


Resina

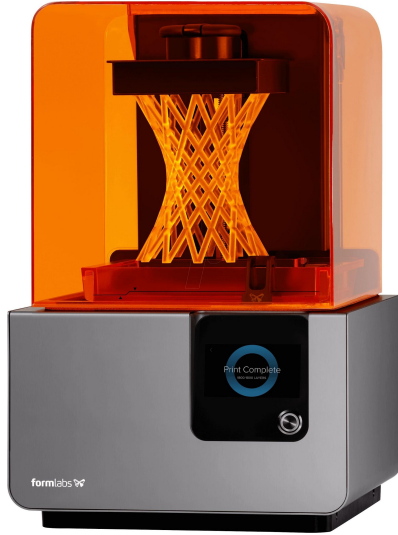


Polvo

Tecnologías más accesibles



Filamento (FDM)



Resina (SLA/DLP)



Polvo de nylon (SLS)

Impresión 3D en filamento vs resina

	Filamento	Resina
Tamaño	Medio y grande	Pequeño
Acabado	Medio	Muy bueno
Detalle	Medio	Muy alto
Materiales	Termoplásticos	Resinas Materiales alto valor añadido
Postprocesado	Opcional	Obligatorio

Tecnologías de impresión 3D por material



Filamento

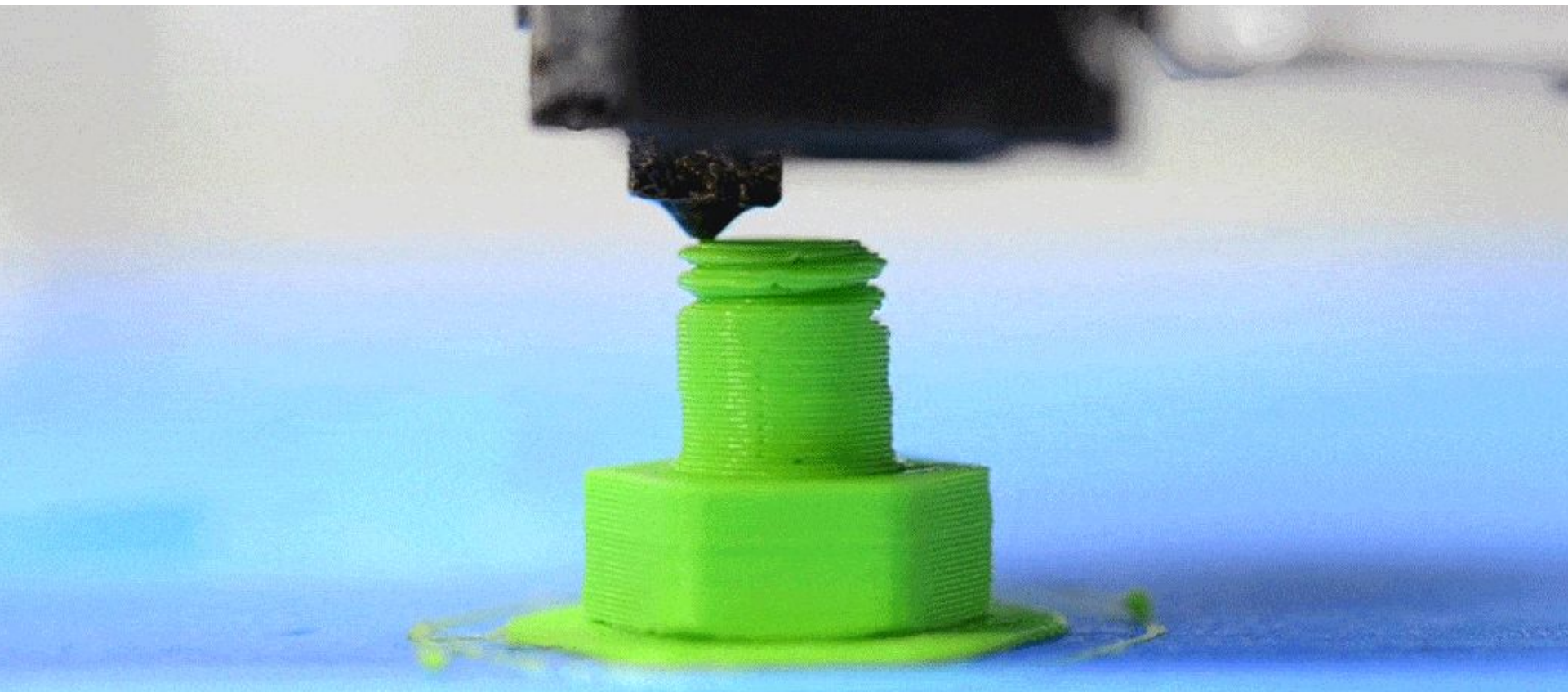


Resina



Polvo

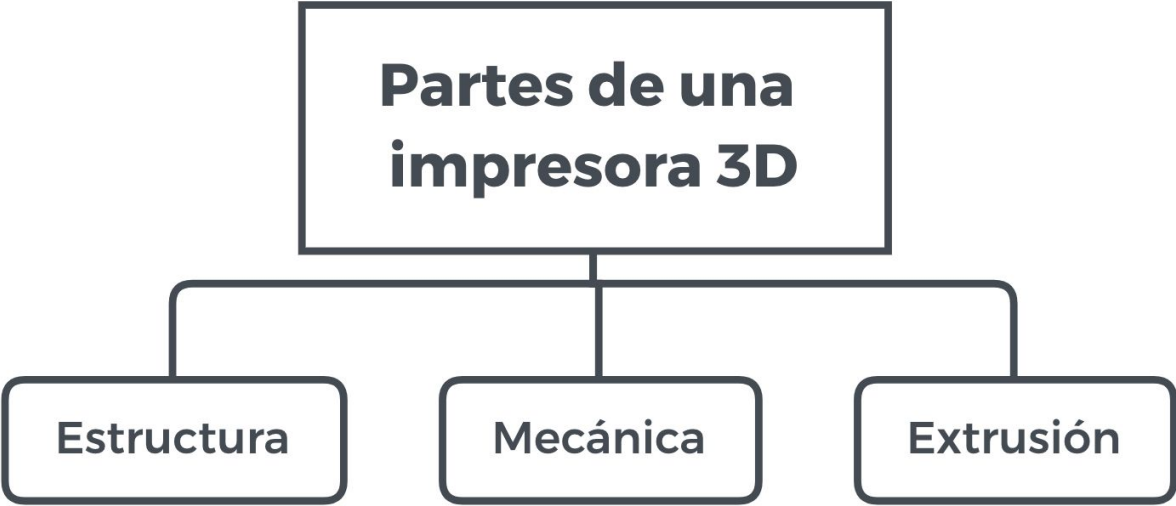
Impresión de filamento



Partes de una Impresora 3D



Partes de una impresora 3D



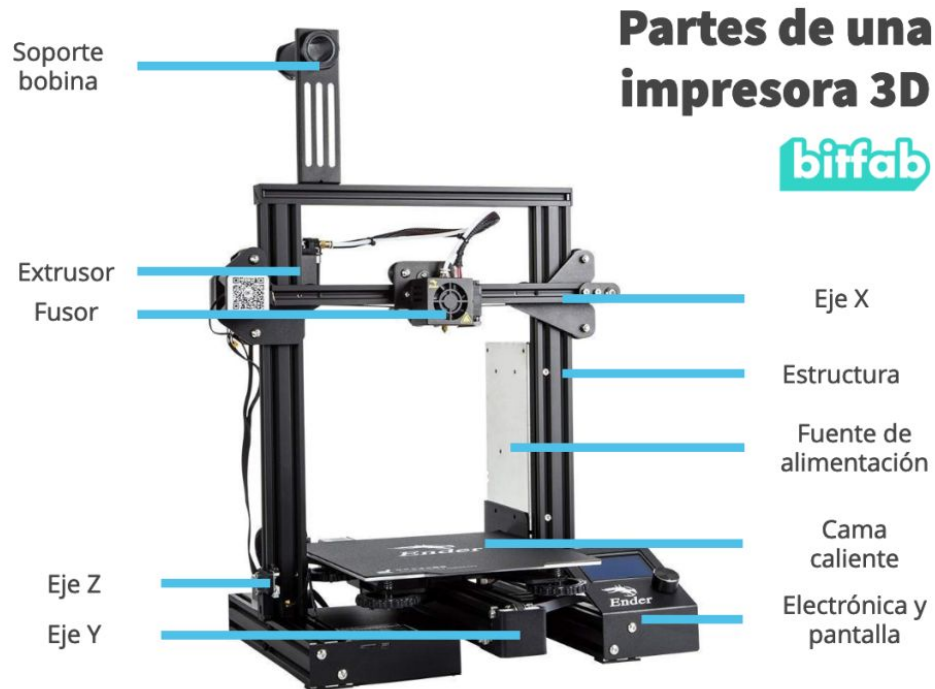
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graph TD; A[Partes de una impresora 3D] --> B[Estructura]; A --> C[Mecánica]; A --> D[Extrusión];
```

Estructura

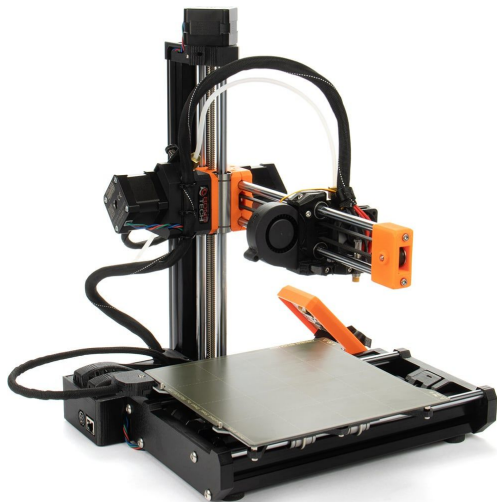
Mecánica

Extrusión

Partes de la impresora



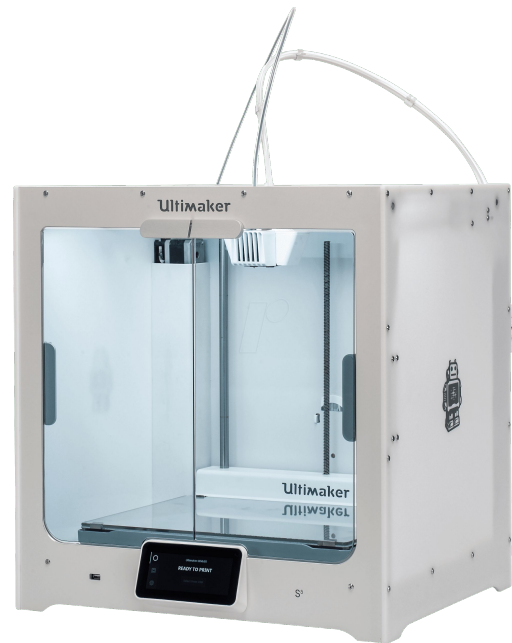
Estructura



Eje en voladizo
Prusa Mini
Kingroon KP3S



Pórtico
Ender 3
Prusa Original



Caja
Ultimaker

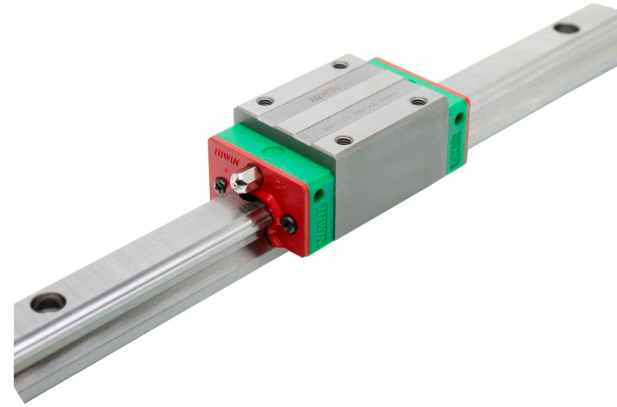
Sistema de movimiento



Rodamientos lineales

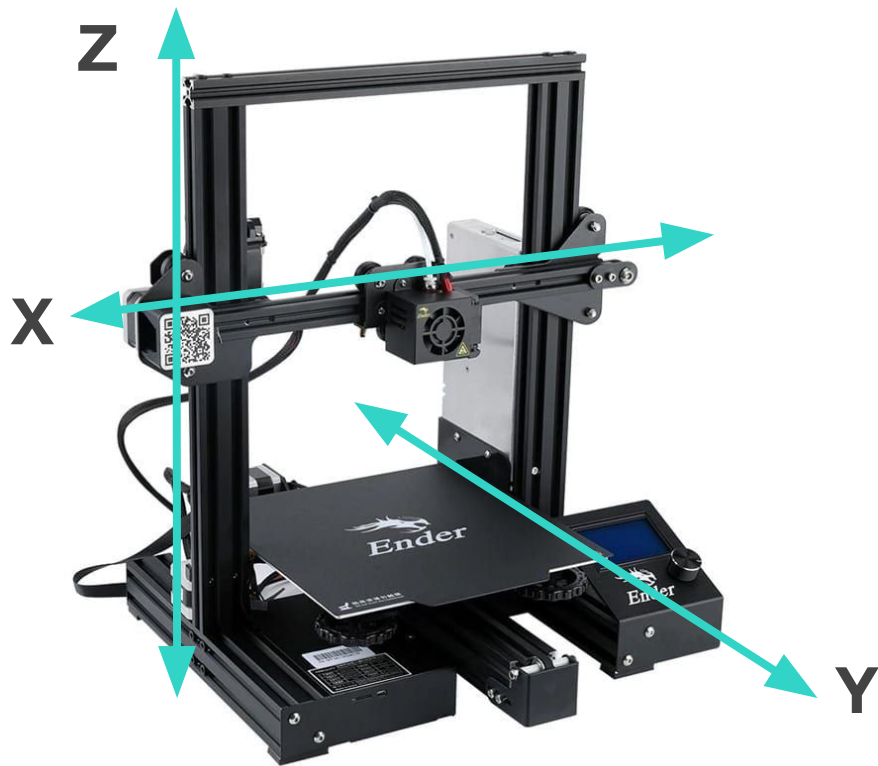


Ruedas en V



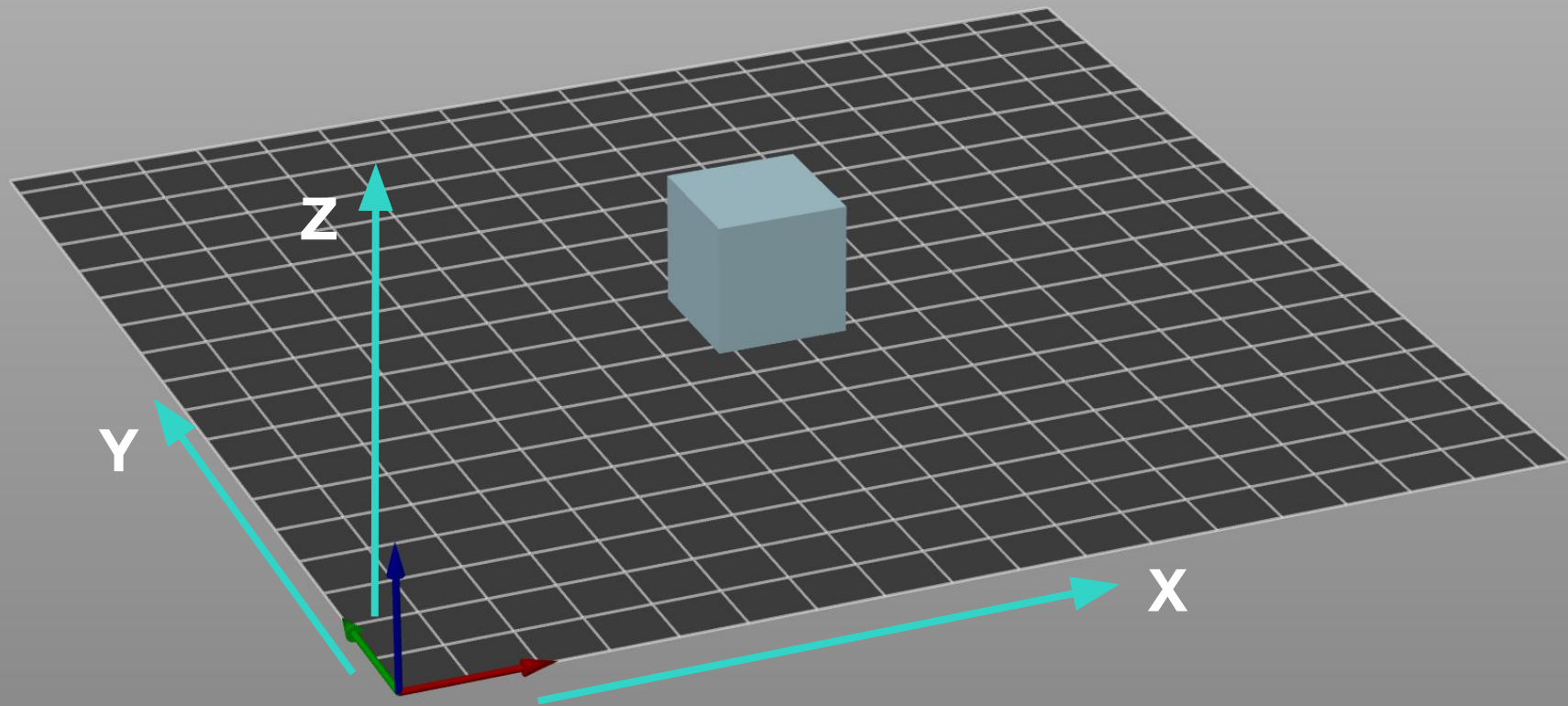
Guías lineales

Ejes impresora 3D



Eje	Dirección
X	Izquierda - Derecha
Y	Alante - Atrás
Z	Abajo - Arriba

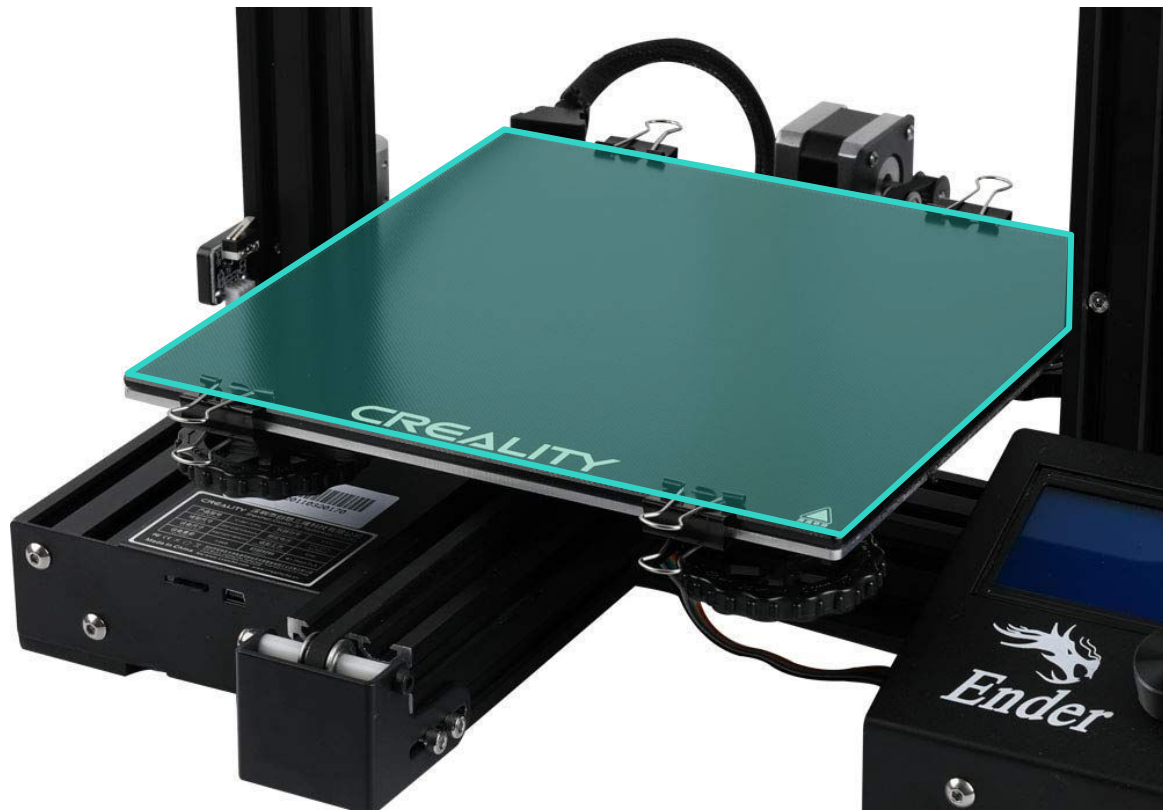
Ejes impresora 3D



Superficie de impresión



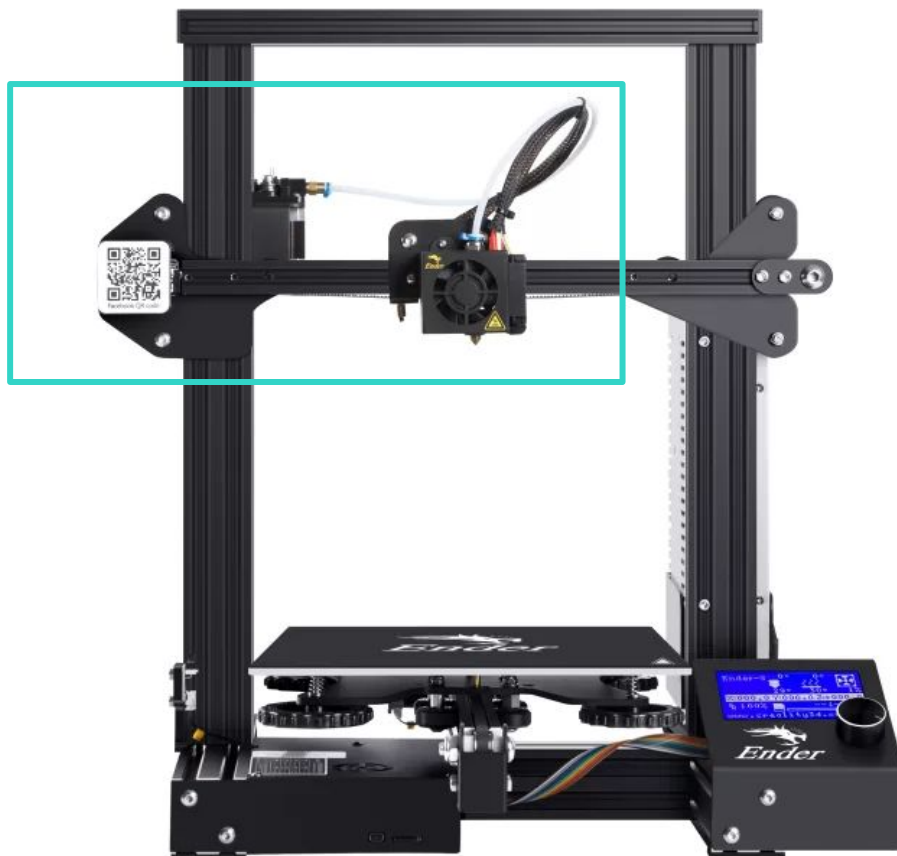
Superficie de impresión



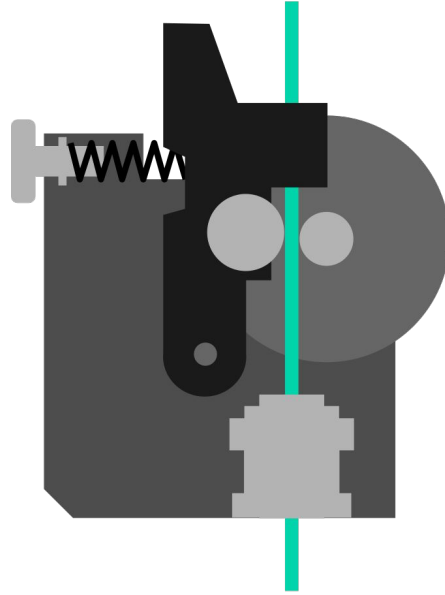
Extrusión



Extrusión



Extrusión - Empujador y fusor

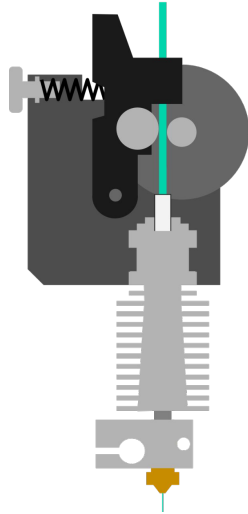


Empujador
extrusor, feeder

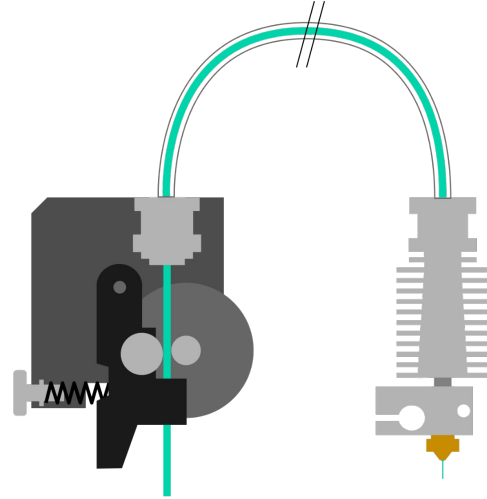


Fusor
hotend, extrusor

Extrusión - Directa vs bowden



Extrusión directa



Extrusión bowden

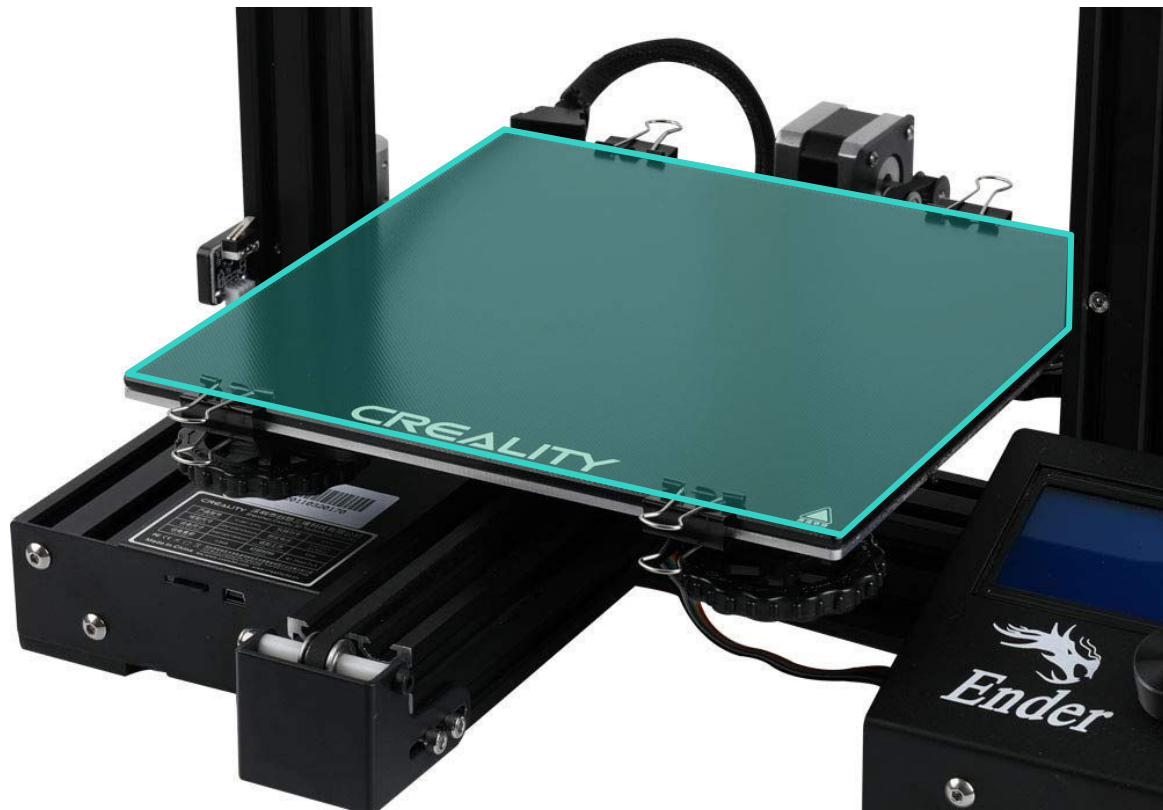
Nivelado de la superficie de impresión



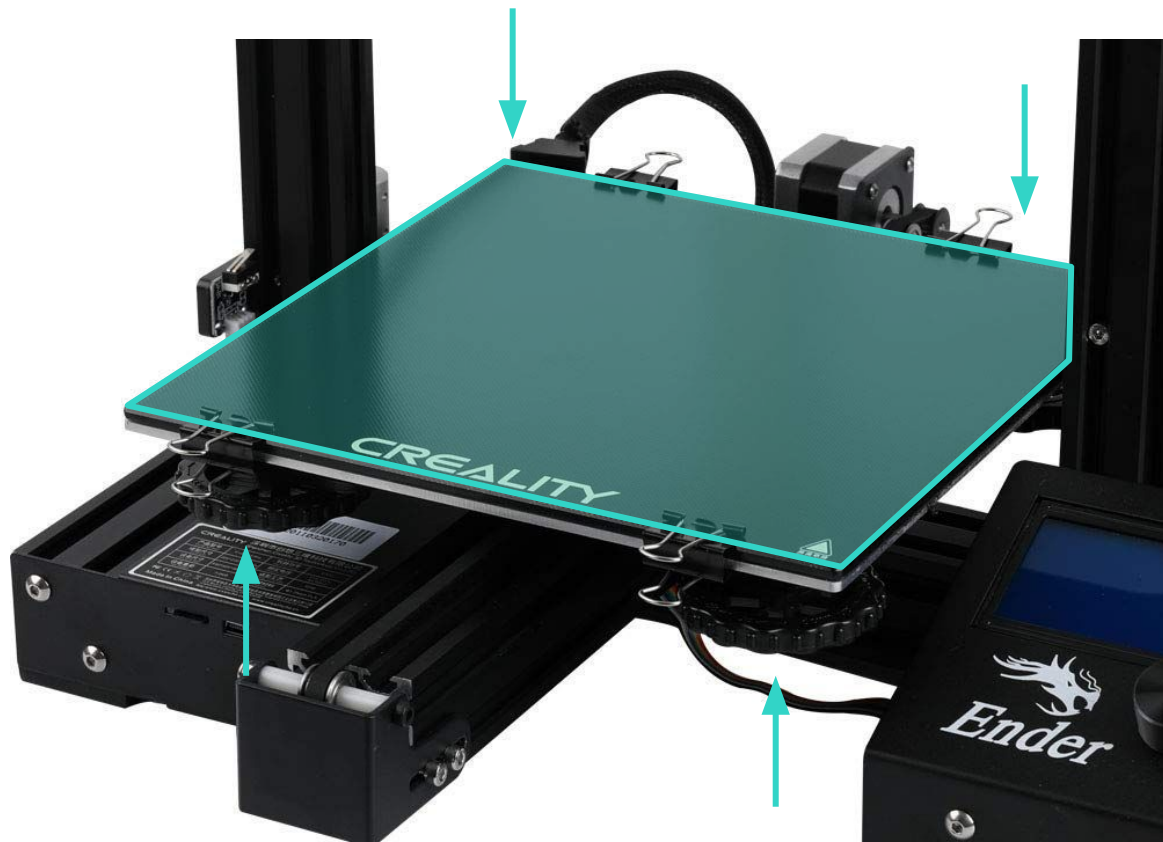
Superficie de impresión



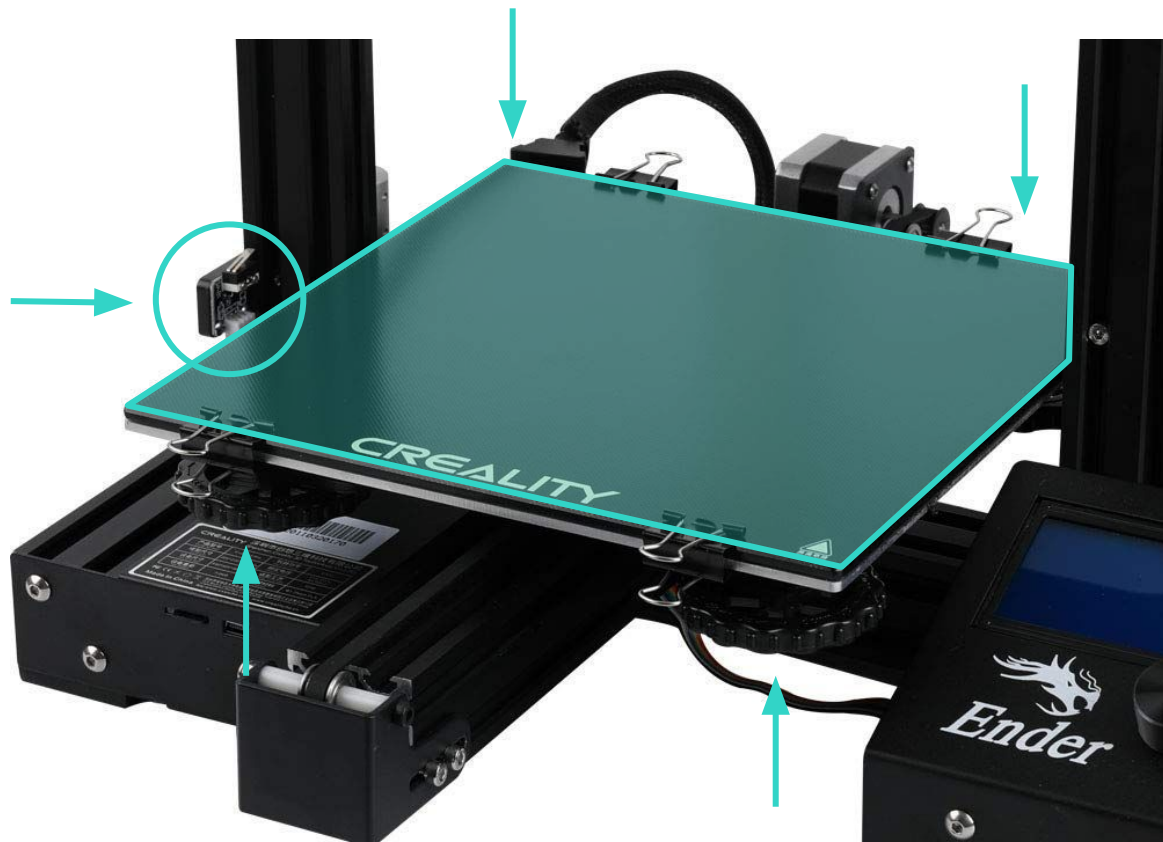
Superficie de impresión



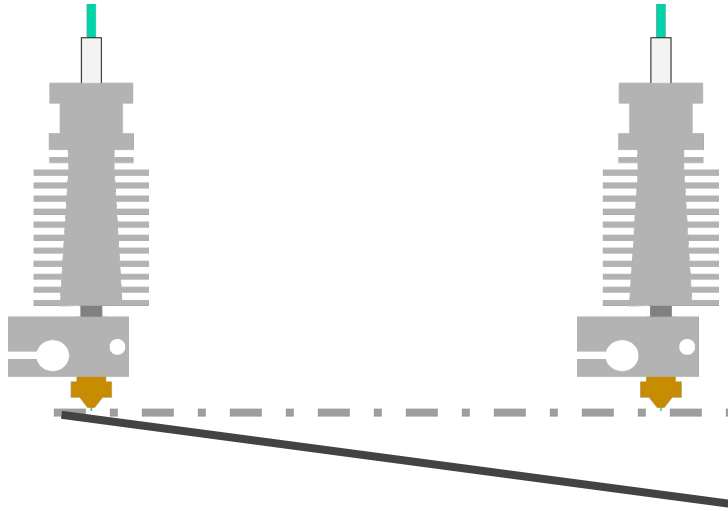
Superficie de impresión



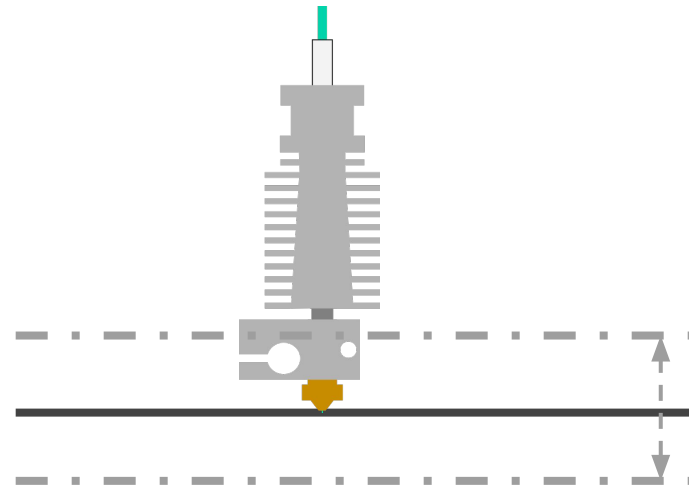
Superficie de impresión



Nivelado de la superficie de impresión

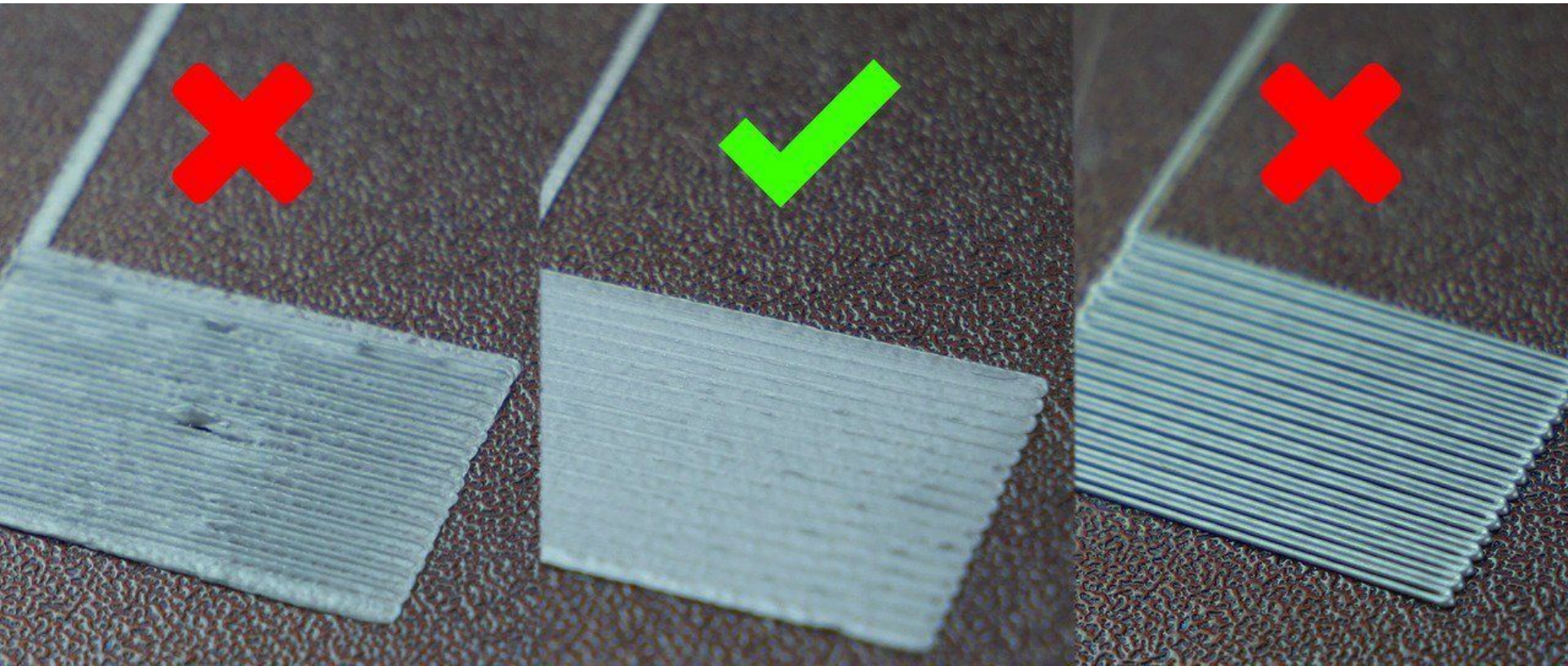


Ángulo superficie



Altura de la superficie
Altura del fusor

Resultado correcto de nivelación



Nivelado

Método del papel



Mantenimiento General



Mantenimiento general



Add cover

[WI] Printer General Maintenance Work Instructions

2 backlinks

Printer General Maintenance Work Instructions

Document Code	To be determined
Written by	Diego Trapero
Approved by	
Object	Define the general maintenance procedure for all printers at Bitfab, used for both preventive maintenance and troubleshooting
Scope	All 3D printers in the farm.
Last changes	2022-08-05 First version

0. Initial Reference

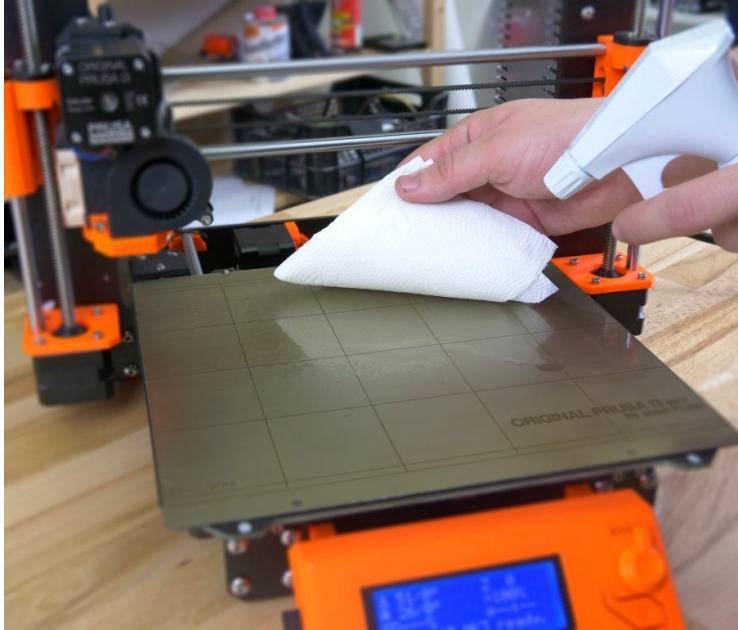
Cleaning product	What to use it for	Don't use on

Materials

Mantenimiento general / preventivo: revisión, limpieza y sustitución si es necesario

- General
- Cama
- Husillos
- Ejes
- Extrusor

Limpieza y revisión general

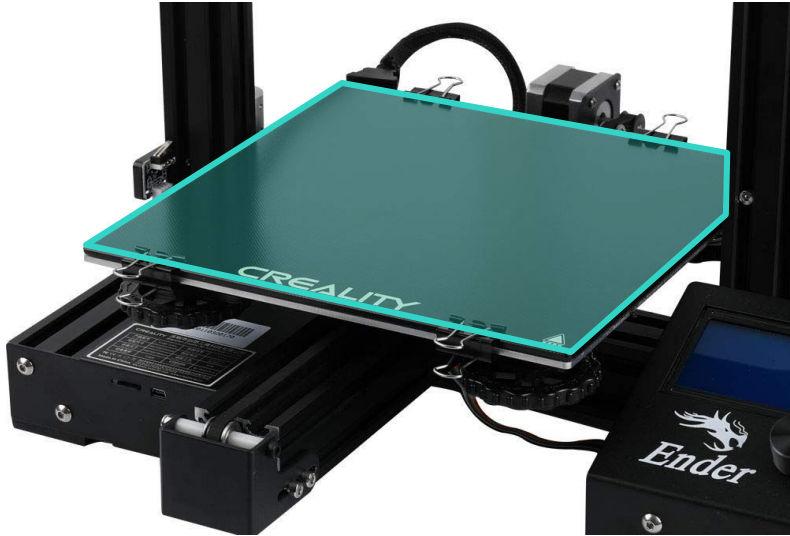


1. Limpiar con aire / aspirador toda la impresora
2. Limpiar todas las superficies: perfiles, cubiertas, motores, pantallas...
3. Componentes:
 1. Ventiladores: no soplar
 2. Plástico: no usar IPA
 3. Electrónica: IPA, soplar, revisar.

Productos de limpieza

Producto	Uso	No recomendado
Limpiador de superficies	Limpieza general - Toda la limpieza por defecto - Laca - Plásticos	Electrónica
Alcohol isopropílico	Limpieza específica - Electrónica - Manchas de resina - Desengrasante	Plásticos (acrílico)

Limpieza de la cama

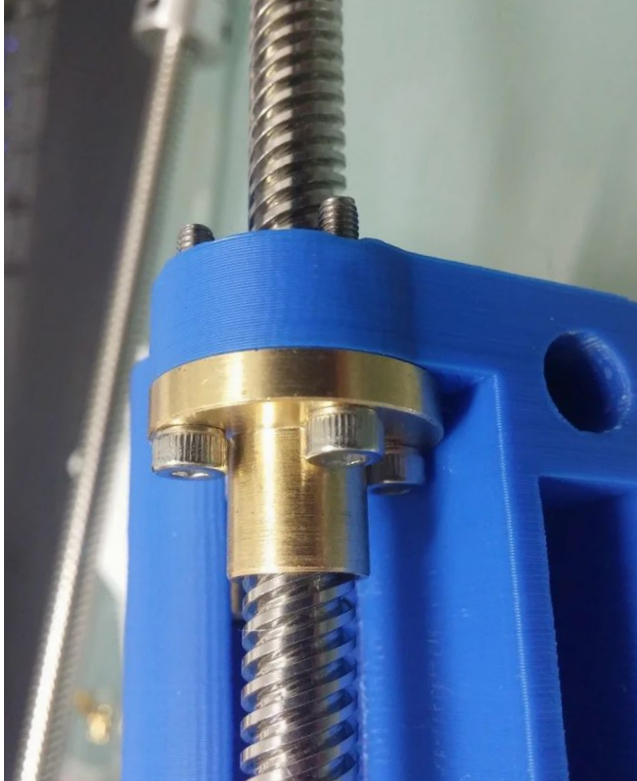


- **Producto:**
 - Se limpia con agua o un limpiador acuoso para retirar la laca y el polvo
 - Las superficies de PEI se limpian con alcohol isopropílico
- **Herramientas**
 - Un paño
 - Una espátula
- **Desperfectos**
 - Buscar desconchones en el cristal o daños en la superficie
- **Fijador:**
 - Volver a aplicar el fijador

Limpieza y lubricación de la mecánica

Producto	Uso
Alcohol isopropílico	Limpieza y desengrasante
Grasa de litio	- Husillos - Varillas y rodamientos - Raíles
Lubricante de silicona	- Ruedas de plástico

Mantenimiento de los husillos



- Producto:
 - Grasa
- Herramientas
 - Un paño

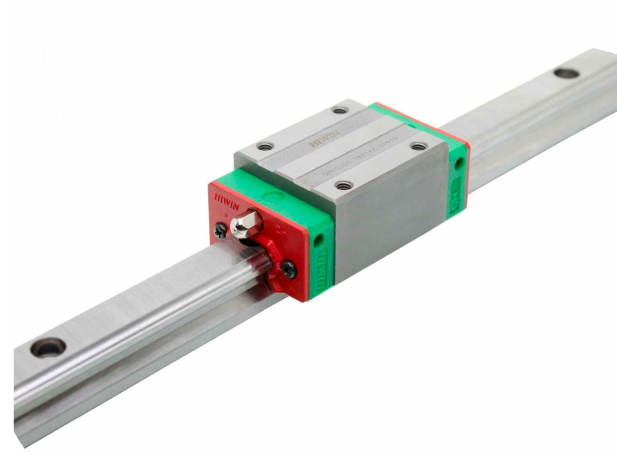
Lubricación de los ejes



Rodamientos lineales
grasa litio, aceite



Ruedas en V
lubricante silicona



Guías lineales
grasa litio

Mantenimiento general



 Add cover

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↩ 2 backlinks

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Mantenimiento Impresora 3D



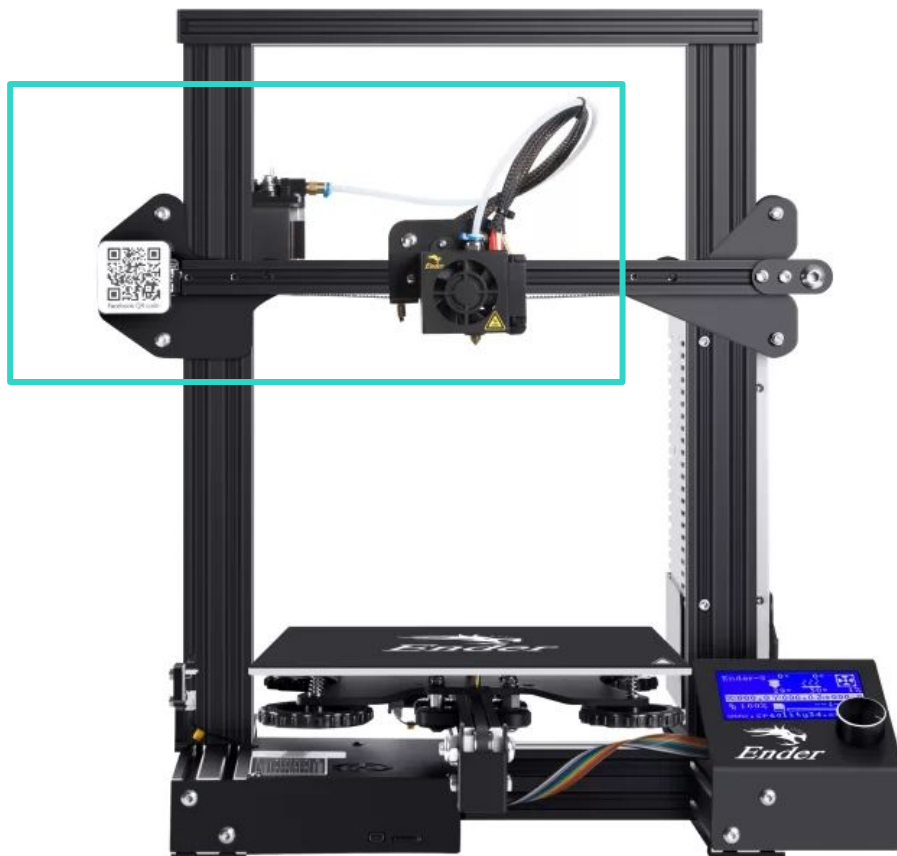
Sistema de extrusión



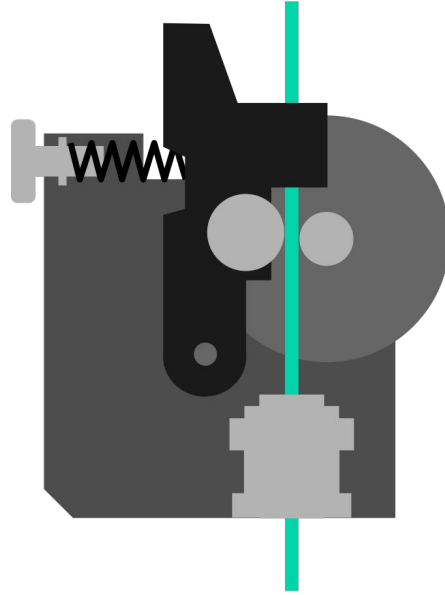
Extrusión



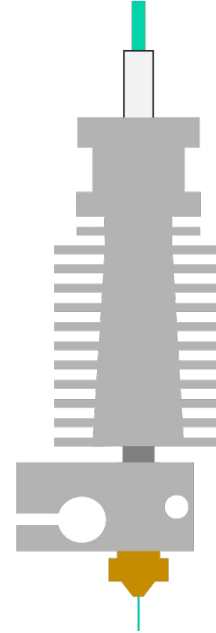
Extrusión



Extrusión - Empujador y fusor

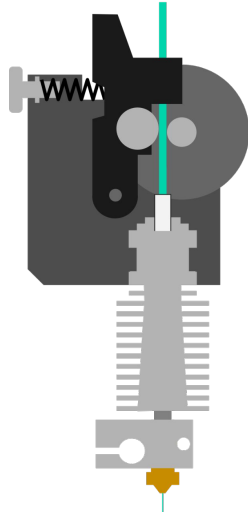


Empujador
extrusor, feeder

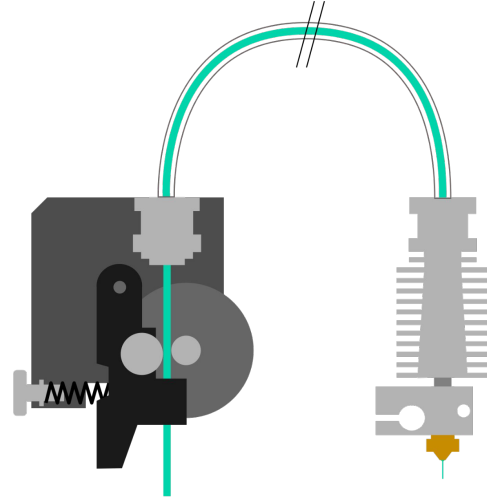


Fusor
hotend, extrusor

Extrusión - Directa vs bowden



Extrusión directa



Extrusión bowden

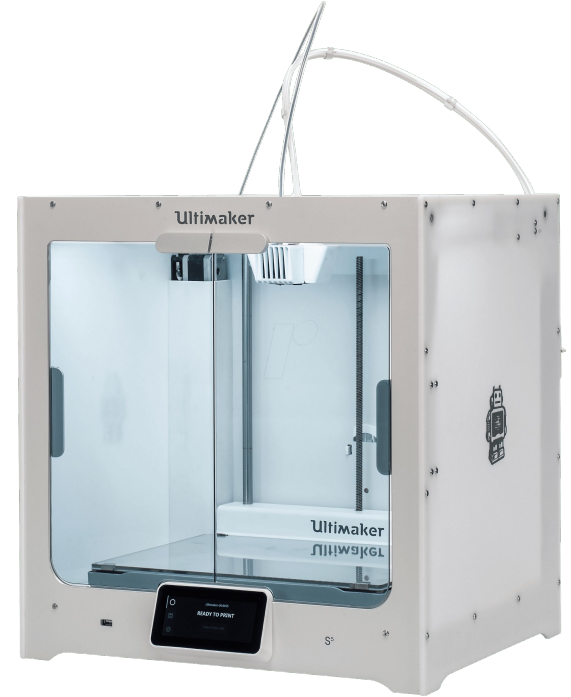
Extrusión - Directa vs bowden



Extrusión directa

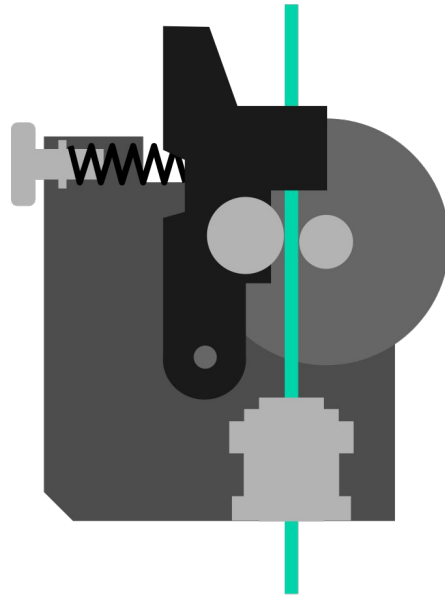


Bowden (mini)

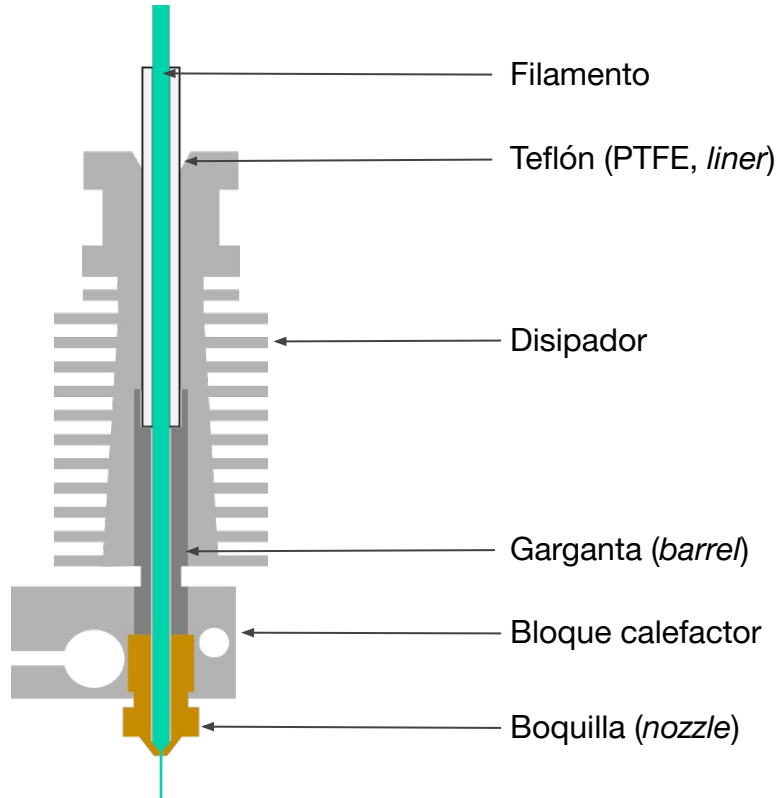


Bowden

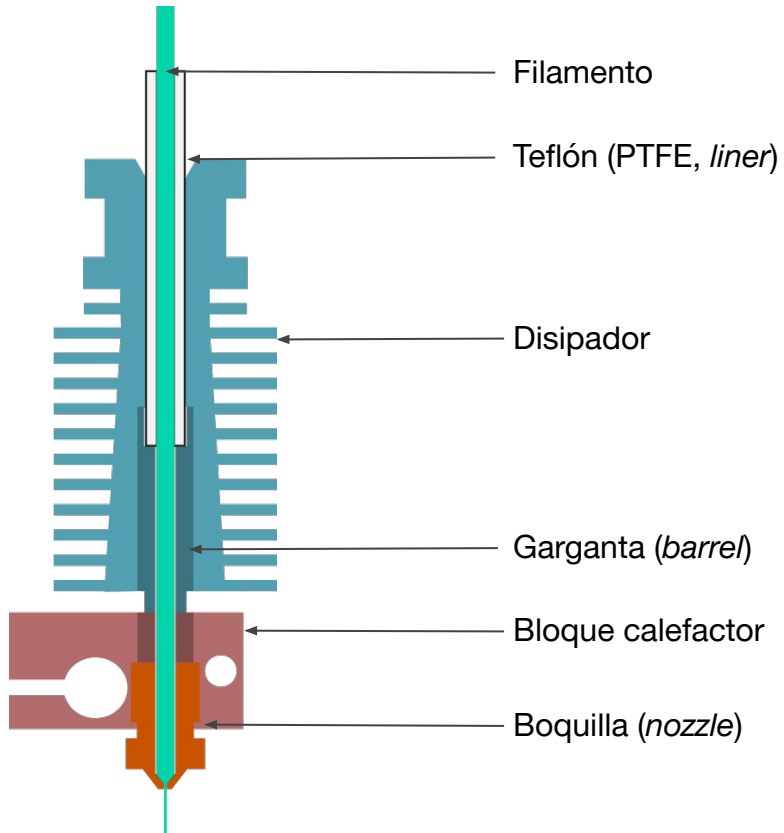
Partes de un empujador



Partes de un fusor

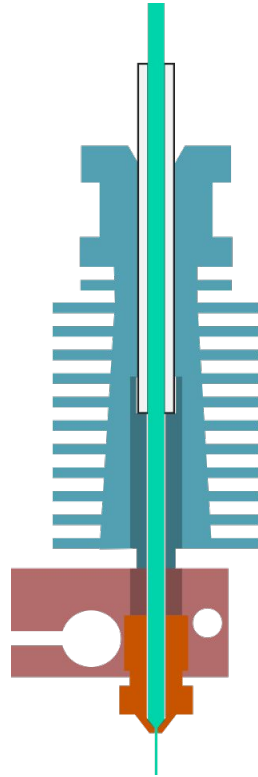


Partes de un fusor

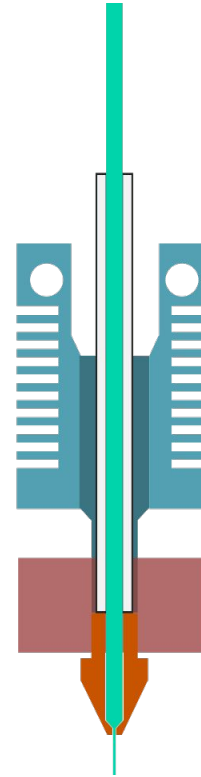


Fusor - *All metal* vs Teflón (PTFE)

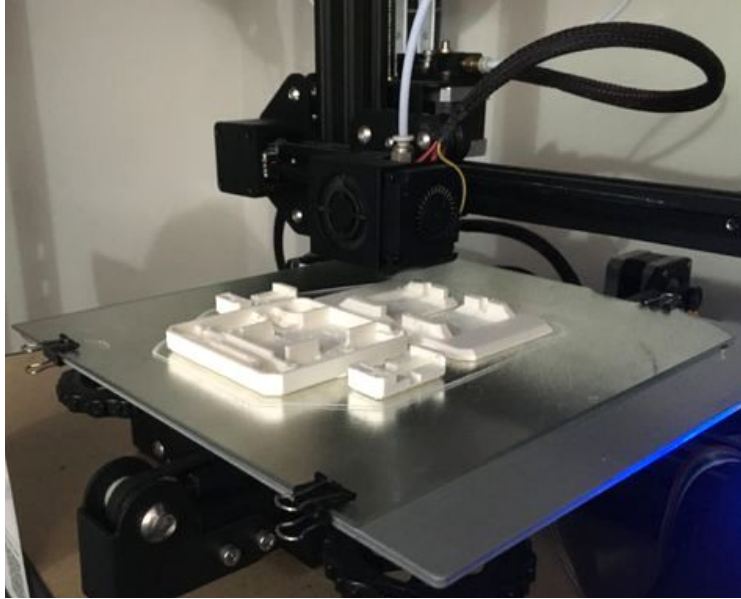
Fusor
All metal



Fusor
teflón



Diagnóstico de problemas de extrusión



Atasco total



Atasco parcial

Solución de problemas de extrusión



[WI] Extrusion Maintenance Work Instructions

↩ 1 backlink

Extrusion Maintenance Work Instructions

Document Code	To be determined
Written by	Diego Trapero
Approved by	
Object	Define the procedure to perform when a printer shows extrusion problems or when doing a complete extrusion maintenance procedure.
Scope	All 3D printers in the farm
Last changes	2022-08-05 First version

Tirón en caliente con aguja

