TRABAJO DE FIN DE GRADO

Grado en Ing. Mecánica

EFECTO DE LA GEOMETRÍA EN LAS PROPIEDADES DE PIEZAS METÁLICAS FABRICADAS MEDIANTE EXTRUSIÓN ADITIVA.

Memòria i Annexos

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Resum

En els últims anys la fabricació additiva amb impressió 3D està en plena expansió. Actualment s'ha avançat amb el modelatge de deposició amb termoplàstics, però no s'ha avançat molt amb els compostos metàl·lics. L'objectiu d'aquest projecte és poder conèixer la influència de la geometria de la peça (gruix de paret, altura), utilitzant l'extrusió additiva i els paràmetres d'impressió (temperatura, diàmetre només de boca, velocitat d'extrusió, traçat) sobre la integritat i propietats de les peces després dels tractaments d'eliminació dels lligants i el sinteritzats.

Les peces es van crear mitjançant l'extrusió de pèl·lets de Inconel 718 que és una mescla d'aglutinant i pols metàl·lica. En aquest projecte es dissenyen unes peces amb una forma cilíndrica, a la qual anem variant l'altura, el diàmetre exterior i interior i s'analitzen els canvis tant de la temperatura com la velocitat d'extrusió, per a poder aconseguir que les peces tinguin la forma desitjada.

Aconseguides les peces desitjades hem d'eliminar l'aglutinant per a posteriorment poder treballar amb metall. L'aglutinant se separa mitjançant dos processos, el primer és col·locar les peces en una dissolució d'aigua amb un 2% d'inhibidor per a evitar que el material s'oxidi a una temperatura de 60 °C durant 15h. Després es dipositen en una estufa a 100 °C perquè s'assequi durant 2h.

Seguidament es fica en un Forn per a realitzar dues etapes, la primera a 600 °C per a eliminar la resta d'aglutinant que no és soluble en aigua, després a 1292 °C per a sinteritzar el material. Una vegada obtingudes les peces es preparen embotint-les en baquelita per a prosseguir amb l'estudi. El primer és l'estudi de duresa mitjançant el mètode Vickers, on obtenim que les peces que tenen distorsió tenen menys duresa.

S'ha trobat provetes que sofreixen distorsió, però que el sistema permet la impressió de formes complexes. Al mateix temps, en reduir la grandària només de boca de 0,8 a 0,5 mm s'aconsegueix disminuir la porositat interna de les peces i les propietats mecàniques, encara que hi ha un increment del temps d'impressió i major dificultat per a l'establiment de flux transitori.

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Resumen

En los últimos años la fabricación aditiva con impresión 3D está en plena expansión. Actualmente se ha avanzado con el modelado de deposición con termoplásticos, pero no se ha avanzado mucho con los compuestos metálicos. El objetivo de este proyecto es poder conocer la influencia de la geometría de la pieza (grosor de pared, altura), utilizando la extrusión aditiva y los parámetros de impresión (temperatura, diámetro de boquilla, velocidad de extrusión, trazado) sobre la integridad y propiedades de las piezas tras los tratamientos de eliminación de los ligantes y el sinterizado.

Las piezas se crearon mediante la extrusión de pellets de Inconel 718 que es una mezcla de aglutinante y polvo metálico. En este proyecto se diseñan unas piezas con una forma cilíndrica, a la que vamos variando la altura, el diámetro exterior e interior y se analizan los cambios tanto de la temperatura como la velocidad de extrusión, para poder conseguir que las piezas tengan la forma deseada.

Conseguidas las piezas deseadas tenemos que eliminar el aglutinante para posteriormente poder trabajar con metal. El aglutinante se separa mediante dos procesos, el primero es colocar las piezas en una disolución de agua con un 2% de inhibidor para evitar que el material se oxide a una temperatura de 60°C durante 15h. Después se depositan en una estufa a 100°C para que se seque durante 2h.

Seguidamente se mete en un Horno para realizar dos etapas, la primera a 600°C para eliminar el resto de aglutinante que no es soluble en agua, luego a 1292°C para sinterizar el material. Una vez obtenidas las piezas se preparan embutiéndolas en baquelita para proseguir con el estudio. Lo primero es el estudio de dureza mediante el método Vickers, donde obtenemos que las piezas que tienen distorsión tienen menos dureza.

Se ha encontrado probetas que sufren distorsión, pero que el sistema permite la impresión de formas complejas. Al mismo tiempo, al reducir el tamaño de boquilla de 0,8 a 0,5 mm se consigue disminuir la porosidad interna de las piezas y las propiedades mecánicas, aunque hay un incremento del tiempo de impresión y mayor dificultad para el establecimiento de flujo transitorio.

Abstract

In recent years additive manufacturing with 3D printing is in full expansion. Progress has currently been made with deposition modeling with thermoplastics, but not much progress has been made with metal compounds. The objective of this project is to know the influence of the geometry of the part (wall thickness, height), using additive extrusion and printing parameters (temperature, nozzle diameter, extrusion speed, layout) on the integrity and properties of the parts after the treatments of removal of the binders and sintering.

The pieces were created by extruding pellets from Inconel 718 which is a mixture of binder and metal powder. In this project some pieces are designed with a cylindrical shape, to which we vary the height, the outer and inner diameter and the changes in both the temperature and the extrusion speed are analyzed, in order to achieve that the pieces have the desired shape.

Once the desired parts have been achieved, we have to remove the binder to later be able to work with metal. The binder is separated by two processes, the first is to place the pieces in a water solution with a 2% inhibitor to prevent the material from rusting at a temperature of 60°C for 15h. Then they are deposited in a stove at 100°C to dry for 2h.

Then it is put in a furnace to perform two stages, the first at 600 ° C to remove the rest of the binder that is not soluble in water, then at 1292 ° C to sinter the material. Once the pieces are obtained, they are prepared by embedding them in Bakelite to continue with the study. The first thing is the hardness study using the Vickers method, where we get that the parts that have distortion have less hardness.

Suffering evidence has been found, but the system allows for the printing of complex shapes. At the same time, reducing the size of the mouth only from 0.8 to 0.5 mm reduces the internal porosity of the pieces and mechanical properties, although there is an increase in printing time and greater difficulty in establishing transient flow.

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Agradecimientos

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A mi compañera de laboratorio Joaquín Turmo Moliner con quien he compartido muchos momentos de triunfos y derrotas, pero que siempre quedaran en el recuerdo.

Para terminar, pero no menos importante, quiero agradecer a toda mi familia por creer en mí, han estado en todo momento apoyándome y evitando que me rinda para conseguir mis sueños.

Glosario

AM: Manufactura Aditiva; Additive Manufacturing.

CAD: Diseño asistido por computadora.

CV: Coeficiente de variación de Pearson.

EEBE: Escuela de Ingeniería Barcelona Este

FCC: Face centered cubic

FFF: Extrusión con filamento fundido

HIP: Prensado isostático en caliente

MEAM: Material Extrusion Additive Manufacturing

MEAM-HP: Material Extrusion Additive Manufacturing of Highly-Filled Polymers

MIM: Moldeo por Inyección de Metales

PEG: Polietilenglicol

PP: Polipropileno

PROCOMAME: Procesos de Conformación de Materiales Metálicos

SEM: Scanning electron microscope

STL: Archivo de Lenguaje de Triangulación Estándar

UPC: Universidad Politécnica de Cataluña

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1. Introducción.

Los metales están presentes en nuestra sociedad de hace muchos años, se han encontrado restos en la Antigua Grecia, Durante la Edad Media, La utilización del hierro como elemento estructural no comienza a emplearse hasta el Siglo XVIII. Con el paso de los años se ha evolucionado con el método de fabricación, para mejorar la calidad del producto y abaratar costes. Uno de los métodos que se está estudiando en la actualidad es la tecnología de la fabricación aditiva (AM). Con el propósito de poder crear piezas con geometrías complejas sin necesidad de usar procesos que son más costos y que malgasta material.

Actualmente los procesos AM están sustituyendo de forma exponencial algunos métodos de fabricación convencionales de la familia de los polímeros y compuestos termoplásticos. Pero para la familia de los cerámicos y metales aún están en proceso de estudio.

La fabricación aditiva de extrusión de materiales "Material Extrusion Additive Manufacturin" (MEAM) consiste en calentar una mezcla de material y empujarlo a través de una boquilla para depositarlo en capas uniformes para construir una estructura tridimensional. La ventaja del MEAM es la reproducción rápida o barata de componentes estándar o prototipos con una variedad de materiales, pero se encuentra con un límite que son las aleaciones metálicas de baja temperatura de fusión. Para poder traspasar este límite se recurre a la tecnología de la MEAM-HP refiriéndose HP a 'Highly-Filled Polymer' polímeros altamente rellenos.

Durante este trabajo se establecieron dos fases: una en la fase de impresión y otra de sinterización. En la impresión, el objetivo es conseguir que mientras se va formando la pieza, se deposite el máximo de materia prima para conseguir una densidad en verde, lo más elevada posible. Para llegar a ese punto es importante encontrar los mejores parámetros de impresión. En la fase de sinterización, los valores experimentales a considerar son el rango de temperaturas de sinterización y el tiempo de mantenimiento para obtener la mayor densidad de las piezas.

Este proyecto es la continuación del trabajo de los compañeros Saba Kvantaliani y Huyenh Valérie. Se centrará en el efecto de la geometría en las propiedades de piezas metálicas fabricadas mediante extrusión aditiva, para la fabricación de componentes de Inconel 718.

El objetivo es imprimir diferentes geometrías como piezas con paredes, con formas que puedan encajar. Se estudiará cómo se comportan después del sinterizado, observar si hay distorsión o no. Mediante microscopio electrónico analizaremos la porosidad y estructura. Una vez caracterizadas las muestras, el objetivo es analizar la posibilidad de poder hacer piezas complejas.

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2. Estado del arte

2.1. fabricación aditiva (AM)

La fabricación aditiva (AM) es un conjunto de tecnologías que permiten la producción de productos con geometrías más complejas que las obtenidas mediante técnicas de fabricación tradicionales, mediante la adhesión del material capa a capa, de forma controlada para crear el diseño deseado.

La evolución de la AM ha hecho que haya adquirido diversos nombres, Prototipo Rápido (Rapid Prototyping), su objetivo era la elaboración de prototipos. Con la evolución del proceso de fabricación, la tecnología ofrecía más variedad de materiales, mejores acabados y tolerancias, provocando el aumento de las prestaciones. Eso provocó la fabricación de piezas totalmente funcionales, cuyo nombre fue, Fabricación Rápida (Rapid Manufacturing) o Rapid Tooling cuando se utilizaban para la fabricación de utillajes y moldes, y de forma coloquial se le llama Impresión 3D.

Para normalizar la designación de estos procesos de fabricación, se forma el comité científico de la ASTM F42. Eso provoca que las designaciones anteriormente nombradas queden invalidadas. La ASTM denomino estos procesos como principios generales para la fabricación aditiva [1]. Posteriormente fue secundada por la ISO en la Norma ISO/ASTM 52900:2015.

Se denomina Additive Manufacturing (Fabricación Aditiva): "El proceso de producción de objetos mediante la adición de material capa a capa realizado a partir de la información de un modelo tridimensional."

La tecnología AM se desarrolló en un principio para producir piezas plásticas. Después de un periodo de investigación, la tecnología AM ha evolucionado al punto de poder hacer piezas complejas con distintos materiales [2].

En la actualidad se puede hacer productos metálicos mediante el proceso AM, se utiliza un aglutinante para la unión de las partículas de metal que formara una pieza tridimensional y se requiere un tratamiento posterior del proceso AM, pero también, hay que de forma directa, las partículas de metal se funden completamente [3]. Existen muchas técnicas de manufactura aditiva que actualmente tratan los metales. Los procesos se pueden clasificar en siete (**tabla 2.1).**

Process		Acronyms	Feedstock	Thermoplastics	Photopolymers	Metals	Ceramics	Composites	Biomaterials	Multimaterial	Other
Extrusion		FFF, FDM, BMD	Filament, rod, pellets	●	●[1]	●	○	●	●	●	Food, Concrete
Photopolymerization		SLA, DLP, CLIP	Liquid		●	●[2]	●[3]	●	●		
Selective Laser Sintering		SLS, HSS, MJF	Powder	●			●	●			
Selective Laser Melting		SLM, DMLS, EBM	Powder			●					
Binder Jetting		BJ, 3DP	Powder			●	●		●		Sugar, Sand, Plaster, Pharmaceuticals
Material Jetting		MJ, Polyjet, Multijet	Liquid	●	●	●[4]	●		●	●	
Directed Energy Deposition		DED, LENS, EBAM	Wire, powder			●	○			●	
Sheet Lamination		LOM, UAM	Sheet	●[5]		●	○	●[6]		●	Paper

Tabla 2.1. La 7 familia de la manufactura aditiva [4]

En la gráfica podemos ver los diferentes materiales que se pueden tratar y que proceso se puede utilizar con dicho material, están marcados con un círculo de diferente colores donde cada color indica lo siguiente:

- **Círculo relleno**: significa que existen máquinas disponibles comercialmente en el mercado que son capaces de procesar el material.

- **Círculo hueco**: significa que la combinación proceso-material ha sido demostrado a nivel de investigación o en artículos técnicos, pero la máquina todavía no está disponible comercialmente.

- **Círculo en color negro**: representa procesos directos, es decir, el proceso de impresión 3D produce la pieza con las dimensiones y densidad final deseada.

- **Círculo en color azul**: representa procesos indirectos, significa que el paso de densificación tal como el sinterizado es necesario para dar a la pieza su densidad final y dimensiones.

Independientemente del proceso de fabricación anteriormente nombrados, la manera de proceder comparte las mismas etapas de la manufactura aditiva. Son las siguiente [5]:

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2.1.1.   creación del diseño en CAD

Lo interesante de este proceso es la facilidad de dar forma al diseño deseado de forma sencilla y rápida, Teniendo la geometría de la pieza, se crea un modelo en software. También hay otros métodos como por ejemplo, láser y escaneo óptico. En la **Figura 2.1**, pueden observarse modelos 3D.
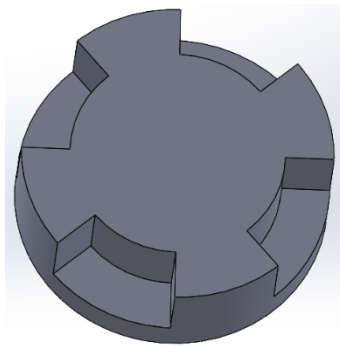
Figura 2.1. Figura creada en CAD (Solidworks)

2.1.2.   Exportación a formato STL

El formato STL representa aproximadamente la geometría mediante una malla cerrada de triángulos. La mayoría de las maquinas AM y los sistemas CAD pueden trabajar con el archivo STL (Standard Triangle Language). Esta exportación se puede hacer variando la resolución de acuerdo con las necesidades, alta o baja resolución. A mayor densidad de triángulos (resolución) mejor aproximación entre el fichero STL y el CAD de la pieza. En la **Figura 2.2**, podemos ver la transformación al formato STL.
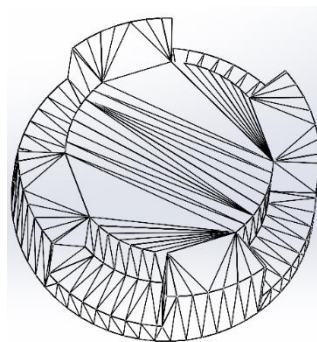
Figura 2.2. Figura CAD pasado a STL

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2.1.3. Tratamiento de archivos STL y código G-Code

El modelo STL es ubicado en una plataforma virtual, específica para cada tecnología, en nuestro caso usaremos el sistema PrusaSlicer, donde el modelo STL es dispuesto con la orientación de fabricación más favorable, acorde con las capacidades y limitaciones de cada proceso de fabricación aditiva.

El Slicer es un paso importante de la impresión, considerando que, el programa tiene en cuenta los parámetros de la impresora y de la materia prima. Se encarga de dividir el diseño 3D en capas de altura deseada y por cada capa a imprimir, designa la velocidad que deseada. Se puede modificar el tamaño, la orientación y la cantidad de piezas a imprimir.

El resultado una vez marcado los parámetros asignados, es un fichero G-Code que contiene todas las instrucciones para la impresión de nuestra pieza (movimientos del cabezal en X, Y, Z, extruir una cantidad de filamento, regular la temperatura etc…).

2.1.4. Construcción y Post-procesado

La elaboración de la pieza en este tramo es automatizada, sólo es necesario realizar una supervisión superficial de la máquina, asegurarse que no se han producido errores en el código, controlar si el depósito tiene suficiente material. La finalidad de este método es que imprima sin supervisión.

Terminado el proceso de fabricación, se extraen la pieza de la máquina. Las piezas son limpiadas del material no procesado que las rodeaba con distintos métodos dependiendo de la tecnología empleada. En nuestro caso La pieza debe separarse de la plataforma de construcción, retirar el exceso de material que rodea a la pieza. Y según el estado de la pieza puede necesitar un acabado abrasivo, como el pulido y lijado. En otros métodos de fabricación se utilizar otros tratamientos, como por ejemplo; si la materia prima fuesen polímeros líquidos (Estereolitografía o SLA y Procesado por luz digital o DLP), primero se escurren las piezas dentro de la máquina, después las piezas se limpian manualmente con alcohol

2.2. Introducción de la fabricación aditiva por extrusión de metales (MEAM).

Esta tecnología consiste en calentar hasta una temperatura que ablanda el material, lo suficiente para que se pueda empujar a través de una boquilla, para depositar ese material capa a capa de forma controlada, hasta construir una estructura tridimensional [6]. La extrusión de material, también conocida como modelado por deposición fundida (FDM), es un método económico y fácil de trabajar.

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Dependiendo del material a tratar, se tendrá que procesar con alguno de los tres tipos de máquinas (Pneumatic, piston, Screw), que se muestran en la **Figura 2.3**.
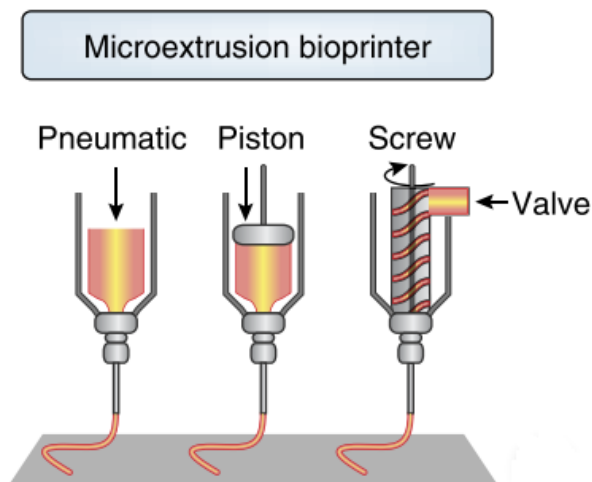
Figura2.3. Diferentes tipos de extrusoras de MEAM

Esta técnica lo desarrollo Stratasys Inc. en los años 80, bajo el nombre de Fused Deposition Modeling (FDM™) usa un filamento continuo como material base, que muchas veces es un polímero termoplástico [7].

Este proyecto se enfoca en la fabricación aditiva por extrusión de metales. Pero es necesario conocer el proceso de Moldeo por Inyección de Metal (MIM).

2.2.1. Moldeo por inyección de metal (MIM)

La tecnología MIM (Metal Injection Moulding) Es un proceso de fabricación que puede dar forma a piezas con volúmenes complejos y de diferentes tamaños, es utilizado para una variedad de materiales metálicos [8]. MIM forma parte de la Metalurgia de Polvos **(PM),** Implica la manipulación de polvos finos en el proceso de fabricación. La materia prima es una mezcla de polvo metálico y aglutinante. Los pasos básicos del proceso MIN son los siguientes (**Figura 2.4**):

- Composición:
  Partimos de polvo de metal muy fino, menos de 20μm de tamaño de partícula. Este se mezcla con aditivos termoplásticos y cera en proporciones muy precisas. Esta mezcla se homogeniza en mezcladoras especiales, mientras se calienta a una temperatura en la que los aditivos se fundan. Esta masa sigue mezclándose

mecánicamente, hasta que todas las partículas de polvo se encuentran recubiertas de manera uniforme por los aditivos.

Posteriormente, se enfría y se granula en forma de pellets, para que sea compatible con la máquina de moldeo por inyección.

- Moldeado:

Se introducen los pellets en el alimentador de la máquina inyectora, donde son calentados e inyectados en la boquilla de la impresora para darle forma a la pieza. Como sólo se funden los aditivos que soportan el polvo metálico, la pieza no está en su estado final, se encuentra en un estado denominado "pieza en verde o marrón", todo este proceso ocurre por debajo de los 220 grados.

- Desligado:

El desligado es el proceso del metal, en el cual se eliminan los agentes ligantes de la pieza moldeada. La mayor parte de estos agentes es eliminada antes del paso de sinterizado, dejando solamente aquel ligante imprescindible para poder introducir las piezas en el horno de sinterizado.

- Sinterizado:

Las piezas son introducidas en hornos a alta temperatura y en atmósfera controlada. Las piezas se calientan a alta temperatura, donde los espacios vacíos entre los granos se eliminan a medida que se funden las partículas. Las piezas encogen de forma isotrópica, transformándose en un sólido acorde a las dimensiones de diseño.

La densidad habitual de una pieza sinterizada es del 97%. Cuanto mayor es la densidad de la pieza, más se parecen las propiedades de esta a las del material forjado.

- Acabado:

Dependiendo de las necesidades del producto final, se le pueden dar diferentes acabados a las piezas sinterizadas. Para mejorar sus propiedades mecánicas, se le puede someter a tratamientos térmicos de igual manera que a un metal cualquiera. Pueden ser sometidas a cualquier tipo de mecanizado para alcanzar las tolerancias deseadas, también se les puede realizar procesos de galvanizado o el bañado.

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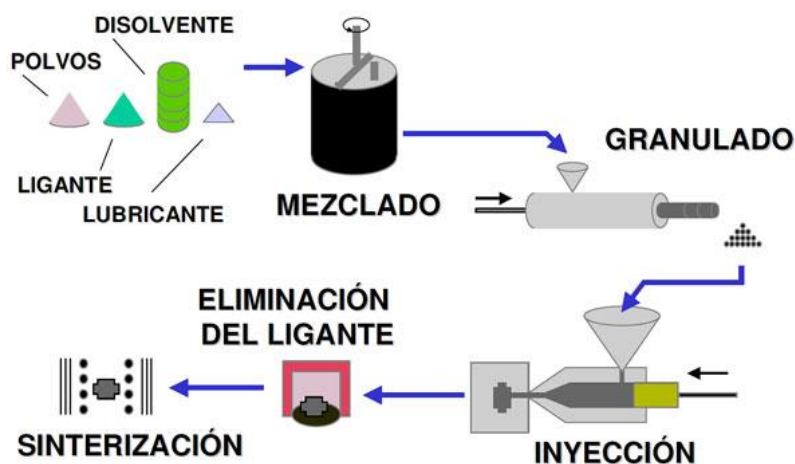
Figura 2.4. Los pasos básicos del proceso MIN

2.2.2. Material Extrusion Additive Manufacturing of Highly-Filled Polymers (MEAM-HP)

El MEAM-HP es un proceso que se diferencia del MEAN únicamente por el uso de material aglutinante en vez de termoplásticos, formado por un polímero con polvo cerámico o metálico. El procedimiento sigue los pasos del MIM. Pero a pesar de ser similar, los resultados varían debido a la diferencia de las técnicas.

Permite fabricar piezas metálicas complejas utilizado dos procesos diferentes. La primera se trata de la manufactura aditiva basado en la extrusión (MEAN), es una técnica de fabricación donde un material es introducido en un cabezal de extenuación, que se encuentra a una temperatura lo suficientemente alta como para que se funda, y a la vez es empujada hacia una boquilla. Los movimientos relativos entre la plataforma de impresión (eje Y) y el equipo de extrusión (ejes X y Z) permiten depositar el material en capas hasta obtener una pieza tridimensional. En el caso de geométricas complejas se puede incluir estructuras de soporte en el proceso de fabricación [6]. La segunda técnica es el moldeo por inyección metálica (MIM) la cual se explica en el apartado 2.2.1

Por lo tanto el proceso MEAM-HP se basa en tratar un polímero termoplástico compuesto de partículas de polvo metálico que se introduce en una máquina de extrusión donde se funde los pellets y se empuja por una boquilla, para crear mediante la técnica MEAM piezas tridimensionales en verde de complejidad variada sin la necedad de moldes con en el proceso MIM.

Una vez tenemos la pieza en verde se elimina el aglutinante polimérico en tratamientos posteriores (catalizador, disolvente y/o desbastado térmico) y posteriormente las partículas de polvo se unen en un paso de sinterización convencional, **Figura 2.5.**
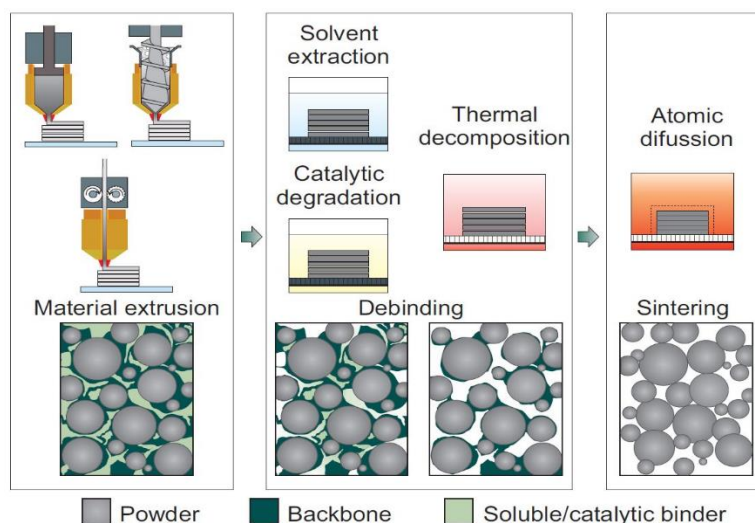
Figura 2.5. Pasos en la técnica de MEAM-HP

El MEAM-HP puede llegar a ser una alternativa rentable para la fabricación de piezas metálicas, cerámica y metal-cerámica de piezas con geometrías complejas que no se pueden conseguir rellenando la cavidad de un molde o crear mediante un tono.

El proceso tienes factores que influyen en la calidad final del modelo, pero tiene un gran potencial y viabilidad cuando estos factores se controlan con éxito. La temperatura de extrusión, el espesor de la capa, la temperatura de la cama de impresión y la velocidad de impresión son algunos de estos parámetros.

2.3. Inconel 718

2.3.1. Superaleaciones

las superaleaciones surgieron a principios de la década de 1940 [9] en la búsqueda de cubrir la demanda de materiales que resista la alta temperatura y otras condiciones exigentes dentro de las turbinas de gas de los motores de los aviones.

Al principio, se intentó mejorar las propiedades de los aceros inoxidables, ya que estas eran las aleaciones líderes para las altas temperaturas en aquellos tiempos. Posteriormente, se lograron avances mediante el desarrollo de superaleaciones destinadas a temperaturas de funcionamiento superiores a 540 ° C [10].

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Las superaleaciones se utilizan como componentes para una amplia gama de aplicaciones, como motores aeroespaciales, motores de generación de energía y productos químicos. A menudo se utilizan como partes dentro de las secciones calientes de motores de turbina de gas, como discos y palas de turbina. Sin embargo, no todas las aplicaciones de las superaleaciones requieren propiedades de alta temperatura y resistencia.

Debido a la buena resistencia a la corrosión de las superaleaciones, ha sido posible implementar superaleaciones en dispositivos biomédicos. En general, las superaleaciones se pueden clasificar en tres tipos principales:

• Superaleaciones a base de níquel
• superaleaciones a base de hierro-níquel
• superaleaciones a base de cobalto

2.3.2.   Composición del Inconel 718

Esta aleación la desarrollo la empresa International Nickel (INCO) en 1959. El uso de niobio fue una evolución, ya que es un elemento endurecedor a elevadas temperaturas. El mecanismo de endurecimiento es la precipitación del compuesto intermetálicos Ni3Nb (fase γ'') en la matriz de níquel al realizar un tratamiento térmico adecuado [11],[12].

El uso de niobio como endurecedor evita la formación de fisuras por deformación durante la fabricación de los componentes finales sobre todo en aplicaciones que necesitan soldadura.

La aleación IN-718 fue aprobada como material para la fabricación de turbinas; a principios de los 80, causada por la crisis de abastecimiento del cobalto. esto la convirtió en la superaleación más importante para la fabricación de motores para aviación.

En la actualidad la aleación Inconel 718 tiene una gran importancia. En un principio la aleación estuvo incluido en el grupo de las superaleaciones base hierro-níquel, pero en la actualidad se considera una aleación del grupo de las superaleaciones base níquel.

Es una super aleación austenítica de base níquel-cromo endurecible por precipitación, pero también tiene otros elementos como el Hierro (Fe), Niobio (Nb), Molibdeno (Mo), Aluminio (Al) y Titanio (Ti) [13]. Su composición química aproximada en forma de polvo se presenta en la **Tabla 2.2.**

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%	NI+CO	CR	MO	CU	CO	C	MN	SI	P	S	FE	TI	AL	NB+TA
Min	50	17	2.8	0	0	0	0	0	0	0	Balance	0.65	0.2	4.75
Max	55	21	3.3	0.3	1	0.08	0.35	0.35	0.015	0.015	Balance	1.15	0.8	5.5

Tabla 2.2. Composición química de Inconel 718. [12].

Esa combinación le da al Inconel 718 unas propiedades mecánicas muy buenas aparte de una gran resistencia a la corrosión, presenta un rango de temperatura de -252 a 700ºC. Las buenas propiedades a alta temperatura del IN-718 se deben a la coherencia entre las fases. Las fases más importantes que aparecen se describen a continuación [14]:

• **Matriz γ:** tiene una estructura cristalina FCC (Cúbico centrado en las caras) solida **Figura 2.6**, es una fase no magnética y continua, que usualmente tiene altos porcentajes de cromo y hierro, además de concentraciones más bajas de molibdeno. Todas las superaleaciones base níquel tienen esta fase. La combinación varía según el tratamiento térmico realizado, Los niveles de Nb, Al y Ti decrecen cuando aumenta la cantidad de fases intermetálicos precipitados.
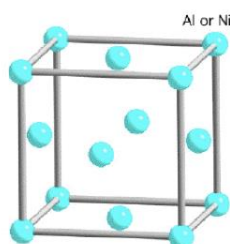
Figura 2.6. Estructura FCC de la fase γ γ'.

• **fase γ':** Esta formado por Al y Ti que reacciona con el Ni creando la composición $Ni_3(AlTi)$. Tiene una red cristalina cúbica semejante a la FCC en el cual los átomos de níquel se localizan en el centro de las caras y los átomos de aluminio o titanio se encuentran en las esquinas del cubo. Es la fase endurecedora principal. La fase γ' es la responsable de la resistencia a la temperatura elevada y su increíble resistencia a la deformación debido a la termofluencia.

La cantidad de γ' depende de la composición química y la temperatura, en la **Figura 2.7** se verá los diagramas de fases ternarios [15]. Los diagramas ternarios de fase Ni-Al-Ti, donde se enseñan las fases γ y γ'. Para una combinación química determinada, el sector de la γ' decrece según aumenta la temperatura. Los precipitados pueden incluir cantidades considerables de Nb, este elemento aparece en niveles muy inferiores que en la fase γ''.
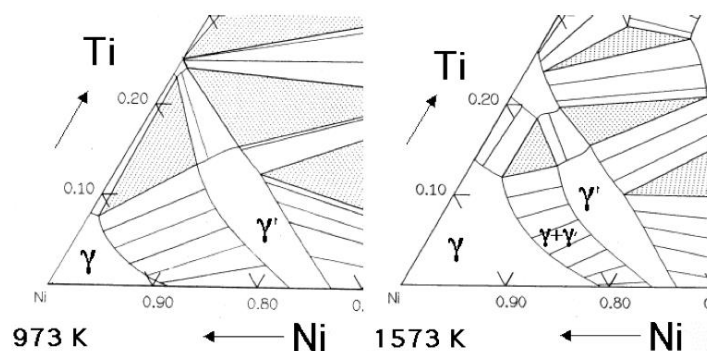
Figura 2.7. Diagrama de fases ternario Ni-Al-Ti

• **fase γ'':** es la principal fase endurecedora del Inconel 718. La estructura cristalina es BCT con un arreglo de átomos de níquel y niobio (Ni_3Nb). La **figura 2.8** muestra la estructura cristalina de la red γ".
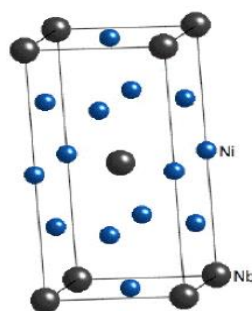
Figura 2.8 Estructura cristalina de la fase γ".

Esta fase precipita a un ritmo más rápido, proporciona una mejor formabilidad y soldabilidad, aporta homogeneidad como partículas en forma de disco más pequeñas de 30nm de diámetro y 5nm de espesor aproximadamente. En consecuencia, provee de una mayor resistencia que γ' al mismo porcentaje de volumen. Opone más resistencia al corte que γ' con el mismo tamaño de precipitado y La transformación de Ni_3Nb es alrededor de los 700°C.

La nucleación de la fase γ'' depende de la concentración de vacantes en exceso existentes en la microestructura, de modo que un aumento de éstas conduce a una densidad más elevada de precipitados γ''. Un proceso de sobre-maduración puede hacer que los precipitados γ'' se hagan más gruesos y que se formen en su lugar precipitados estables de la fase δ.

• **fase δ:** A 870ºC también se forma esta fase y su fórmula es Ni_3Nb. Aparecer en los límites de grano, a veces aparecen algunos precipitados intergranulares. Microanálisis realizados sobre la matriz γ en los alrededores de la fase δ muestran una disminución del contenido de Nb en estas zonas superior al 50%.

• **Carburos MC:** Tipo de precipitado grueso (0.5-1 μm) aparece en forma de grandes bloques. Con estructura cúbica y su composición química, tiene gran cantidad de Ti y Nb ((TiNb)C). Estos carburos se pueden formar durante el proceso de solidificación o durante un recocido a 1.038ºC.

• **Precipitados Laves**: Son precipitados gruesos con morfología en forma de glóbulos irregulares (a veces alargados), que aparecen fundamentalmente en los límites de grano. Su estructura cristalina es hexagonal y su composición se puede representar mediante la fórmula (Ni0.5Fe0.25Cr0.25) (NbMoSi). Esta fase se puede formar durante la etapa de solidificación o durante un recocido a 1038ºC. Esta fase puede causar al menos tres tipos de problemas.

1. Retira Nb de la matriz γ, reduciendo el endurecimiento.
2. La fase Laves funde a una temperatura menor que el resto de la matriz, por lo que puede provocar fusión localizada y porosidad durante el procesado a alta temperatura.
3. La fase Laves es una zona débil dentro de la microestructura, La ruptura del material sometida a tensión suele iniciarse en la interfase matriz-fase Laves.

Como solución a evitar estos problemas, Bouse [16] propuso homogeneizar la microestructura mediante una velocidad de calentamiento lenta entre 1.065ºC y 1.180ºC, o mantenerlo 1 hora a 1.150ºC para que la fase Leves se disuelva y se transforme en fase γ**.**

La secuencia de transformaciones que sufre la aleación IN-718 durante su calentamiento fue estudiada por Valencia et al. mediante Análisis Térmico Diferencial (DTA) [17]. y se presenta a continuación:

1) En el intervalo 600ºC-800ºC se produce la precipitación masiva de las fases γ' y γ''.
2) Alrededor de 800ºC precipita la fase δ ortorrómbica.
3) En el intervalo 1.150ºC-1.190ºC, se produce fusión la fase Laves.
4) Temperatura sólidus del material a 1279ºC.
5) Temperatura líquidus del material en torno a 1.340ºC.

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Inconel 718 ha sido sin duda la superaleación más utilizada en muchas aplicaciones. En épocas más recientes, ATI ha desarrollado una versión mejorada de Inconel 718 conocida como ATI 718 Plus que ha mejorado la estabilidad térmica y las propiedades mecánicas a altas temperaturas en comparación con Inconel 718 (pero nosotros trabajaremos con el Inconel 718) [18].

Las excelentes propiedades a alta temperatura del IN-718 se deben a la coherencia entre las fases y al limitado número de sistemas de deslizamiento disponibles que funcionan en $\gamma\gamma''$. Debido a la alta coherencia la velocidad de formación de $\gamma\gamma''$ es muy lenta [19]. Algunas superaleaciones a base de níquel son reforzadas tanto por la fase $\gamma\gamma'$ como por la fase $\gamma\gamma''$. Uno de esos es el Inconel 718.

2.3.3. Sinterización del Inconel 718

En la actualidad no hay un proceso de sinterizado específico para las piezas en verde del Inconel 718 fabricadas mediante MEAM-HP. Se presupone que los procesos han de ser semejantes a los sinterizados de las piezas en verde fabricadas mediante MIM, explicado en el apartado 2.2.1.

El sinterizado es un tratamiento térmico que se aplica para unir el polvo metálico en una pieza sólida. La temperatura de trabajo debe estar cerca del punto de fusión del metal, por lo que debe trabajar un 10% por debajo de la temperatura de fusión [20].

Para trabajar con el Inconel 718, debemos tener en cuenta los parámetros de la temperatura y el tiempo, hay que tener en cuenta la estructura geométrica de las partículas de polvo, la composición de la mezcla de polvo, la velocidad del compacto y la composición de la atmosfera protectora en el horno. El proceso de sinterizado trabaja en dos etapas diferentes:

- etapa con unión local (formación de cuellos) entre partículas adyacentes, la distancia entre los centros de las partículas decrece
- etapa de redondeo y contracción de poros.

En estas dos etapas el volumen se reduce, lo que provoca el aumento de la densidad. Valencia et al. en su artículo estudia la complejidad de la sinterización del Inconel 718 por Inyección de Metales (MIM). Se observa que a temperaturas cercanas al punto de fusión, reacciones de precipitación en estado sólido complican la sinterización y forman fase eutéctica γ y fase Laves. Diversos estudios muestran que la mejor atmosfera para efectuar el sinterizado es la atmosfera protectora de Argón, o en vacío. Valencia et al. realizaron

sinterizaciones a distintas temperaturas y durante distintos periodos de tiempo. Estos resultados se ven en la **Tabla 2.3**.

Run No	Temp. °C	Ramp Rate °C/min	Interm. Hold(*) Hrs	Holding Time Hrs	Density Sintered (g/cm^3)	Density HIP'd (g/cm^3)
1	1250	1	0	2	7.81	7.90
2	1250	1	2	8	7.96	7.78
3	1250	8	2	2	7.55	7.44
4	1250	8	0	8	8.12	8.17
5	1275	1	2	2	7.71	7.87
6	1275	1	0	8	8.18	8.21
7	1275	8	0	2	7.90	8.11
8	1275	8	2	8	7.94	8.16
9	1262	4.5	1	5	7.76	7.94
10	1250	10	2	1	7.70	NA(**)
11	1260	20	0	2	7.95	NA(**)

Tabla 2.3. Temperaturas, ratios de calentamiento, tiempo de mantenimiento, densidades después de la sinterización.

más tiempo se mantiene la pieza a temperatura de sinterizado. En este tipo sinterización se debe tener en cuenta las rampas de calentamiento, ya que se determinó que la densidad aumentaba con la velocidad de calentamiento [21].

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3.   Parámetros de Impresión

Para poder dar facilidad a la compresión de los parámetros de impresión, se hace un pequeño resumen del sistema de impresión 3D usado en este estudio.

La impresora Utilizada es Prusa i3 MK3 a la que se le ha modificado el cabezal de origen; por el cabezal de extrusor Direct3D, que se trata de una versión pequeña de una máquina de extrusión convencional de los pellets poliméricos.   El cabezal Direct3D se muestra en la **Figura 3.1.**

Figura 3.1. El cabezal Direct 3D

El extrusor Direct3D, tiene un tornillo husillo, que debido a su diseño, hace que el material se desplace por todas las zonas que conforma la unidad de extrusión, que son las siguientes (**Figura 3.2**), [22]:

1. Zona se alimentación: se encarga de transportar los pellets a la zona de trabajo.
2. Zona de fusión: se encarga de fundir y mezclar los pellets mediante calor y fricción.
3. Zona de dosificación: la mezcla es sometida a una alta presión antes de su extrusión por la boquilla.

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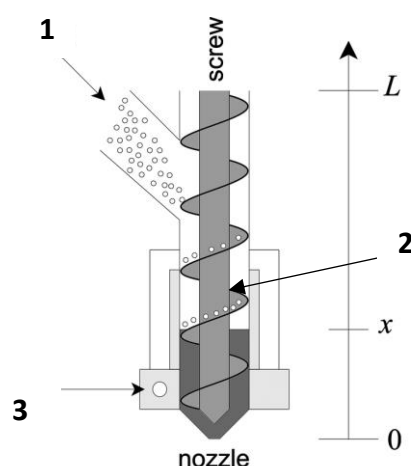
Figura 3.2. Procesos del cabezal Direct 3D

El modelo de la pieza que se quiere imprimir en 3D; se introduce en el software PrusaSlicer, que es un programa centrado en Slicer, que se basa en un software libre que actúa de enlace entre el modelo 3D y la impresora. El software nos deja programar el movimiento del cabezal de impresión (unidad de impresión), y de la plataforma de impresión (sustrato), aparte de otros parámetros. El software convierte el modelo 3D en capas delgadas y nos genera un archivo G-Code, que es un lenguaje de programación de control numérico, donde sale toda información que ha de realizar la impresora.

Algo importante para tener en cuenta con PrusaSlicer es que su técnica de manufactura aditiva está diseñada para la fabricación de filamentos fundidos (FFF) en vez de pellets. Esto provoca que haya parámetros que no tienen sentido para la extrusora Direct 3D, pero se tienen que introducir igualmente porque el programa lo solicita. Por eso es importante entender la relación entre los diferentes parámetros.

3.1. Flujo del extrusor MEAM-HP

Para los procesos realizados mediante MEAM-HP, la presión necesaria en el extrusor es importante. Para un polímero con un 60% en volumen de carga metálica, oscila entre los 2MPa y 10MPa. Nos damos cuenta de que es muy inferior si lo comparamos con los procesos MIM, ya que la presión requerida es mucho más elevada, entre los 55MPa y 60MPa [23].

Controlar el flujo en el extrusor es imprescindible para conseguir una estabilidad dimensional de los filamentos que salen de la boquilla, para garantizar que la pieza creada en 3D no tenga deformaciones.

Un control óptimo del flujo de material tendrá una tasa de flujo TFV (Tasa de flujo volumétrico) semejante a la tasa de producción TPV (Tasa de producción volumétrica), esta igualdad es el principio de conservación de la tasa de flujo volumétrico [24][25].

$$TFV = TPV \qquad \textbf{(Ec.3.1)}$$

- TFV: es el volumen de material que es empujado por el extrusor hacía la boquilla. [mm^3/s]
- TPV: es la velocidad que es depositado el material en la plataforma de impresión. [mm^3/s]

El control del flujo no se debe de ignorar. Según Zinniel et al**.** [26] una tasa de flujo descontrolada, incluso con escasas fluctuaciones, puede causar variaciones significativas en la calidad, producir huecos y variar el espesor extruido.

3.2. Filamento de extrusión

En la fabricación basada en la extrusión aditiva, el filamento no mantiene su forma cilíndrica después de salir de la boquilla, dado que se aplasta sobre la plataforma de impresión y sobre la capa anteriormente impresa [27]**.** Para evitar que se produzca el aplastamiento del material, se calcula la altura a la que tiene que estar la boquilla. Esto se define en la siguiente ecuación [28]:

$$h_c = \frac{0.785 * V_E * D_b}{V_C} \qquad \textbf{(Ec.3.2)}$$

- h_c = Altura critica de la boquilla.
- D_b = diámetro de la boquilla.
- V_E = Velocidad de extrusión [mm/s].
- V_C = Velocidad del cabezal (Velocidad de la boquilla a través de la plataforma de impresión) [mm/s].

En este proyecto se imprimirá las capas con una h_c inferior a la calculada. En los procesos de fabricación mediante la técnica MEAM-HP, se intenta que los filamentos impresos

generen un pequeño aplastamiento, para garantizar la adhesión entre las capas y evitar que en el interior de la pieza queden huecos y obtener una pieza homogénea después del sinterizado. Existe un límite de altura a la que puede disminuir, pasado ese límite, afectara sus propiedades mecánicas [29].

Un parámetro que es importante a tener en cuenta es el porcentaje de relleno (infill percentage). Su función es definir la densidad de la estructura de soporte interno de los objetos a fabricar. Cuanto mayor sea la densidad mayo será su porcentaje de relleno, como se ve en la **Figura3.3** [30].
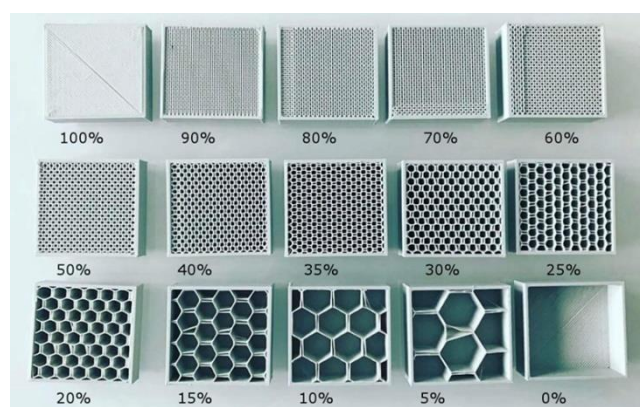
Figura 3.3 Diferentes porcentajes de relleno

El objetivo de este proyecto es fabricar piezas con la densidad máxima posible, por lo que se escoge un porcentaje de relleno del 100%, se puede calcular el espaciado de la trama con la siguiente ecuación,

$$S = w - h * \left(1 - \frac{\pi}{4} \right) \qquad \textbf{(Ec.3.3)}$$

- w = es el ancho de extrusión (mm)
- h = altura de la boquilla (mm)

Con PrusaSlicer se calcula la distancia de forma que los filamentos queden tangentes entre ellos, esto provoca que se generen huecos vacíos entre los filamentos [31], lo que puede causar defectos y afecta a la densidad, por lo que las propiedades mecánicas se ven claramente afectada con respecto a una pieza sin huecos entre filamentos. Para evitar estos espacios se emplea un parámetro llamado porcentaje de superposición (overlap), que permite superponer los filamentos adyacentes entre ellos de forma que se reduzcan los espacios vacíos. En los trabajos realizados por Saba Kvantaliani [32] y Huyenh Valérie

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[33] determinaron que la superposición requerida para el método MEAM-HP ha del 50 % o superior. En la imagen siguiente se ve la diferencia de porcentajes **Figura 3.4.**
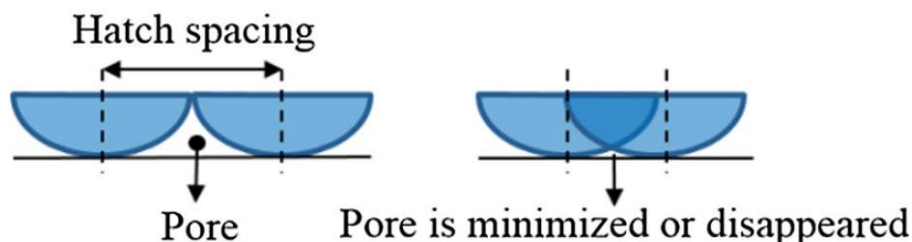
Figura 3.4 Esquema del espacio de la trama (hatch spacing) entre dos filamentos adyacentes y del efecto que tiene la superposición sobre los poros. Izquierda: superposición del 0%. Derecha: superposición del 50%

3.3. Velocidad de giro del husillo

Se ha de tener presente que PrusaSlicer está diseñada para la fabricación de filamentos fundidos (FFF), y se ha adaptado la impresiona de fabricación con filamento fundido (*Prusa i3 MK3)* añadiéndole un cabezal de extrusor (*Direct 3D)* que trabaja con pellets, siendo un husillo el encargado de procesar el material y dirigirlo hacia la boquilla como se muestra en la **Figura 3.2** del apartado 3**.**

Esto hace que la tasa de flujo volumétrico (TFV) tenga una velocidad de extrusión (V_E) que depende de la velocidad de giro del husillo (V_H).

Ouradnik **[34]** mediante su estudio define V_E con la siguiente ecuación,

$$V_E = M_{221} * \frac{\left((w-h)*h + \pi*\left(\frac{h}{2}\right)^2\right)*V_C}{\mu * \frac{\pi*D^2}{4}}$$

(Ec.3.4)

Según Ouradnik, la (*D*) de la ecuación no tiene sentido físico, debido que el material utilizado no es un filamento, pero es obligatorio asignarle un valor en PrusaSlicer, que afectará a la velocidad de extrusión. PrusaSlicer permite definir el ancho (w) y la altura (h) del filamento extruido. Además, se debe añadir un factor de conversión de firmware (μ) con unidades [mm/revolución], que correlaciona la cantidad de filamento que se extruye con las revoluciones que da el husillo.

En la ecuación tenemos el multiplicador (M_{221}) que aumenta la velocidad de giro de husillo, es una magnitud adimensional que se define mediante el software de PrusaSlicer o también se puede añadir al código G-code. Cuando se introduce a través de PrusaSlicer se multiplica la velocidad del husillo durante todas las capas de impresión. El problema es que; la primera capa sí solicita un flujo elevado para facilitar su adhesión con la plataforma de impresión, pero las siguientes capas no necesitan un flujo tan elevado. Cuando la cantidad de flujo es la igual para todas las capas, afecta la fabricación de forma muy negativa, afectando a las dimensiones y geometría de la pieza que se ve en foto de la (**Figura3.5**).

Figura 3.5. Imagen de pieza impresa con flujo excesivo

Al añadir la función M_{221} a través de G-Code, podremos asignar un multiplicador en cada capa, solventado el problema del exceso de material extruido. Una combinación entre el valor añadido en PrusaSlicer y el valor añadido en G-Code se puede calcular mediante la siguiente ecuación,

$$M_{221} = \frac{M_{221_{Slicer}} * M_{221_{G-code}}}{10} \qquad \textbf{(Ec.3.5)}$$

En el estudio que se está desarrollando, se establece un valor fijo de μ=30 mm/revolución]. Con esta relación es posible obtener la velocidad de giro del husillo (V_H), cuya unidad de medida es revoluciones por segundo (rps), la ecuación queda de la siguiente manera,

$$V_H = M_{221} * \frac{\left((w - h) * h + \pi * \left(\frac{h}{2}\right)^2\right) * V_C}{30 * \frac{\pi * D^2}{4}} \qquad \textbf{(Ec.3.6)}$$

Analizando las ecuaciones 3.4 y 3.6 podemos decir que $V_H \approx V_E$.

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3.4. Criterio de flujo

El flujo (F) es la relación entre la velocidad del cabezal de extrusión y la velocidad de giro del husillo, por lo que es un parámetro importante para controlar. Se define con la siguiente ecuación,

$$F = \frac{V_C}{V_E} \qquad \textbf{(Ec.3.7)}$$

Se considera la distancia que recorre el cabezal cuando el husillo ha dado una revolución. Según Rane et al [27], cuando la velocidad del cabezal es mayor que la del husillo (F > 1), el ángulo de contacto es inferior a 90º, lo que puede causar problemas dado que a mayor cantidad de filamento depositado mayor será la tensión friccional que tira del filamento. Esto causa variaciones en el diámetro del filamento extruido. Cuando la velocidad del cabezal es igual a la del husillo (F = 1) el ángulo de contacto es prácticamente 90º, lo que genera que el filamento se solidifique con el mismo diámetro que el que salió de la boquilla. Cuando la velocidad del cabezal es inferior a la del husillo (F < 1), el exceso de filamento extruido causa que se comprima y comience a expandirse, lo que recibe el nombre de "pie de elefante", **Figura 3.6**. La conclusión es que, cuanto mayor sea la diferencia entre V_C y V_E mayores serán los efectos.

FFF 3D printing elephant's foot

STEMFIE.org
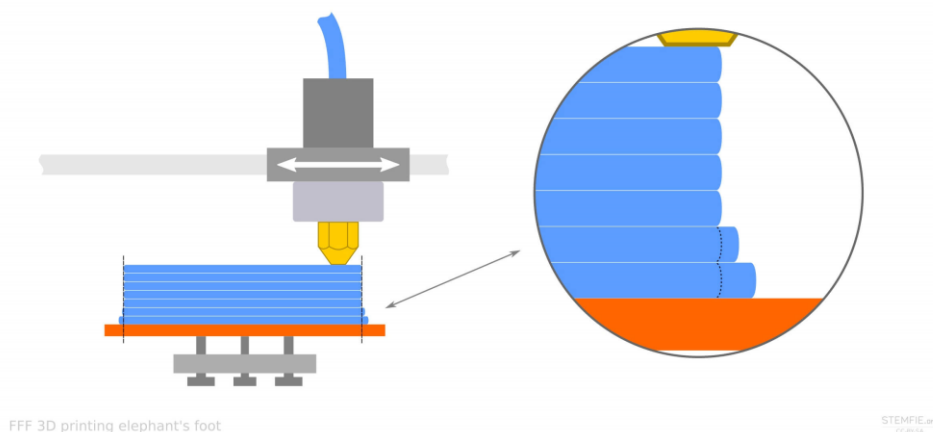
Figura 3.6. Imagen de pieza con pie de elefante.

Es importante saber que F interactúa con la temperatura y otros parámetros del material con el que se esté trabajando, lo que provoca que para cada material y temperatura de extrusión se tenga que realizar un análisis de cuál ha de ser su F más apropiada. En los estudios realizados por Rane et al [27] se presentó una gráfica que para elaborarla se

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hicieron impresiones usando la técnica MEAM-HP con pellets de acero 316 MIM, a diferentes temperaturas de extrusión (Te), con diferentes valores de F y se midieron las variaciones en el diámetro del filamento extruido tras el enfriamiento, el resultado es el mostrado en la (**Figura 3.7)**
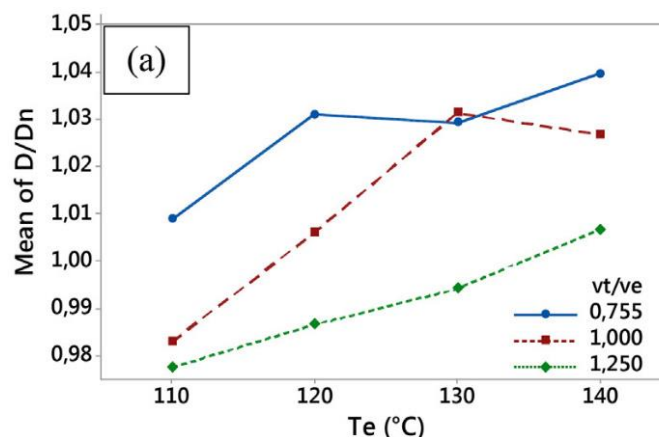
Figura 3.7 Efecto de la relación vt/ve (F) y la temperatura de extrusión (Te) sobre la media D/Dn [27].

Para poder definir F sustituimos la ecuación 3.4 en la ecuación 3.8 para definir,

$$F = \cfrac{1}{M_{221} * \cfrac{\left((w - h) * h + \pi * \left(\cfrac{h}{2} \right)^2 \right) *}{30 * \cfrac{\pi * D^2}{4}}} \qquad \textbf{(Ec.3.8)}$$

Como poder ver en la ecuación es posible variar F variando el valor de D y/o de M_{221}. Se debe tener en cuenta que PrusaSlacer mantiene constante el flujo en todo el proceso de fabricación de la pieza. Para poder modificar la velocidad se tiene que añadir el multiplicador M_{221} en el G-code y poder regular el flujo en cada capa.

3.5. Diámetro de la boquilla

Si el diámetro de una boquilla es pequeña, también lo serán los diámetros de los filamentos extruidos, eso provoca que se pueda imprimir piezas más detalladas; pero también provoca que se mas difícil controlar el flujo y el tiempo de impresión será mayor [34]. El diámetro afecta al flujo, porque al incrementar el diámetro de la boquilla (D_b), se genera una

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disminución de la tasa *de corte ($\dot{\gamma}$)* aplicado en el material, como predice en la ecuación de Hagen-Poiseuille [27].

$$\dot{\gamma} = \frac{32 * Q}{D_b^2} \qquad \textbf{(Ec.3.9)}$$

- Q: es el caudal volumétrico [mm^3/s]
- D: diámetro de la boquilla [mm]
- $\dot{\gamma}$: shear rate [s^{-1}]

Según esta ecuación, al disminuir el diámetro de la boquilla, decrece el caudal volumétrico por lo que se necesita presiones más elevadas para extruir los filamentos. Esto puede generar problema, pues el husillo tendrá que girar a más velocidad, lo que podría causar atascos y un flujo irregular.

Hay algunas limitaciones al usar un polímero cargado con partículas metálicas, una de ellas es el diámetro mínimo de la boquilla de extrusión. Es posible que se creen tapones a causa de la acumulación de las partículas metálicas. Las boquillas proporcionadas por el fabricante tienen diámetros de 0.5mm, 0.8mm y 1.2mm. Con boquillas inferiores a 0.5mm no es recomendable trabajar, ya que es complicado controlar el flujo y es fácil que se tapone lo que suele causar la aparición de defectos en las piezas en verde.

4. Materiales y métodos

4.1. Materia prima

La materia prima de este proyecto es Inconel 718, en forma de pellets como se muestra en la **Figura 4.1**, fabricado por la empresa PolyMIM®. La **Tabla 4.1** muestra la composición química del polvo metálico que forma los pellets. Estos gránulos se utilizan normalmente para el proceso MIM.

Figura 4.1 Pellets MIM de PolyMIM®

IN718	Min %	Max %
Ni	50	55
Nb	4.7	5.5
Ti	0.65	1.15
Al	0.2	0.8
Mo	2.8	3.3
Cr	17	21
C	0.03	0.06
Fe	Balance	

Tabla 4.1 Composición porcentual en peso, tras el sinterizado, del polvo de Inconel 718 suministrado por PolyMIM®

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La empresa suministradora no aporta datos sobre la cantidad en volumen de los componentes, ni de la composición del aglutinante, dado que es un secreto industrial. La composición del aglutinante se espera que sea semejante a la propuesta por Royer et al. [35] compuesto, en volumen total de los pellets:

- 22% de polietilenglicol (PEG)
- 16% de polipropileno (PP),
- 2% de ácido esteárico (SA)

El componente principal del aglutinante utilizado en el gránulo es polietilenglicol. Es una molécula hidrofílica; por tanto, es un polímero soluble en agua. Debido a ello, la desaglomeración del disolvente se puede realizar únicamente con agua.

Se presupone que la composición de los pellets que se van a usar en este proyecto será similar a los de la **Tabla 4.2**. Donde se presentan las características de los componentes, junto con sus fracciones en peso y en volumen.

Material	Fracción en volumen (%)	Fracción en peso (%)	Densidad (g/cm³)	Punto de fusión (°C)	Inicio degradación térmica (°C)
Inconel 718	60	92.02	8.19	1320	-
PEG20K	22	4.95	1.21	66	195
PP	16	2.68	0.9	160	287
SA	2	0.35	0.94	69	360

Tabla 4.2 Composición esperada para los pellets de Inconel 718 suministrados por PolyMIM® junto con la fracción en peso y en volumen aproximada de sus componentes.

El certificado suministrado por PolyMIM® reporta un factor medio de 1.1515 (significa que al crear las piezas hay que multiplicar el tamaño por ese número para compensar la contracción que se producirá durante el sinterizado) y una densidad teórica después de la sinterización superior a 8 g/cm³.

4.2. Método de impresión

Para el desarrollo de este proyecto utilizaremos la impresora Prusa i3 MK3 desarrollada por la empresa Prusa Research S.R.O **Figura 4.2,** es una impresora de fabricación con filamento FFF, de código abierto. Esta máquina tiene 4 motores paso a paso NEMA 17, conectada a una base Einsy Rambo, que se encargan del movimiento del cabezal y la

plataforma de impresión mediante tres carriles que corresponden a cada eje (x,y,z); donde la plataforma de impresión se mueve en el eje (y), mientras que el cabezas de extrusión se desplaza en los ejes (x,z).

La precisión en el desplazamiento a lo largo de (x,y,x) es de 10 x 10 x 5µm. Esta impresora está limitada a imprimir piezas de dimensiones correspondientes a 250 x 210 x 200mm. La velocidad máxima a la que puede llegar el cabezal es de 200 mm/s, mientras que la temperatura máxima de la plataforma de impresión es de 120 °C [36]. La impresora se conecta mediante un puerto USB.

Figura 4.2 Impresora cartesiana de fabricación con filamento fundido PRUSA i3 MK3.

Para poder fabricar las piezas con los pellets, el cabezal de la impresora se reemplazará por otro de extrusión fabricado por Direct3D, se trata de una versión miniaturizada de una maquina extrusora convencional de pellets poliméricos **Figura 4.3** Está diseñado para ser compatible con la impresora Prusa i3 MK3 además de con el software específico de este.
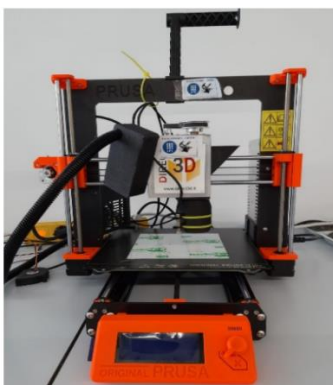
Figura 4.3 Impresora PRUSA i3 MK3. Con cabezal Direct3D

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El cabezal tiene un husillo que es girado por un motor paso a paso NEMA 17, que se encarga de desplazar los pellets por todo el recorrido del cabezal explicado en el tema 3, **Figura 3.2**. La altura y anchura del cabezal es 18 x 13 cm como máximo, tiene un peso de 1Kg y es capaz de extruir entre 30 y 250 g/h (dependiendo del material, el tamaño de la boquilla y de la resolución deseada) a una temperatura máxima de 300°C.

En la plataforma de impresión se adhirió un material polimérico distribuido por GeckoTek, **Figura 4.4**. Que nos facilita la adhesión del polímero a la plataforma de impresión. Como el cabezal Direct3D es más grande que el original, se instala un sensor inductivo que detiene la impresión en caso de que este fuera a impactar contra la plataforma de impresión; este sensor se puede observar en la **Figura 4.4**.

Figura 4.4. sensor inductivo, material polimérico (Gecko Tek)

4.3. Software

4.3.1. PrusaSlicer

PrusaSlicer es el software de laminado creado por el fabricante de impresoras 3D Prusa Research S.R.O basado en el programa de código libre Slic3r. El programa permite escoger perfiles de impresión para conseguir los mejores resultados. Dado que para el desarrollo de nuestro proyecto le cambiamos el cabezal, no existe una configuración predeterminada para los pellets de Inconel 718. Aun así, posee la capacidad de multiplicar los objetos, cambiar su tamaño y forma con limitaciones, cambiar el color y disposición. El terminal básico se observa en la **Figura 4.5.** El eje de coordenadas es la posición (0,0,0) de la impresora.

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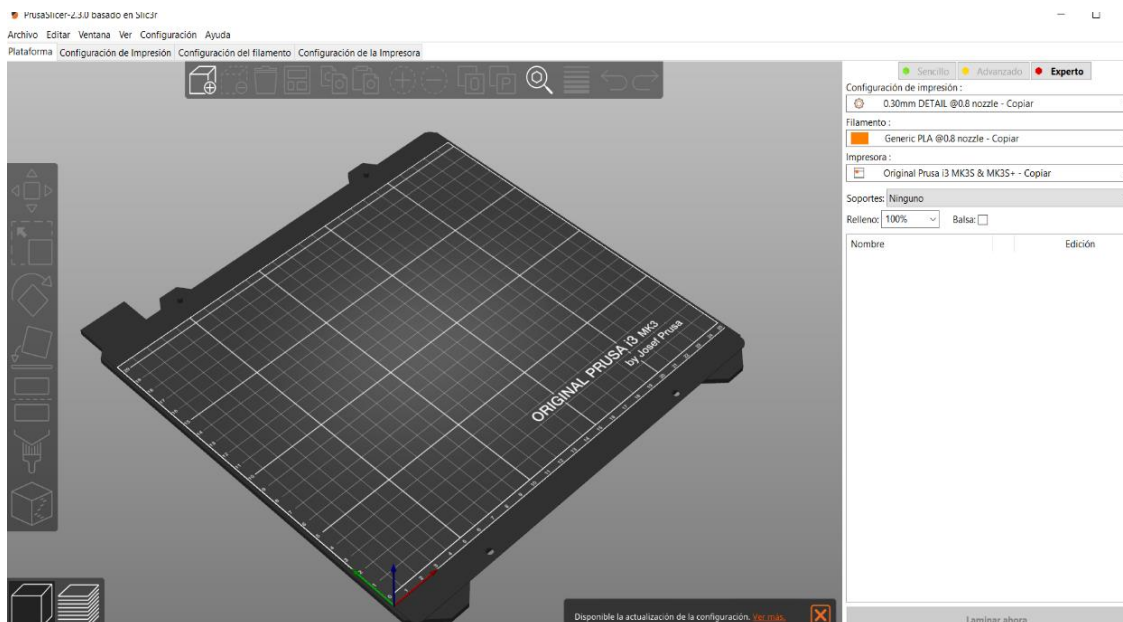
Figura 4.5 PrusaSlicer 2.3.0

Para añadir el archivo que deseamos imprimir se abre Archivo, Importar STL (**Figura4.6**), pero también puede importar otros formatos. Para poder modificar todos los parámetros debemos seleccionar la opción de Experto.
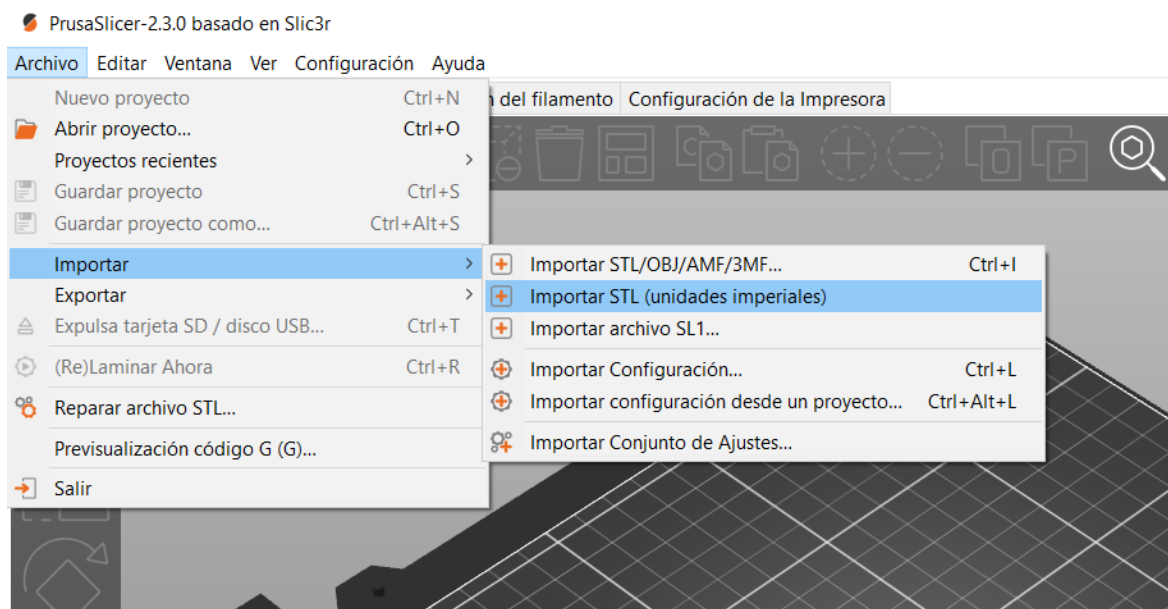
Figura 4.6 Importar archivo STL

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Una vez ya tenemos la pieza importada se podrá hacer modificaciones. Podremos cambiar la posición de la cara que estará en contacto con la plataforma de impresión. Una vez tenemos la pieza en la posición deseada, podremos continuar con la modificación de los diferentes parámetros de impresión en modo experto y que a continuación explicaremos con más detalle (**Figura 4.7).**
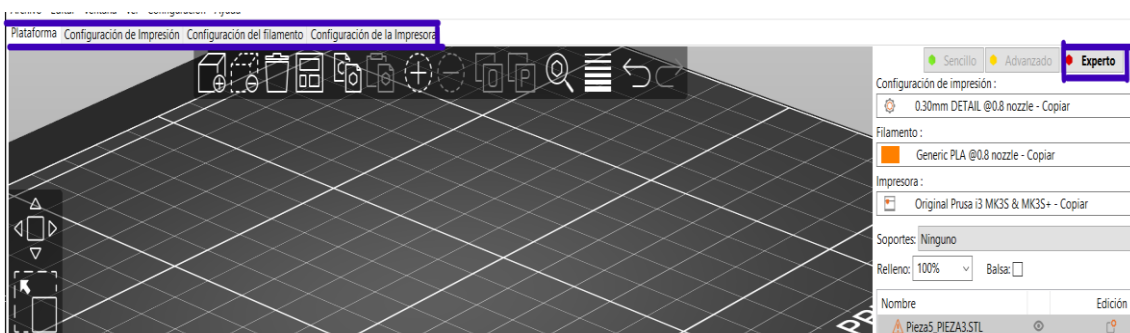
Figura 4.7 Barra de modificación de PrusaSlicer (color azul)

- **Configuración de impresión**

En este apartado se seleccionan todos los parámetros que afectan a la impresora.

- Relleno **(Figura 4.8)**

    - La densidad de relleno: que nos permite rellenar la parte interna de la pieza. Por lo general, en una impresión convencional el porcentaje de relleno suele ser del 30%, pero en nuestro caso, lo que estamos buscando es obtener piezas solidas con la máxima densidad posible, pondremos una densidad de relleno de 100%. Esto genera que automáticamente el patrón de relleno pase a ser rectilínea.

    - Angulo de relleno: Ángulo predeterminado para la orientación del relleno 40º

Figura 4.8 configuración impresión (Relleno) PrusaSlicer

- Falda y balsa **(Figura 4.9)**

  - Falda: Se imprime antes que cualquiera de los modelos y su finalidad es principalmente estabilizar el flujo del filamento a través de la boquilla. En nuestro caso le ponemos un bucle de 1, con una distancia de la pieza a fabricar de 3mm.
  - Balsa: El número de bucles de la falda, que en nuestro caso será 0.
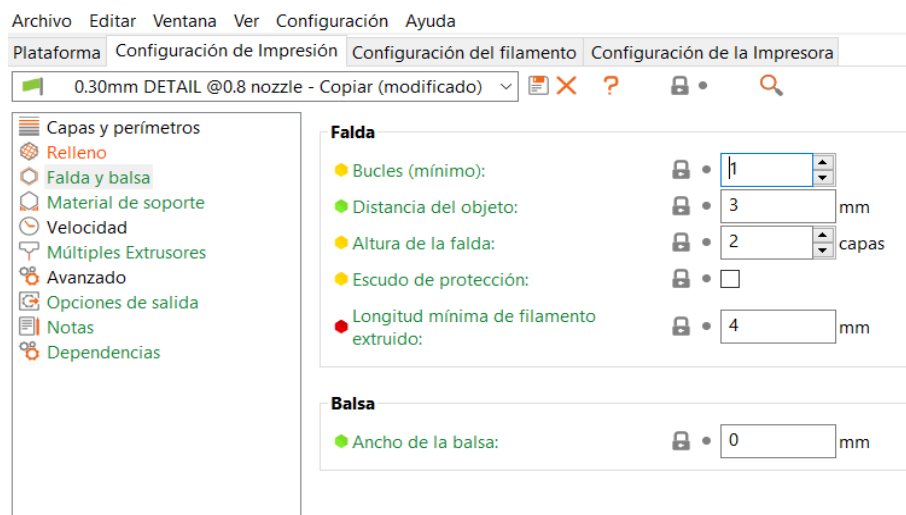
Figura 4.9 configuración impresión (Falda y balsa) PrusaSlicer

- Velocidad **(Figura4.10)**

En este apartado se configura la velocidad de todas las posibles variables que pueda tener la impresión, en nuestro caso la velocidad para los movimientos de impresión será de 7,5mm/s y la velocidad para movimientos sin impresión y automática será de 60mm/s
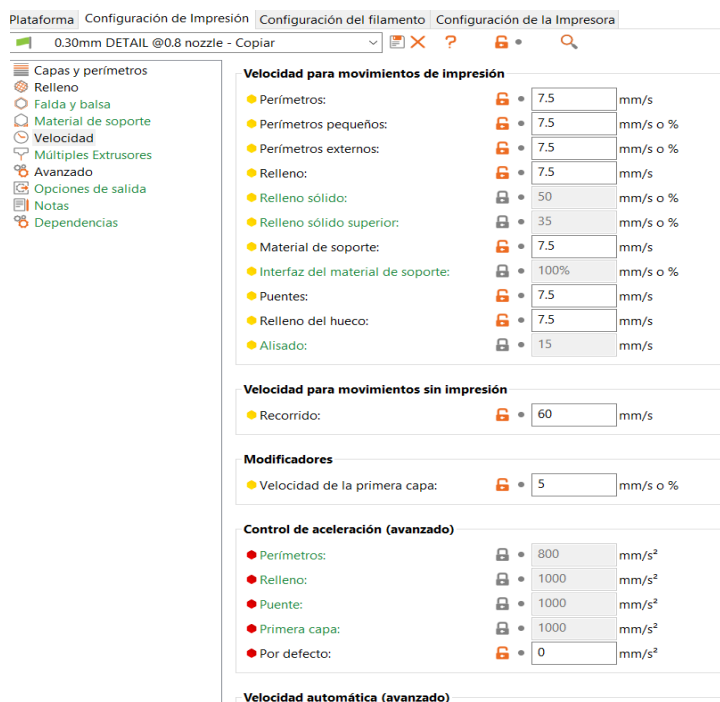
Figura 4.10 configuración impresión (Velocidad) PrusaSlicer

- Avanzado **(Figuera 4.11)**

  - Ancho de extrusión: es el ancho de la boquilla que estaremos utilizando, hay que tener en cuenta que este proyecto solo trabajaremos con dos boquillas de 0,5mm y 0,8mm.
  - Superposición: puede controlar la cantidad de material que se deposita entre el relleno y las paredes. Un valor más alto generalmente resulta en una mejor unión entre el relleno y las paredes, nosotros trabajaremos entre el 50% y el 100%.
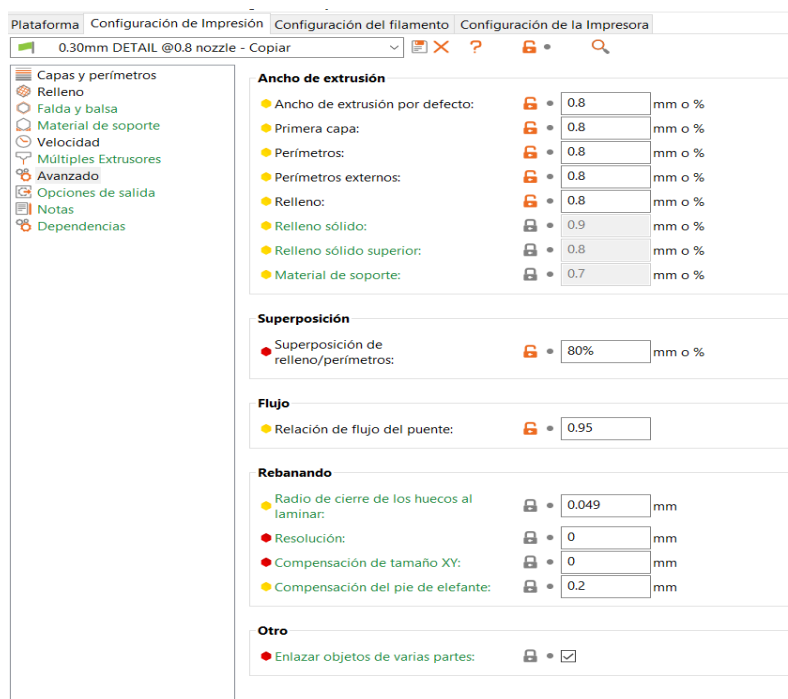
Figura 4.11 configuración impresión (Avanzada) PrusaSlicer

- Los parámetros restantes (Falda y baliza, material de soporte, Multiplicador extrusores, Opciones de salida, Notas, Dependencias) no se modifican.

- **Configuración de filamento**

- Filamento
    - Diámetro: PrusaSlicer es un programa diseñado para usar filamentos, por lo tanto para nuestro proyecto el parámetro "diámetro" **(Figura 4.12)** no tiene ningún valor físico, aun así, se debe tener en cuenta dado que ese parámetro afecta a la velocidad del husillo (V_H) y en consecuencia también al flujo (F), como indica en las Ecuaciones **(3.6) y (3.8)**. Nuestro material son pellets, y se debe tener en cuenta que puede influir el diámetro del filamento indicado en la impresión. Se ha decidido un diámetro de 3 mm para este proyecto.
    - Temperatura: Aquí debemos elegir las temperaturas de impresión para el extrusor y la base que en este caso son 210 y 90°C respectivamente.
    - multiplicador de extrusión: Es la velocidad de los diferentes ventiladores de la impresora, entre otros parámetros. el código M221 explicado en el Apartado 3.3. Existen dos valores M221. Uno es La **Ecuación 3.5,** que se

introduce dentro del G-Code mediante la línea de comando "M221" (**Figura 4.13**). El siguiente valor se añade a través del software PrusaSlicer **(Figura 4.12).** la combinación de los dos dará un valor M211 definitivo como se ve en la **Ecuación 3.5**.

El M221 es una magnitud adimensional definida y su función es incrementar la velocidad del husillo. Si se elige un valor grande en el software el flujo será excesivo y para corregir ese flujo se ha de añadir en el archivo de G-Code un M221 menor. Por lo contrario si el valor es demasiado pequeño en el software el flujo será lento y tendremos que añadir G-Code un M221 mayor.

```
Pieza5.2_PARTE2_0.8n_0.1mm_PLA_MK3S_20m.gcode: Bloc de notas          —    □    ×
Archivo  Edición  Formato  Ver  Ayuda
; generated by PrusaSlicer 2.3.0+win64 on 2021-02-15 at 08:56:09 UTC

;

; external perimeters extrusion width = 0.80mm
; perimeters extrusion width = 0.80mm
; infill extrusion width = 0.80mm
; solid infill extrusion width = 0.90mm
; top infill extrusion width = 0.80mm
; first layer extrusion width = 0.80mm


M73 P0 R20
M73 Q0 S20
M201 X1000 Y1000 Z1000 E5000 ; sets maximum accelerations, mm/sec^2
M203 X200 Y200 Z12 E120 ; sets maximum feedrates, mm/sec
M204 P1250 R1250 T1250 ; sets acceleration (P, T) and retract acceleration (R), mm/sec^2
M205 X8.00 Y8.00 Z0.40 E1.50 ; sets the jerk limits, mm/sec
M205 S0 T0 ; sets the minimum extruding and travel feed rate, mm/sec
M107

M221 S550

M862.3 P "MK3S" ; printer model check
M862.1 P0.8 ; nozzle diameter check
M115 U3.9.1 ; tell printer latest fw version
G90 ; use absolute coordinates
M83 ; extruder relative mode
M104 S210 ; set extruder temp
M140 S90 ; set bed temp
M190 S90 ; wait for bed temp
M109 S210 ; wait for extruder temp

M73 Q1 S20
M73 P1 R20
G92 E0.0
```

Figura 4.13 G-code (M221) PrusaSlicer
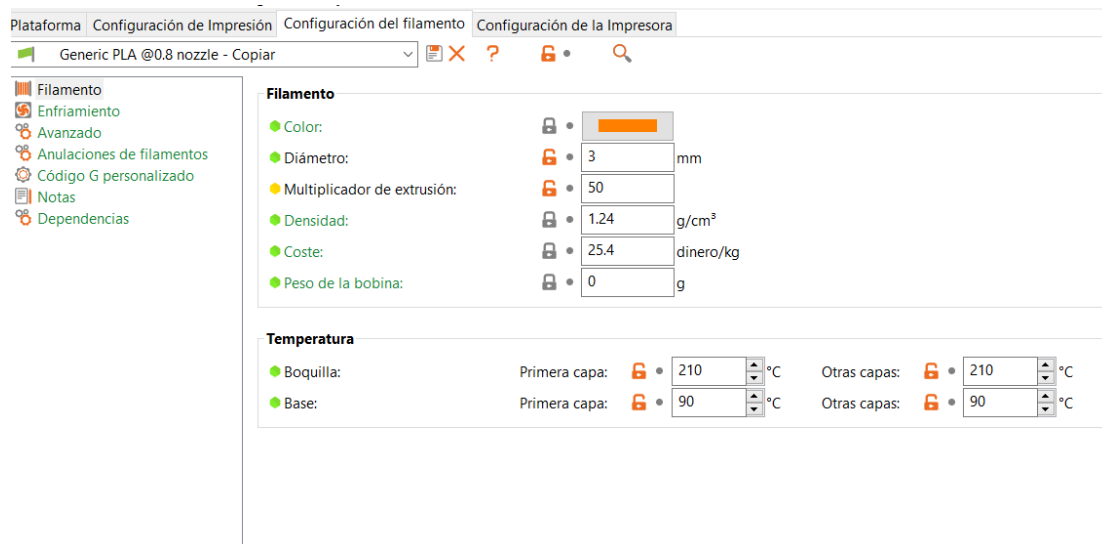
Figura 4.12 configuración de temperatura PrusaSlicer

- Los parámetros restantes (Enfriamiento, avanzado, Anulaciones de filamento, Código G personalizado Nota, dependencias) no se modifican.

- **Configuración de la impresora**

- Extrusión **(Figura 4.14).**
  En este apartado añadimos diámetro de la boquilla, que en nuestro caso será de 0,5mm y 0,8 mm y situamos la retracción a 0 ya que no tenemos filamento sino pellets.
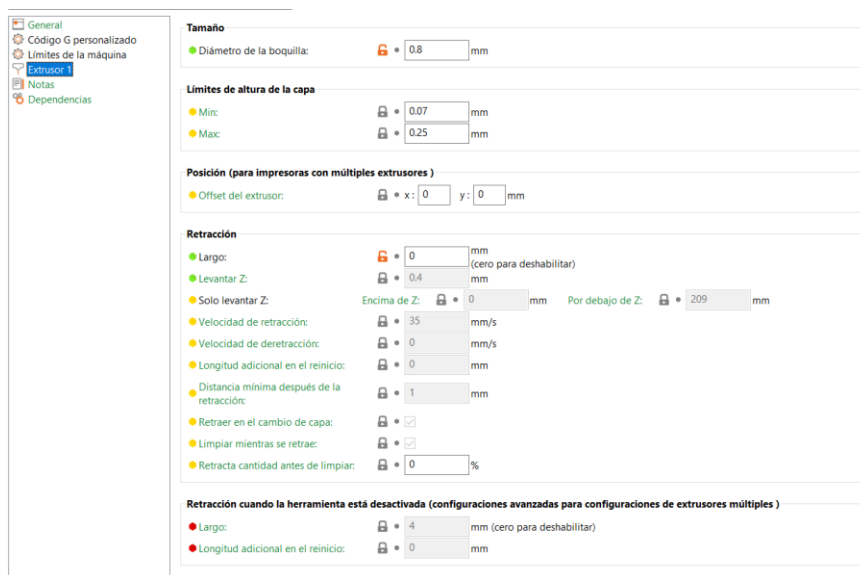
Figura 4.14 configuración de la impresión (extrusión)PrusaSlicer

- Los parámetros restantes (General, Código G personalizado, unidades de la máquina, notas y dependencias) no se modifican.

Una vez tenemos todos los parámetros requeridos, volvemos a la plataforma y pulsamos la tecla de "laminar ahora" **(Figura 4.15).**
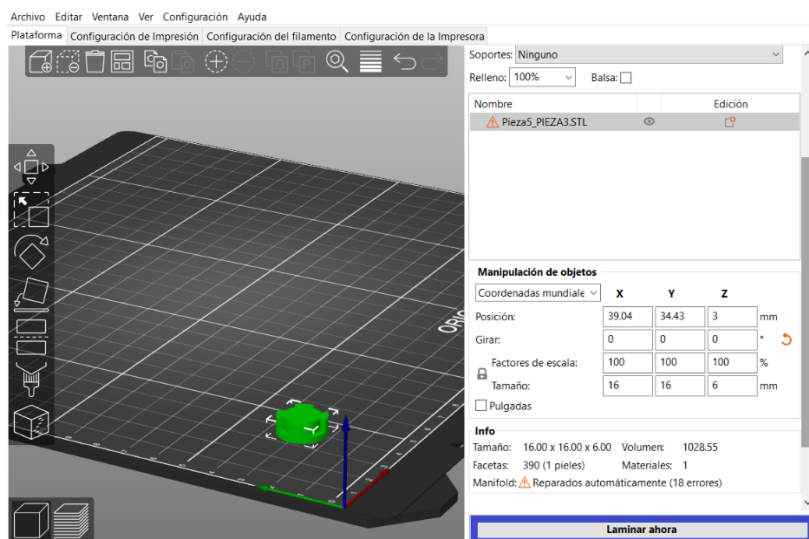
Figura 4.15 Laminar pieza (recuadro color azul) PrusaSlicer

El software nos indica el tiempo de impresión de la pieza (35 min) y se visualizas las diferentes capas y el patrón de presión. Una vez vemos que esta correcto pulsamos la tecla "exportar código G" que nos convertirá la pieza en línea de código en formato txt de cada capa, que posteriormente introduciremos en la impresora (**Figura 4.16).**
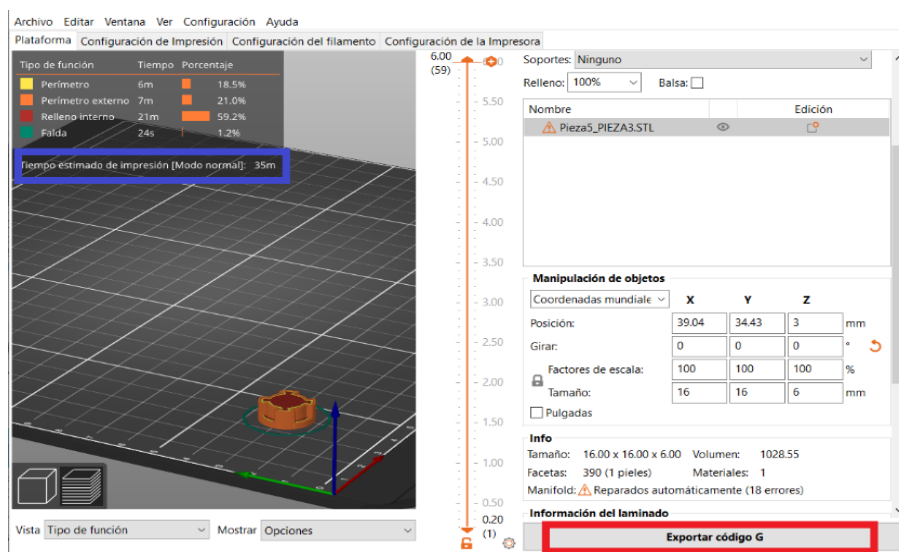
Figura 4.16 Tiempo de impresión (Recuadro azul), Exportar el código G-code (recuadro rojo) PrusaSlicer

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Una vez ya tenemos el G-Code exportado a texto, se debe cambiar algunos parámetros. Unos de ellos es la asignación de la velocidad M221. Que se añade mediante el parámetro "M221 SX" donde X es el valor que necesitamos. Si introduce este comando antes del inicio de impresión de la primera capa, indicar que será su valor para esa capa (**Figura 4.13**). Si lo introducimos después de acabar la impresión de una capa, justo después de la línea de (BEFOR_LAYER_CHANGE), será para el resto de las capas siguientes **(Figura 4.17).**

```
G1 X36.098 Y40.720 E2.70709
; stop printing object Pieza5_PIEZA3.STL id:0 copy 0
M106 S84.15
;LAYER_CHANGE
;Z:0.3
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0

M221 S260

;0.3
```

Figura 4.17 G-code (M221) cambio de velocidad entre capas PrusaSlicer

Para evitar tener que esperar a que la temperatura se estabilice cada vez que termina una pieza y empezar otra, se quita el comando de apagar la temperatura de la boquilla y de la plataforma. Eliminamos las líneas de código que hace que la impresora vuelva a la posición (0,0,0) cundo termina la impresión.

La impresora no está calibrada por lo que no tiene su propio origen de coordenadas establecido al estar modificada. Por ese motivo la posición (0,0,0) se deberá añadir con la ayuda de Pronterface.

Una vez editado el código G-Code, se puede insertar el archivo mediante una tarjeta SD o el software Pronterface.

4.3.2. Pronterface

Pronterface es un programa que nos permite controlar la impresora desde un PC, donde nos permite configurar, calibrar y someter a prueba de control de todos sus componentes. Es un software desarrollado para el manejo de máquinas cartesianas. Se le introduce el archivo G-Code para que la impresora lea y genere la impresión de la pieza. El interfaz se muestra en la **Figura 4.18**

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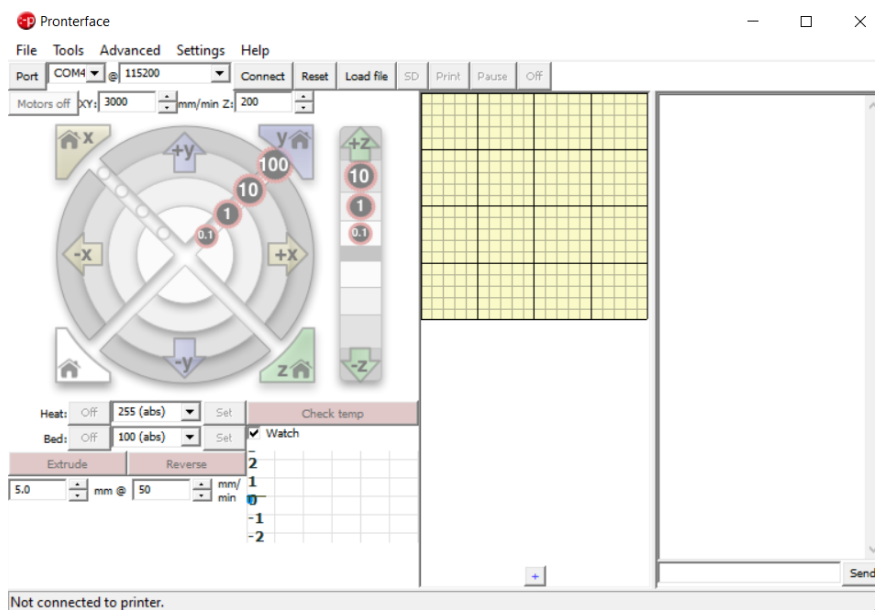
Figura 4.18 Interfaz Pronterface

El modo de uso de este programa es de la siguiente manera:

- Conecta la impresora a su PC con el cable USB.

- Se ajusta la velocidad de conexión en 250.000 baudios

- Elije el puerto de conexión en Pronterface. los puertos de Windows para PC son (COM1, COM2, etc.) El puerto correcto se muestra en el administrador de dispositivos. Cuando la impresora esté conectada, pulsando la tecla "Connect". La columna de la derecha muestra la información de conexión, lo que indica que la conexión se ha realizado exitosamente.

- El siguiente paso es cargar el código G-code que quieres imprimir, pulsando la tecla "Load file" y seleccionado el archivo.

- Puedes controlar el movimiento de todos los ejes de la impresora en el área de control. Por ejemplo, es posible mover el cabezal extrusor y la plataforma de impresión a la posición deseada o seleccionar la temperatura de la boquilla y de la plataforma de impresión, También se puede hacer girar el husillo con la dirección y velocidad deseada.

- Antes de realizar una impresión, se tiene que indicar cual será la posición inicial del cabezal extrusor. Por lo que colocamos la boquilla a una altura un poco superior a la altura deseada para la primera capa e introducir en la ventana de comandos de Pronterface el comando "G92 X0 Y0 ZX", donde X es la altura de la primera capa;

- Puedes verificar las temperaturas reales de la boquilla y la cama en Pronterface.

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- Cuando cargas el modelo, la columna de la derecha muestra la duración estimada de la impresión.
- Una vez tienes todo listos, presionas "Print" para que la impresora empiece a imprimir.

4.4. Parámetros de impresión para las muestras fabricadas con Inconel 718.

Para desarrollar este proyecto, se ha seguido los métodos de los TFG de Saba [32] y Valérie [33], para obtener los parámetros de impresión. Después de seguir los pasos de nuestros compañeros, se hicieron pruebas imprimiendo piezas con diferentes formas y conjunto de parámetros, al final se consiguió obtener un parámetro que nos da la impresión de cualquier pieza con una calidad elevada. Los parámetros que se muestran en la **Tabla 4.3** son los que se han usado para imprimir las muestras tanto para la boquilla de 0,5mm como las de 0,8mm.

Boquilla 0,8mm a)	Unidades	Valor	Boquilla 0,5mm b)	Unidades	Valor
Diámetro de la boquilla	mm	0,8	Diámetro de la boquilla	mm	0,5
Altura de la pieza (teórica)	mm	4	Altura de la pieza (teórica)	mm	4
Altura primera capa	mm	0,2	Altura primera capa	mm	0,2
Altura de capa	mm	0,2	Altura de capa	mm	0,2
Loops	aros	2	Loops	aros	2
Velocidad de cabezal	mm/s	10	Velocidad de cabezal	mm/s	10
Velocidad de viaje	mm/s	60	Velocidad de viaje	mm/s	60
Velocidad de primera capa	mm/s	5	Velocidad de primera capa	mm/s	5
Espesor de extrusión, W	mm	0,8	Espesor de extrusión, W	mm	0,8
Overlap (Superposición relleno)	%	100/80	Overlap (Superposición relleno)	%	80
Patrón		0°/45°	Patrón		0°/45°
Diámetro del filamento	mm	3	Diámetro del filamento	mm	3
Multiplicador slicer (M211)		50	Multiplicador slicer (M211)		50
Multiplicador G-code 1er- Capa (M211)		550	Multiplicador G-code 1er- Capa (M211)		850
Multiplicador G-code siguientes capa (M211)		290	Multiplicador G-code siguientes capa (M211)		350
Temperatura de cama	°C	90	Temperatura de cama	°C	115
Temperatura de extrusor	°C	210	Temperatura de extrusor	°C	235
Altura de guage	mm	0,4	Altura de guage	mm	0,4

Tabla 4.3 Resumen de los parámetros de impresión. a) Boquilla 0,8mm, b) Boquilla 0,5mm

Podemos observar; que los parámetros que se han modificado en los dos modelos de boquilla son los que implica la temperatura y la velocidad de extrusión. También tenemos

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un cambio en el overlap, ya que alguna de las piezas impresas con la boquilla de 0,8mm, se fabricarán con un overlap de 80% y otras con el 100%.

Se debe tener en cuenta la cantidad de pellets que se colocan en la tolva. Según Ouradnik, se recomienda cargar 170g y no superar las 0,36rps, dado que a velocidad superior el husillo comienza a bloquearse. No se aprecia visualmente el bloqueo, pero sí suena un chasquido que indica que no soporta la velocidad [21].

4.4.1. Muestras fabricadas

Para el desarrollo de este estudio se ha fabricado tres piezas con tres formas diferentes. Se realizan esas geometrías ya que son relativamente complejas de imprimir.

- La primera pieza (1) se trata de un pequeño tubo cilíndrico con la base cubierta. En la **Figura 4.18** se ve tanto la forma como las medidas de la pieza**.**
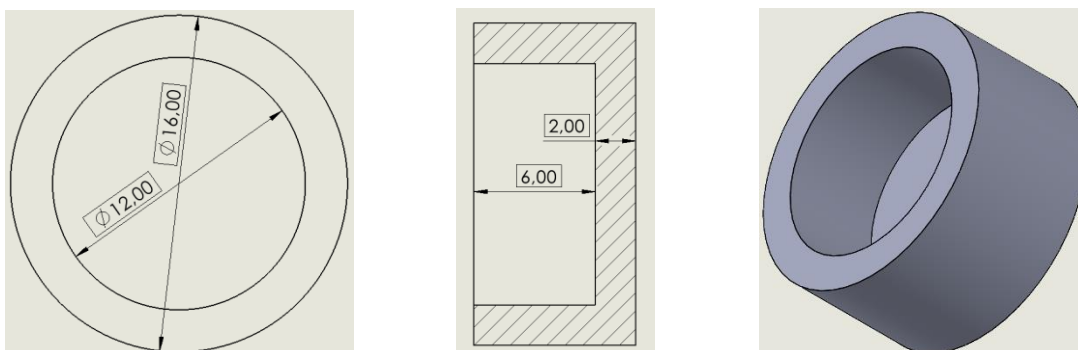
Figura 4.18 Geometría y dimensiones de la pieza 1, hecha en SolidWorks.

PrusaSlicer divide la pieza 1 en 79 capas; y el tiempo de impresión es de 31 minutos. En la **Figura 4.19** se visualiza en la primera capa un contorno de color verde, esto es la falda, se realiza para garantizar la purga del extrusor y nivela la base antes de fabricar la pieza, para evitar errores.

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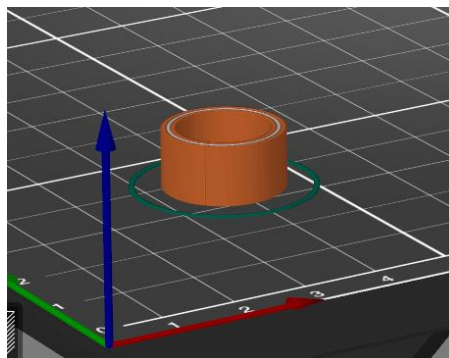
Figura 4.19 División de la pieza realizada por PrusaSlicer. Naranja: pared externa, blanco: patrón de llenado, y verde: falda.

- La segunda pieza (2) se trata de una pequeña corona con la base cubierta. En la **Figura 4.20** se ve tanto la forma como las medidas de la pieza**.**
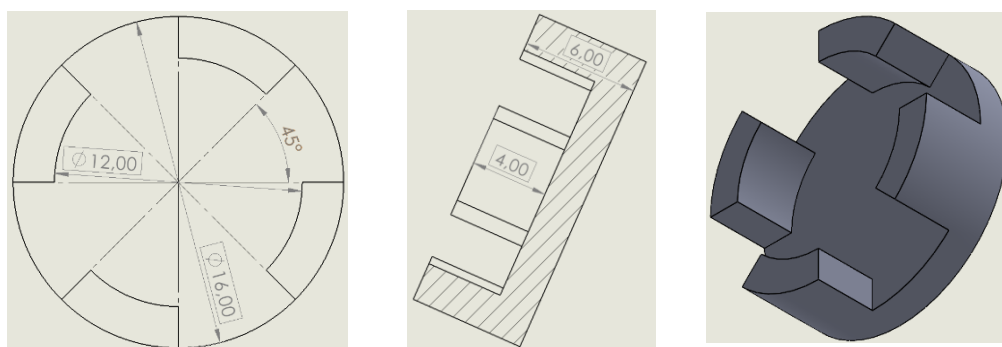
Figura 4.20 Geometría y dimensiones de la pieza 2, hecha en SolidWorks.

PrusaSlicer divide la pieza 2 en 59 capas; y el tiempo de impresión es de 20 minutos.

- La tercera pieza (3) se trata de una forma opuesta a la corona (pieza 2). En la **Figura 4.21** se ve tanto la forma como las medidas de la pieza**.**
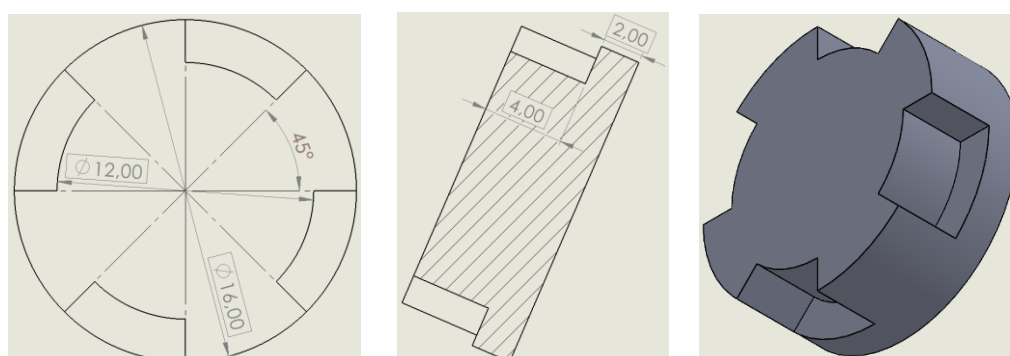

Figura 4.21 Geometría y dimensiones de la pieza 3, hecha en SolidWorks.

PrusaSlicer divide la pieza 3 en 59 capas; y el tiempo de impresión es de 35 minutos.

En el estudio realizado por Ouradnik, el uso un tamaño de boquilla de 0.8mm, el motivo era la complejidad de poder controlar el flujo de material extruido con una boquilla con dimensiones inferiores. En el desarrollo de este estudio se usarán boquillas de 0,5mm y 0,8mm. A pesar de ser complejo controlar el flujo con boquillas más pequeñas del 0,8mm, el resultado final de la pieza mejora **[34].**

Antes de la impresión, la boquilla se coloca a una altura de 0,2mm y se introduce el comando G92 X0 Y0 Z0 en la ventana de comandos de Pronterface Explicado en el punto 4.3.2.

Según Ouradnik, hay un vínculo entre la velocidad máxima del husillo y el número de pellets que hay en la tolva. Ouradnik recomienda cargar la tolva con 150g y no superar las 0,36rps dado que a velocidades superiores el husillo puede bloquearse. En este estudio, cuando trabajemos con la boquilla de 0,8mm seguiremos los pasos de Ouradnik, pero cuando cambiemos la boquilla por la de 0,5mm, el husillo deba girar a mayores velocidades para dar suficiente flujo. En consecuencia se cargar la tolva con una cantidad inferior a los 150g de pellets lo que ha permitido imprimir piezas a velocidades superiores a los 0,36rps.

A temperaturas cercanas a los 200°C y 210°C se observar que el flujo sale constante y las piezas han salido correctas para para trabajar. A pesar de que el fabricante recomienda una temperatura de extrusión en la boquilla de 180 °C. Se ha intentado hacer piezas a temperaturas de 180°C pero el resultado no ha sido satisfactorio, a comparación con las fabricadas a 210°C.

Según Ouradnik [34] la temperatura de la plataforma de impresión se tiene que encontrar entre 60°C y 120°C para evitar el warping (Pandeo) de la pieza y facilitar la adherencia de la primera capa. En nuestro proyecto la temperatura de la plataforma será de 90°C, ya que no ha dado ningún problema.

Debido a que la adhesión de la primera capa con la plataforma de impresión es difícil, se coge una altura de capa menor y el flujo lo aumentamos; esto provocas que se seleccione unos parámetros diferentes en función de cada capa.

En la primera capa, entre menor sea la altura de capa mejor será su adherencia con la plataforma de impresión, pero si nos excedemos las propiedades mecánicas y la resolución

de la pieza se verán afectadas; la altura de 0,2 mm es la que ha dado una mejor adhesión manteniendo una buena resolución.

Para la velocidad se ha seleccionado una velocidad del cabezal de 7,5mm/s, es la que presenta una buena armonía entre el tiempo de impresión y el flujo. El multiplicador M221 añadido en el G-Code es de 550 "M221 S550".

Para las capas siguientes, como la adhesión entre capas es buena, se extruye los filamentos con una altura mayor. Se ha decidido usar una altura de capa de 0.2mm lo que hace que los filamentos presenten un cierto aplastamiento entre ellos sin ser excesivo, por lo que la resolución de la pieza es buena. El multiplicador M221 añadido en el G-Code ha sido de 400 "M221 S400".

4.5. Debinding (eliminación del aglutinante primario, PEG)

Una vez tenemos impresas las muestras, el siguiente paso es eliminar el aglutinante antes del paso de sinterización. La desaglomeración es un proceso importante del MEAM. El objetivo es eliminar el ligante antes de la sinterización. Para eliminar el componente soluble del aglutinante (PEG), las muestras se sumergen en agua a 60°C durante 15 horas con agitación a 500 rpm **(Figura 4.22)**. Se agrega al agua un inhibidor anticorrosivo para prevenir el fenómeno de corrosión. La empresa Polymim® recomienda el uso del inhibidor ZUSOTEC CP 200 **(Figura 4.23)**. con una cantidad del 2% en volumen. Después de la desaglomeración del solvente es necesario secar las muestras antes de proceder con el desaglomerado térmico. Para ello, las muestras se depositan en una estufa a 100°C durante 2 horas.

Figura 4.22. Agitador IKA

Figura 4.23 ZUSOTEC CP 200 (anticorrosivo)

4.6. Sinterización y eliminación de los aglutinantes insolubles.

El desaglomerado térmico es el segundo debinding para la extracción del aglutinante, este proceso se va a llevar a cabo junto con el sinterizado en un mismo ciclo de calentamiento. El resto del aglutinante que no puede desprenderse con agua se retira en un horno tubular de la marca Hobersal® **(Figura 4.24)** a 600°C durante 1 hora (segundo debinding). En el tubo que recorre el horno fluye un flujo de argón que pasa por el horno durante todo el proceso de tratamiento térmico para evitar la oxidación. La velocidad de calentamiento del horno es de 5 ° C / min.

Figura 4.24 Horno tubular Hobersal®

Durante el proyecto, la sinterización se realizó sin presión y en atmósfera inerte, mediante flujo de argón. Las temperaturas de sinterización son elevadas; por tanto, se facilita la oxidación y por eso hay que tener presente el flujo de argón.

El rango de sinterización de Inconel 718 es [1200 ° C-1300 ° C], sabiendo que el punto de fusión de Inconel 718 es de alrededor de [1300 ° C-1340 ° C], dependiendo de la composición química del material.

Previamente Miguel Grande Molina [37] realizó la sinterización a 1310 ° C. Pero a esa temperatura se produjeron pequeñas fusiones parciales y gran distorsión, por lo que se cogerán temperaturas más bajas para este proyecto. Cada parámetro (temperatura y tiempo) que dio los mejores resultados fue seleccionado para el proceso de sinterización final. La sinterización se llevó a cabo a una temperatura de 1295°C y 1292°C durante 4 horas; en **Tabla 4.4** podemos relacionar los modelos (1, 2 y 3) con el tratamiento de sinterizado (A, B, C, D y F) aplicado a cada grupo. El ciclo térmico final se muestra en la **Figura 4.25**. Este ciclo térmico se utilizará para las muestras a estudiar.
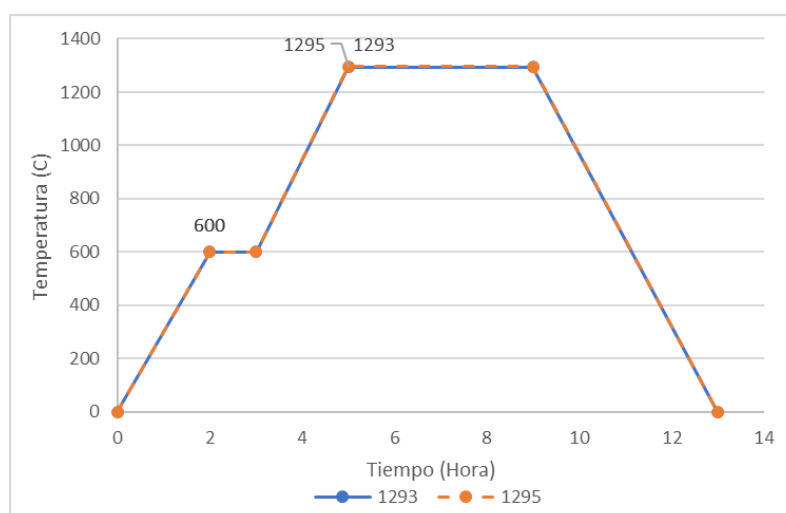
Figura 4.25 Ciclos de sinterización realizados con tiempo de sinterización de 4h.

		Temperatura de sinterizado	Tiempo de sinterizado	Flujo de Argón	Overlap
		°C	Horas		%
Ensayo A	Pieza 1A	1295	4	alto	100
	Pieza 2A				
	Pieza 3A				
Ensayo B	Pieza 1B	1295	4	bajo	100
	Pieza 2B				
	Pieza 3B				
Ensayo C	Pieza 1C	1292	4	bajo	80
	Pieza 2C				
	Pieza 3C				
Ensayo D	Pieza 1D	1292	4	alto	80
	Pieza 2D				
	Pieza 3D				
Ensayo F	Pieza 1F	1292	4	alto	80
	Pieza 2F				
	Pieza 3F				

Tabla 4.4. grupos de sinterizado (A, B, C, D y F)

En este gráfico, la tasa de enfriamiento no es la tasa de enfriamiento real. Cuando termina el proceso de sinterización, el horno deja de funcionar, pero el flujo de argón se mantiene hasta que la temperatura del horno alcance al menos 400°C.

4.7. Dimensiones, volumen, peso y densidad.

Para obtener las dimensiones de todas las muestras, usaremos pie de rey digital con precisión de ±0,02mm. Según el estudio de Ouradnik, medir estas estas dimensiones pueden verse afectada por la rugosidad superficial y la resolución de la impresora lo que provocara una obtención poco precisa de las dimensiones [34], un ejemplo de esto se

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muestra en una de la piezas impresas **(Figura 4.26)** donde se visualiza que no toda la superficie del pie de rey está tocando toda la superficie de la pieza a medir, por lo que hay espacios claramente visibles entre las mordazas y la cara externa de la piezas impresa.

Figura 4.26 Imagen de la izquierda vemos una pieza cilíndrica medida con un pie de rey digital y en la derecha ampliación de la imagen vemos donde se marca con un círculo rojo las mordazas y la zona de contacto de las mordazas con el diámetro exterior de la pieza

Existe dos principales motivos que causa la imprecisión dimensional, según Ouradnik el primer motivo es la inadecuada colocación de la boquilla de la extrusora con relación al recorrido definido con el código G-code. Durante el proceso de impresión hay la probabilidad que alguna de las correas en los ejes (X, Y, Z) pueda resbalar, lo que provoca que la boquilla no esté en su posición original, lo que causaría una variación en las dimensiones de la pieza. Se debe tener en cuenta que a la impresora se le instalo un cabezal extrusor con un peso superior al del cabezal original, lo que ocasiona que cuando este se desplaza durante la impresión, la inercia sea superior que si tuviera el cabezal original, por lo que facilita el posible deslizamiento de las correas.

La segunda motivo es la inestabilidad del ancho (W) del filamento depositado causado por la desigualdad en el flujo de extrusión. El control del flujo depende de varios factores lo que dificulta su control con precisión, tal como se explica en el apartado 3. Para evitar el exceso de variaciones en el flujo se decide mantener todos los paramentos de impresión constantes **(Tabla 4.3)**, pero las piezas siempre tendrán una pequeña irregularidad **(Figura4.27)**.
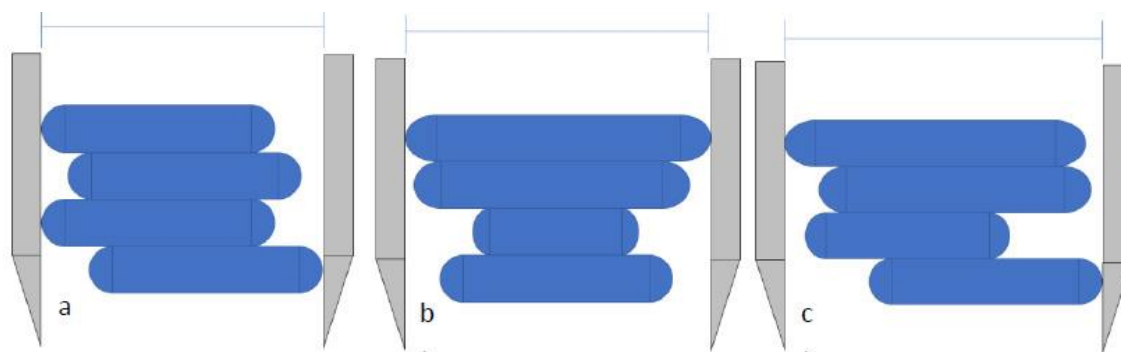
Figura 4.27 (a) Error en las dimensiones asociadas con la colocación incorrecta del cabezal del extrusor, pero con un ancho de extrusión constante. (b) Error en la dimensión asociada con un ancho de extrusión inconsistente, pero con una alineación perfecta. (c) Una combinación de los dos errores, lo que agrava aún más el error en la medición.

Debemos tener en cuenta que en PrusaSlicer las muestras son perfectas, pero cuando se imprimen las piezas, no presentan una geometría perfecta causada por los defectos en el proceso de impresión. Para agilizar la toma de medidas, suponemos que la geometría de las piezas impresas es perfecta. Para obtener el volumen se ha usado las siguientes ecuaciones;

- Volumen pieza 1 **(Figura 4.28)**:
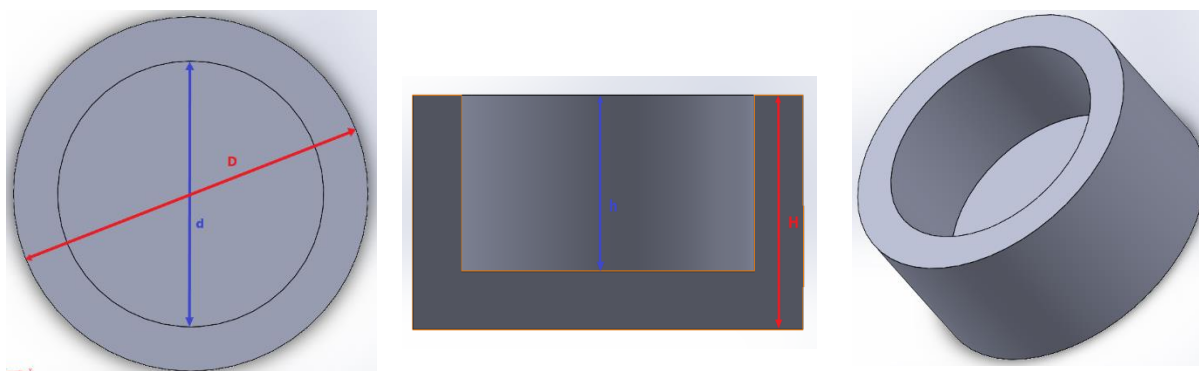
Figura 4.28 Geometría y dimensiones de la pieza 1A.

$$V = \pi * \frac{D^2}{4} * H - \pi * \frac{d^2}{4} * h \qquad \textbf{(Ec.4.1)}$$

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- Volumen pieza 2 **(Figura 4.29):**
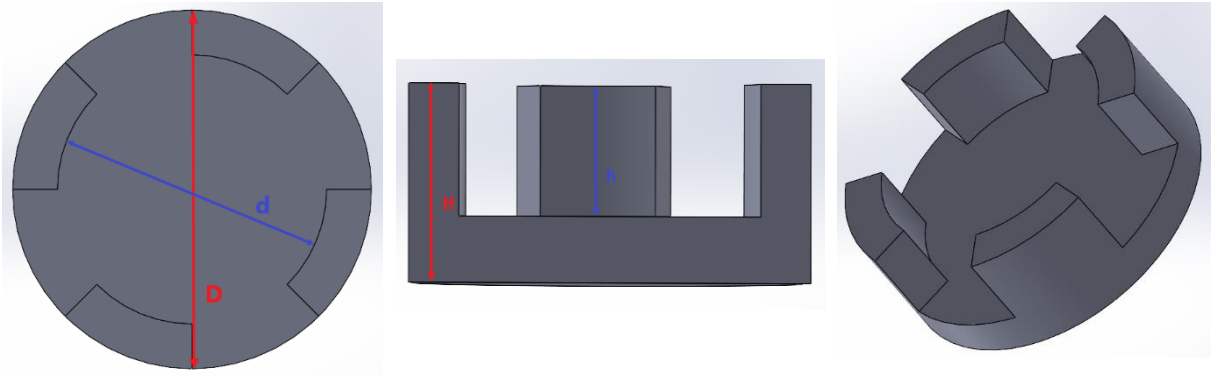
Figura 4.29 Geometría y dimensiones de la pieza 2A.

$$V = \pi * \frac{D^2}{4} * H - \pi * \frac{d^2}{4} * h - \pi * \frac{(D-d)^2}{8} * h \qquad \textbf{(Ec.4.2)}$$

- Volumen pieza 3 **(Figura 4.30):**
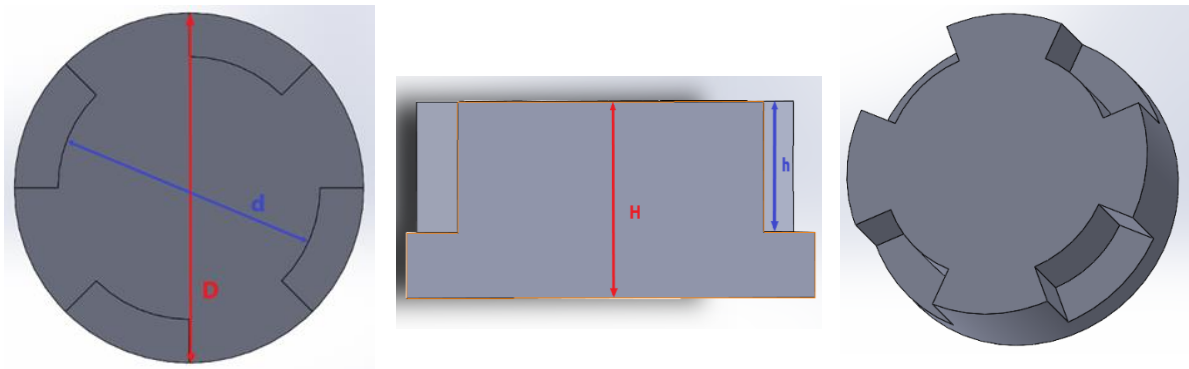
Figura 4.30 Geometría y dimensiones de la pieza 3A.

$$V = \pi * \frac{D^2}{4} * H - \pi * \frac{(D-d)^2}{8} * h \qquad \textbf{(Ec.4.3)}$$

Para calcular el peso y la densidad se utilizará una balanza de precisión de la marca KERN EMB-V (**Figura 4.31)** con función integrada de determinación de densidad de los cuerpos sólidos y líquidos [38]

Figura 4.31. Bascula KERN EMB-V.

La determinación de los cuerpos se realiza mediante la aplicación del principio de Arquímedes, Los tres valores físicos básicos son: el volumen(V) y la masa (m) de los cuerpos sólidos, así como la densidad (ρ). La masa y el volumen son relacionadas por la densidad:

$$\rho = \frac{m}{V} \qquad \textbf{(Ec.4.4)}$$

Para calcular la densidad de cuerpos sólidos, la balanza nos permite pesar los cuerpos sólidos tanto en el aire [A], como en el agua [B]. Sila densidad del líquido de medida [ρ_o] es conocida, la densidad del cuerpo solido [ρ] se calcula con la siguiente ecuación:

$$\rho = \frac{A}{A-B} * \rho_0 \qquad \textbf{(Ec.4.5)}$$

Para definir la densidad de un cuerpo sólido es necesario primero pesar el cuerpo en el aire y, a continuación, en el líquido de medida cuya densidad es conocida **(Tabla 4.5)** según la temperatura ambiental. La diferencia de las masas indica el valor de empuje que el programa transforma en densidad. La pesa tiene una precisión de ±0,0001.

Temperatura [°C]	Densidad ρ [g/cm³]		
	Agua	Alcohol etílico	Alcohol metílico
10	0,9997	0,7978	0,8009
11	0,9996	0,7969	0,8000
12	0,9995	0,7961	0,7991
13	0,9994	0,7953	0,7982
14	0,9993	0,7944	0,7972
15	0,9991	0,7935	0,7963
16	0,9990	0,7927	0,7954
17	0,9988	0,7918	0,7945
18	0,9986	0,7909	0,7935
19	0,9984	0,7901	0,7926
20	0,9982	0,7893	0,7917
21	0,9980	0,7884	0,7907
22	0,9978	0,7876	0,7898
23	0,9976	0,7867	0,7880
24	0,9973	0,7859	0,7870
25	0,9971	0,7851	0,7870
26	0,9968	0,7842	0,7861
27	0,9965	0,7833	0,7852
28	0,9963	0,7824	0,7842
29	0,9960	0,7816	0,7833
30	0,9957	0,7808	0,7824
31	0,9954	0,7800	0,7814
32	0,9951	0,7791	0,7805
33	0,9947	0,7783	0,7896
34	0,9944	0,7774	0,7886
35	0,9941	0,7766	0,7877

Tabla 4.5 Cuadro de densidad del agua.

4.8. Preparación de muestras

Una vez ya tenemos las piezas sinterizadas, procederemos a preparar las muestras para su estudio. El primer paso es cortar las muestras usando una cortadora Struers Accutom-50 equipada con un disco de diamante **(Figura 4.32),** con el corte podemos visualizar el interior, evitando el patrón de impresión.
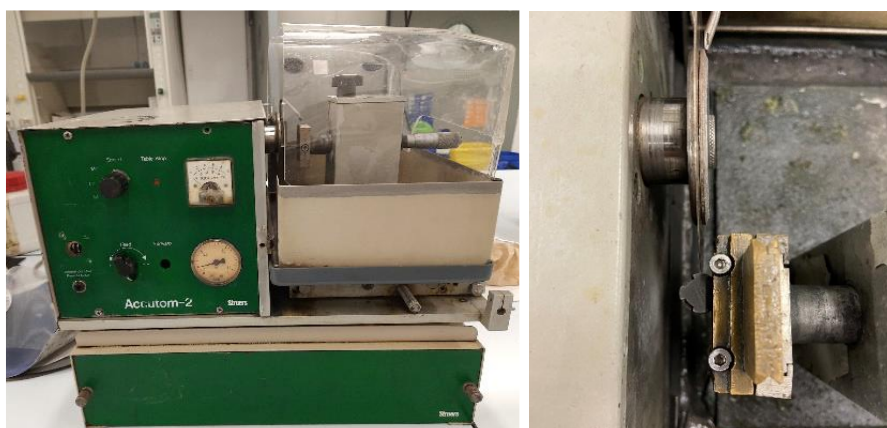
Figura 4.32. cortadora Struers Accutom-50.

No es importante el sentido de corte dado que la impresión de la pieza tiene un patrón de 0°/45° por lo que el sentido de la impresión es diferente en cada capa **(Figura 4.33).**
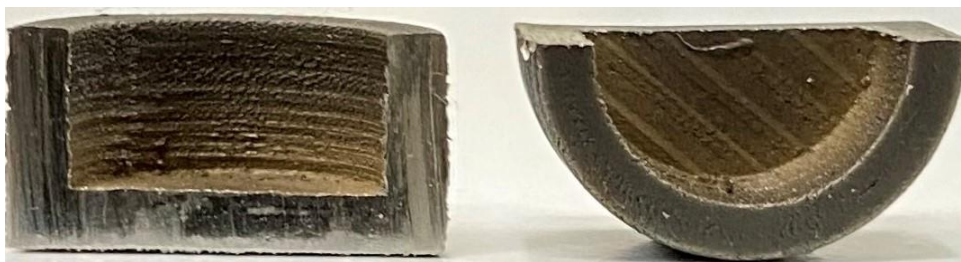
Figura 4.33. El corte de la muestra 1A. (izquierda) el corte, (derecha) Vista superior.

Posteriormente se preparan las piezas para embutirlas en baquelita, utilizando una encastadora Struers LaboPress-3 **(Figura 4.34).**
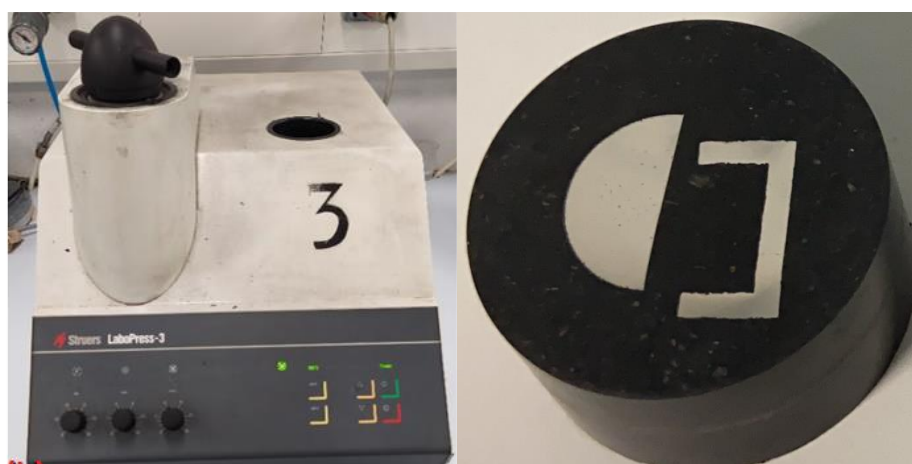
Figura 4.34. encastadora Struers LaboPress-3 (izquierda), pieza (1A) embutida (derecha)

Para dejar la pieza lista para poder realizar las pruebas al material, se pule en una pulidora automática Buehler **(Figura 4.35)** usando papel abrasivo de tamaño de grano 400, 600, 800, 1200 y 2400 y paños con pasta de diamante de tamaño 6, 3 y 1 μm.
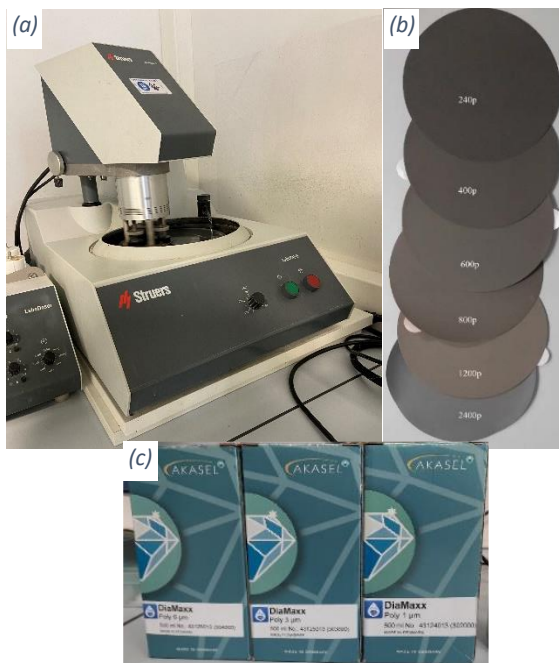
Figura 4.35. Pulidora automática Buehler (a), papel abrasivo (b), suspensiones de diamante para distintos acabados (c).

Después del pulido se han atacado las muestras con el reactivo de Kalling. Es un químico que se utiliza para atacar las superaleaciones de base níquel. Es útil para poder visualizar el límite de grano [39][40]. La composición de esté atacante se representa en la siguiente **Tabla 4.6.** El compuesto químico es nocivo, por lo tanto, la preparación se debe llevar a cabo en una campana de gas. Las muestras se sumergen durante 15 segundos para limpiar la zona de estudio.

Componente	Cantidad
$CuCl_2$	1,5 g
HCl	100 ml
Etanol	100 ml
Agua	33 ml
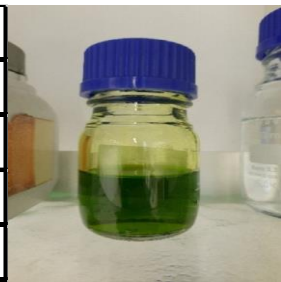
Tabla 4.6 Composición del compuesto Kalling.

4.9. Microscopia óptica

Después de la preparación metalográfica, se realiza microscopía óptica para observar el aspecto superficial de las muestras. Se pueden observar diferentes informaciones como la distribución de la porosidad, el tamaño de los poros, la microestructura y la presencia de precipitados (**Figura 4.36**).

Figura 4.36. Microscopio óptico.

4.10. Estudio de las muestras SEM

Una vez ya tenemos las piezas pulidas y atacadas se procede a realizas el estudio de la microestructura utilizando un microscopio de barrido (máquina SEM) **Figura 4.37.**

Figura 4.37 Imagen de uno de los microscopios electrónicos de barrido (SEM)

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Esta herramienta nos ayuda a la observación de muestras sólidas mediante imágenes obtenidas con electrones primarios, secundarios y retrodispersados. Posee un espectrómetro de energía dispersiva de RX que puede realizar análisis de composición química semicuantitativa de las muestras. Con los electrones secundarios se captura la imagen tridimensional de la muestra. La emisión de los electrones retrodispersados depende del número atómico medio de la muestra, por lo que los átomos más pesados producen más cantidad de electrones retrodispersados. Estas herramientas nos permiten analizar la topografía, la morfología, la composición química y la cristalinidad de un material. El SEM utilizado en este trabajo es de la empresa ZEISS GeminiSEM®.

El proceso de adquisición de la imagen de la muestra comienza con un haz de electrones "back-scattered" producido por un filamento de tungsteno, pasa a través de lentes electromagnéticos para llegar a la cámara de vacío donde se coloca la muestra. El haz se recoge y se enseña con la misma velocidad de barrido en un tubo de rayo catódicos. La superficie de la pieza a estudiar tiene que ser conductora. Para poder conseguir el haz se aceleran los electrones mediante una diferencia de potencial que oscila desde los 50 hasta 30.000 voltios. Los elementos acelerados con un voltaje pequeño se usan para muestras muy sensibles, como las muestras bilógicas o muestras aislantes, por lo contrario, elementos acelerados con voltajes elevados son los materiales metálicos, de esta manera se aprovecha la menor longitud de onda para tener una mejor resolución y poder penetran a una profundidad del orden de 1 µm sobre la pieza a estudiar, extendiéndose lateralmente a una distancia similar.

El haz de electrones que sale del cañón es conducido por el ánodo y pasa por la columna del SEM verticalmente donde unas lentes electrónicas y pequeñas aperturas dominan el diámetro del haz y lo enfocan en la superficie de la muestra, a menor diámetro del haz mayor será la resolución de la imagen obtenida **Figura 4.38**
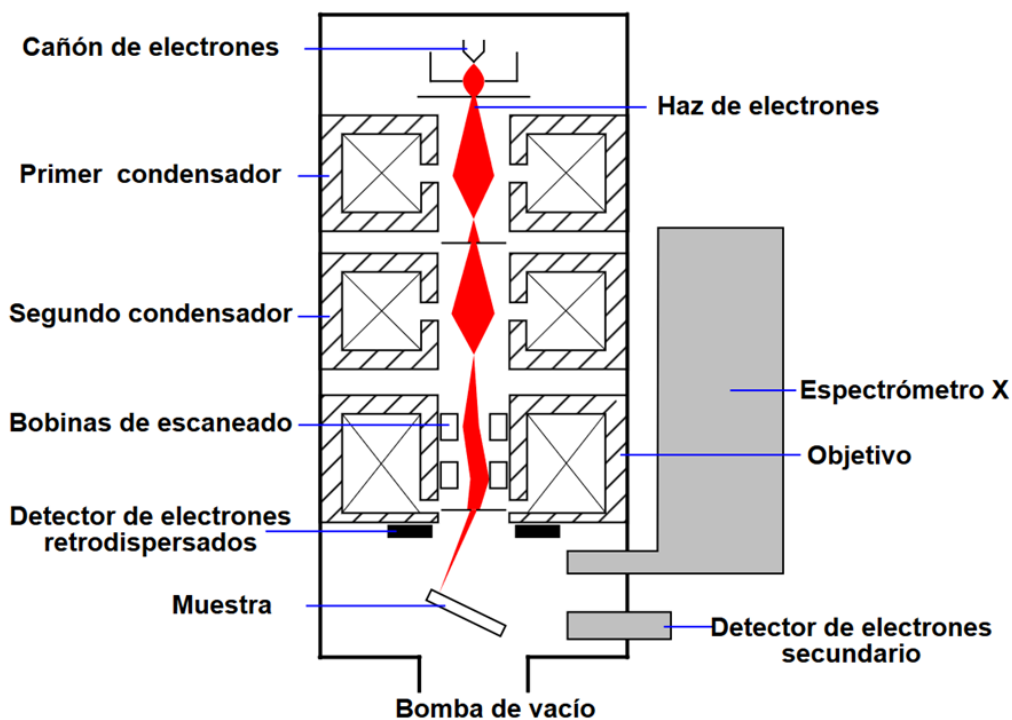
Figura 4.38 Diagrama de la trayectoria del haz de electrones dentro de la columna de un SEM equipado con un detector de rayos X.

Los electrones secundarios se originan en la superficie de la muestra, mientras que los retrodispersados provienen de las profundidades de la muestra (**Figura 4.39)**. Por lo tanto, los dos brindan información diferente sobre el material. Las imágenes de retrodispersados (Figura --) son sensibles a las diferencias, en número atómico, lo que significa que muestran contraste según la composición química, mientras que las imágenes de los electrones secundarios brindan información más detallada sobre la superficie y la tipografía [41]. La operación debe realizarse al vacío para evitar que los electrones interactúen con las moléculas de aire lo que provocaría una pérdida de su energía cinética.
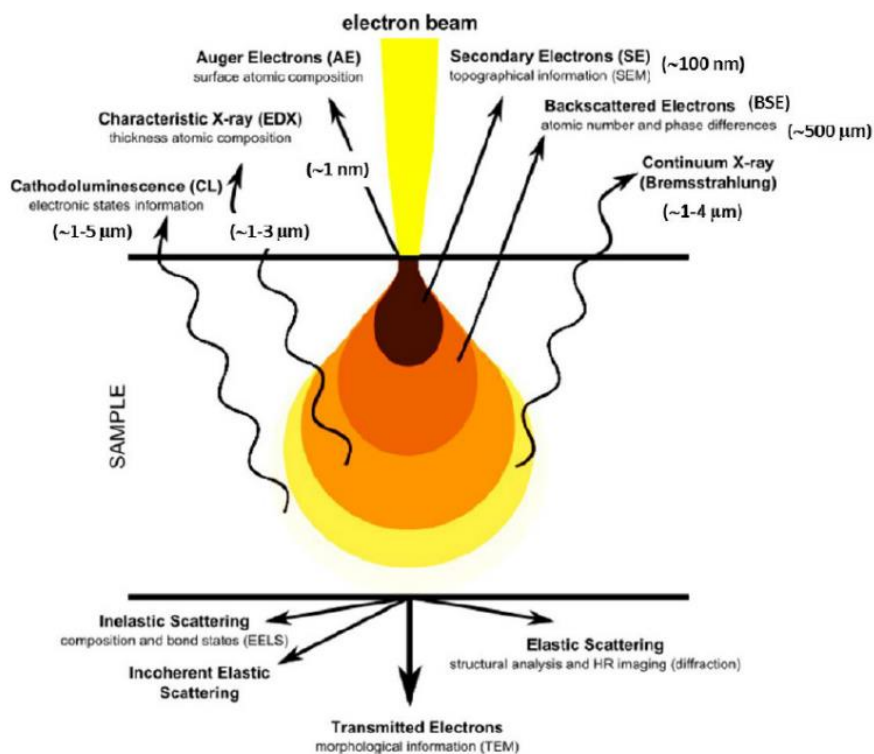
Figura 4.39 Representación esquemática de las energías producidas por la interacción del haz de electrones con la materia sólida (SEM)

En este trabajo se ha estudiado las muestras **(1A,1D,2A,2D,3A,3D)** con la ayuda de SEM. El examen microscópico es una herramienta útil para el estudio y la caracterización de los materiales.

4.11. Estudio de las muestras: Dureza

Los ensayos de dureza cuantifican la resistencia de un material a las deformaciones plásticas. Esta propiedad física depende no solo de las características del material, sino también de la naturaleza y forma de la pieza que hará la marca y del modo que deja la marca. La dureza se medirá mediante la máquina de ensayo Vickers (Akashi®), con una carga de 0,2 kg y un tiempo de carga de 20 s.

El principio de la prueba de Vickers consiste en comprobar la resistencia de un material al ser penetrado, aplicándole una carga sobre la superficie y posteriormente midiendo el hundimiento residual que tiene forma de una pirámide de diamante de base cuadrada **(Figura 4.40)**.
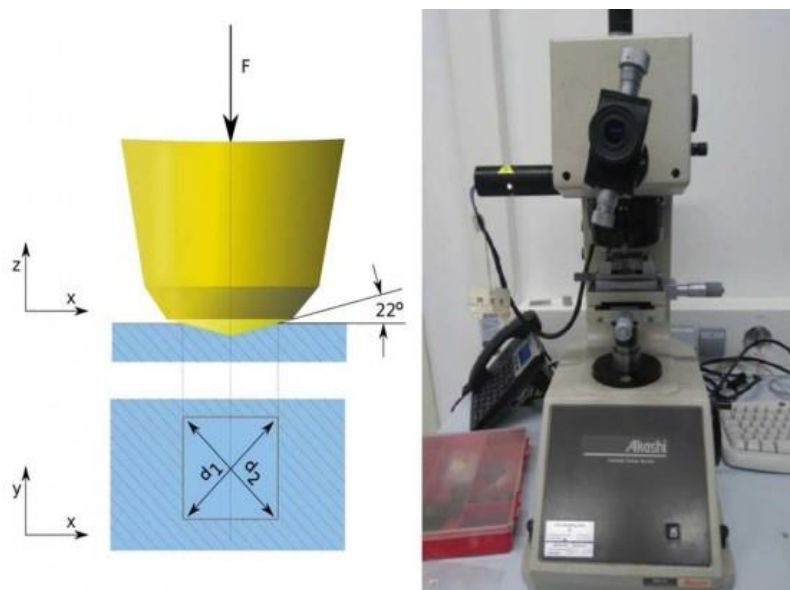
Figura 4.40 Máquina de ensayo Vickers (Akashi®) y la forma de la marca de deja

Una de las ventajas de esta técnica es la ausencia de deformación del penetrador de diamante al medir una alta dureza, para obtener un buen resultado se requiere una buena preparación superficial para poder observar la deformación de forma adecuada. La dureza Vickers HV es el cociente de la carga de prueba P (kg) por el área de la hendidura diagonal promedio D (mm), la ecuación queda de la siguiente manera:

$$HV = \frac{1.854 * P}{D^2} \qquad \textbf{(Ec.4.6)}$$

4.12. Método de intersección o método Heyn

El método Heyn sirve para determinar la longitud del grano (l_m). Para poder calcular se debe dibujar algunos segmentos paralelos (l) en una imagen que muestre claramente los límites del grano. Luego, se cuenta el número de intersecciones (n) entre las líneas y los límites de grano. Finalmente, con la siguiente relación se puede calcular la longitud del grano. Con (M) la ampliación de la imagen.

$$l_m = \frac{l}{M * n} \qquad \textbf{(Ec.4.7)}$$

4.13. Estudio de la confiabilidad de los datos.

Para certificar la fiabilidad de los datos que obtenemos se ha decantado por realizar el coeficiente de variación, también denominado coeficiente de variación de Pearson (CV). es una medida estadística que nos informa acerca de la dispersión relativa de un conjunto de datos, por lo que es la desviación estándar expresada como porcentaje de la media aritmética y es adimensional. Su valor es bajo cuando es inferior a 10%; medio de 10 a 20%, alto cuando van de 20 a 30% y muy alto cuando es superior a 30%.

Para los casos que los valores obtenidos sean prácticamente cero o el valor es muy alto, serán valores que no se corresponde con la realidad, para esos casos calcularemos la desviación estándar.

5. RESULTADOS Y DISCUSIÓN

5.1. Régimen de impresión

En el desarrollo de este trabajo se ha podido observar que durante el proceso de impresión, encontramos dos regímenes en los que se puede encontrar el cabezal extrusor; el primero es el régimen transitorio que se produce cuando el flujo de material es muy irregular y poco constante. El segundo es el régimen estacionario que sucede cuando el flujo es semejante al teórico y se mantiene prácticamente constante. Estos dos regímenes provocan que existan variación dimensional entre las muestras impresas tal como se muestra en la **Figura 5.1**
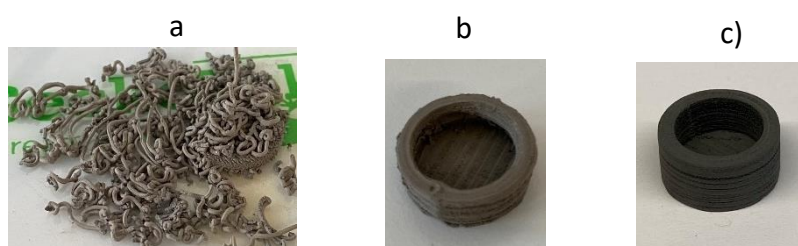
Figura 5.1 a) y b) estado transitorio, c) estado estacionario

Para poder hallar los parámetros correctos para evitar el régimen de transición y así poder evitar la impresión de piezas defectuosas y malgastar material en exceso, se ha realizado la impresión de una serie de muestras de prueba modificando los parámetros de la velocidad de extrusión en G-code (M221). Se ha modificado también la temperatura hasta encontrar unos valores que permiten hacer una pieza a la primera o segunda impresión, y que permita realizar las impresiones posteriores con dimensiones muy similares entre ellas. Con los valores obtenidos podemos garantizar que se llega al punto del régimen estacionario dentro del cabezal extrusor, sin necesidad de malgastar material en exceso.

También nos puede ocurrir que a pesar de alcanzar el régimen estacionario no tengamos grades resultados a la hora de imprimir, nos puede pasar que a pesar de que el flujo trabaje correctamente, el material no se adhiera a la base de la plataforma por lo que la pieza queda deforme.

Analizando los dos regímenes, se deduce que puede ser debida a que al realizar la impresión, la temperatura en la boquilla se va incrementado hasta alcanzar el régimen

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estacionario, donde la temperatura en la boquilla es de X+ΔT (donde X es la temperatura asignada en PrusaSlicer y ΔT es la temperatura generada por la fricción entre el material y el husillo). Si la velocidad de giro del husillo es elevada, el disipador de calor del extrusor no es capaz de disipar todo el calor y la temperatura en la boquilla irá aumentando lentamente produciéndose un aumento gradual del flujo. Se debe tener en cuenta que el régimen estacionario no estabiliza de manera permanente el flujo de extrusión.

Esto provoca que, al intentar realizar una impresión en series a partir de una determinada impresión, el flujo del material a través de la boquilla comienza a ser excesiva y las dimensiones de la pieza se vean afectadas. Eso genera la necesidad de detener la impresión para poder enfriar la boquilla. Para evitar esa situación podemos regular la temperatura sin tener que detener la impresión, ya que utilizando el software Pronterface podemos regular la temperatura durante el proceso de impresión y controlar la temperatura en cada una de las capas de la impresión. De ese modo podemos calentar la boquilla unos minutos antes para poder llegar al régimen estacionario antes de la impresión o reducir la temperatura en una capa cuando la boquilla este provocando exceso de flujo y pueda deformar la pieza.

Los parámetros que se modificaron y dieron un resultado correcto a la hora de fabricar las diferentes piezas **(Figura 5.2)**, de manera eficiente en la primera o segunda impresión son las siguientes:

con la boquilla de diámetro 0,8mm:

- Temperatura de boquilla 210ºC
- Temperatura de la plataforma 90ºC
- Añadir al G-code la acción M221 en la primera capa de 550
- Añadir al G-code la acción M221 a partir de la segunda capa de 290

Figura 5.2 figuras impresas con boquilla 0,8

En el caso de la boquilla de 0,5; se intentó mantener los mismos valores que la boquilla de 0,8mm, pero el resultado no fue el deseado. Se procedió a realizar el estudio de imprimir

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varias piezas cambiando los valores de la velocidad y la temperatura, hasta encontrar los puntos más apropiados para la fabricación de las piezas **(Figura 5.3)** que son los siguientes:

- Temperatura de boquilla 245ºC
- Temperatura de la plataforma 105ºC
- Añadir al G-code la acción M221 en la primera capa de 850
- Añadir al G-code la acción M221 a partir de la segunda capa de 350

Figura 5.3 figuras impresas con boquilla 0,5

5.2. Estudio dimensional de las piezas impresas

En la **Tabla 5.1** se muestra las dimensiones, el volumen, el peso y la densidad medida con la balanza de precisión explicado en el apartado 4.7, de las piezas en verde. En la tabla también encontramos diferenciada las piezas fabricadas con la boquilla 0.8mm y 0,5mm.

	h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	P (En verde)	volumen	ρ (densidad)	
	(mm)	(mm)	(mm)	(mm)	(g)	(cm^3)	(g/cm^3)	
Boquilla 0,8mm								
Pieza 1A	6,02	8,14	16,18	11,7	5,195	1,026	5,37	
Pieza 1B	6,11	8,13	16,01	11,54	4,762	0,998	5,17	
Pieza 1C	5,96	8,06	16,08	11,48	5,219	1,020	5,40	
Pieza 1D	6,02	8,17	16,11	11,54	5,347	1,036	5,34	
Pieza 2A	4,07	6,11	16,18	11,51	3,327	0,798	5,42	
Pieza 2B	4,09	6,17	16,15	11,79	3,143	0,787	5,32	
Pieza 2C	4	6,02	16,14	11,55	3,192	0,779	5,40	
Pieza 2D	3,99	6,08	16,26	11,26	3,406	0,826	5,45	
Pieza 3A	3,98	5,95	16,23	12,17	5,467	1,205	5,31	
Pieza 3B	4,08	6,1	16,21	12,16	5,140	1,233	5,12	
Pieza 3C	4	5,93	16,12	11,03	5,042	1,170	5,29	
Pieza 3D	3,98	6,24	16,04	12,12	5,849	1,237	5,40	
Boquilla 0,5mm								
Pieza 1F	6,08	8,07	16,59	11,28	5,963	1,137	5,57	
Pieza 2F	4,03	6,16	16,42	11,26	3,624	0,861	5,45	
Pieza 3F	4,02	5,93	16,44	12,36	6,085	1,232	5,60	

Tabla 5.1 Dimensiones, pesos y densidades de las piezas (piezas en verde).

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Podemos visualizar que las piezas impresas tienen un aumento de las dimensiones en comparación a los datos introducidos en PrusaSlicer. El proceso de impresión es muy complejo, por lo que es muy complicado conseguir que las piezas tengan las dimensiones precisas. Hay que cortar además de la dificultad de controlar todos los indicadores que intervienen en el proceso, ya que no disponemos en la actualidad de una configuración concreta y precisa para la impresión con el Inconel 718.

Una de las causas que provoca ese aumento de las dimensiones, se deduce que es debido al diámetro del hilo saliente de la boquilla, ya que no coincide con el tamaño teórico que el software PrusaSlicer considera correcto, causando una variación del valor teórico. A continuación se visualizará la **Tabla 5.2** donde se comparan las dimensiones de las piezas diseñadas con valores experimentales (teórico), con la media de las dimensiones de las piezas impresas (piezas en verde) y su coeficiente de variación.

		h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	Peso	volumen
		(mm)	(mm)	(mm)	(mm)	(g)	(cm^3)
1(A,B,C,D)	Teórico	6	8	16	12	-	0,930
	Valores medios y coeficientes de variación (En verde)	6,01 ± 0,97%	8,11 ± 0,58%	16,19 ± 1,42%	11,51 ± 1,32%	5,222 ± 9,63%	1,043 ± 5,19%
2(A,B,C,D)	Teórico	4	6	16	12	-	0,7288
	Valores medios y coeficientes de variación (En verde)	4,04 ± 1,07%	6,11 ± 1,01%	16,23 ± 0,72%	11,47 ± 1,94%	3,338 ± 5,72%	0,810 ± 4,12%
3(A,B,C,D)	Teórico	4	6	16	12	-	1,1812
	Valores medios y coeficientes de variación (En verde)	4,01 ± 1,03%	6,03 ± 2,28%	16,21 ± 0,93%	11,97 ± 4,45%	5,302 ± 8,36%	1,215 ± 2,35%

Tabla 5.2 Los valores teóricos, valores experimentales obtenidos con el coeficiente de variación.

Se observa que las piezas se encuentran sobredimensionadas respecto a las dimensiones asignadas en el G-code (teórico). Cuando se realice el diseño de la pieza, se ha de tener en cuenta que la sobredimensión que se producirá al imprimir la pieza es anisotrópica.

Esta sobredimensión provoca que al inicio de la impresión se coloque la boquilla a una cierta altura de la primera capa, que ayuda a compensar esta diferencia de dimensiones entre el filamento extruido y el asignado en PrusaSlicer. Sin esta altura, durante la impresión, llegará un momento en el que la boquilla terminará aplastando y deformando la pieza.

También debemos tener en cuenta que el acabado superficial de la muestra varía entre las primeras capas y el resto de las capas superficiales. Uno de los motivos es el problema de

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adhesión que presenta la primera capa con la plataforma de impresión, lo que causa que las dimensiones de los filamentos sean menores, por lo que pueden aparecer huecos entre los filamentos. Otro factor es una altura inadecuada ente la boquilla y la plataforma de impresión al imprimir la primera capa: si la altura es muy baja el filamento se aplasta excesivamente, lo que genera el llamado "pie de elefante". Si la altura es muy elevada el filamento no se aplastará lo suficiente y tendremos huecos entre filamentos y también la posibilidad que no se adhiera a la plataforma.

Obtener una primera capa completamente rellena y sin pie de elefante es bastante complicado. Se podría encontrar un punto de equilibrio donde la base se encuentra completamente rellena a la vez que no aparece el pie de elefante, pero, debido a la irregularidad y complejidad de controlar el flujo con una boquilla de 0,8 y 0,5mm, esto es muy difícil lograrlo. Por lo general, esto provoca que al terminar una pieza que tiene la forma deseada, se tenga que lijar el exceso provocado por el pie de elefante.

5.3. Debinding resultados obtenidos (muestras en marrón)

Como hemos explicado en el apartado 4.5, el debinding nos sirve para eliminar uno de los aglutinantes solubles en agua (PEG) de la pieza impresa, el tratamiento tiene una duración de 15h a una temperatura de 60°C. En los datos obtenidos en la **Tabla 5.3** podremos ver la reducción del peso de todas las piezas y en la **Tabla 5.4** podremos visualizar el promedio junto a con su coeficiente de variación.

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	P1 (Peso en verde)	P2 (Peso en marron)	Pérdida de masa
	(g)	(g)	%
Boquilla 0,8mm			
Pieza 1A	5,195	5,011	3,54
Pieza 1B	4,762	4,585	3,72
Pieza 1C	5,219	5,022	3,77
Pieza 1D	5,347	5,149	3,70
Pieza 2A	3,327	3,211	3,49
Pieza 2B	3,143	3,027	3,69
Pieza 2C	3,192	3,070	3,82
Pieza 2D	3,406	3,279	3,73
Pieza 3A	5,467	5,270	3,60
Pieza 3B	5,14	4,962	3,46
Pieza 3C	5,042	4,864	3,53
Pieza 3D	5,849	5,663	3,18
Boquilla 0,5mm			
Pieza 1F	5,963	5,739	3,76
Pieza 2F	3,624	3,487	3,78
Pieza 3F	6,085	5,871	3,52

Tabla 5.3. tabla de pesos de las piezas en verde y las piezas en marrón. Porcentaje de pérdida de peso

		P1 (Peso en verde)	P2 (Peso en marron)	Pérdida de masa
		(g)	(g)	%
1(A,B,C,D)	Promedio y coeficiente de variación.	5,297 ± 8,17%	5,101 ± 8,14%	3,7 ± 2,49%
2(A,B,C,D)	Promedio y coeficiente de variación.	3,338 ± 5,72%	3,215 ± 5,70%	3,7 ± 3,52%
3(A,B,C,D)	Promedio y coeficiente de variación.	5,517 ± 8,12%	5,326 ± 8,18%	3,46 ± 4,73%

Tabla 5.4 Los pesos (verde), pesos (marrón) con el coeficiente de variación.

Si el tratamiento se realiza de la forma correcta, tendremos una reducción de peso (masa) en todas las piezas. Es muy difícil obtener con precisión el valor del volumen de cada pieza. El debinding provoca una contracción que disminuye el volumen considerando el aglutinante que se elimina en la superficie. El valor de esa reducción es muy pequeño por lo que se puede despreciar, teniendo en cuenta el error que se comete al tomar las medidas de la pieza.

Por ese motivo, el indicador más preciso para saber si el aglutinante ha sido eliminado, es la disminución del peso. Según el datasheet de los pellets de Inconel 718 utilizados, la

pérdida de masa sufrida por una pieza tras el debinding ha de ser del 3,25 % o ligeramente superior. El valor obtenido **(Tabla 5.3)** en todas las muestras están muy cerca de este valor, coincide con el dato proporcionada por el fabricante.

5.4. Estudio tras el segundo debinding y tratamiento de sinterización

Como se ha explicado en el apartado 4.6; el segundo debinding y el sinterizado se realiza en el mismo horno en un solo proceso. El segundo debinding nos sirve para eliminar el aglutinante no soluble en agua (PP). Para poder eliminarlo tenemos que poner la pieza en el horno y elevar la temperatura a los 600°C durante una 1 hora (**Figura 4.25**), ese tiempo sirve para eliminar todo el aglutinante y que solo quede el polvo metálico.

Una vez pasado el periodo del segundo bedinding, proseguimos con el aumento de la temperatura hasta llegar a los 1293°C durante 4 horas (**Figura 4.25**). Es un proceso que se somete a la pieza a temperaturas muy altas para conseguir una buena unión metalúrgica, ya que a temperaturas menores se han obtenido en anteriores trabajos resultados de resistencia muy bajas y piezas poco sólidas. Cuando se llega a esa temperatura el polvo metálico comienza a fusionarse y a formar una pieza solidad. Durante el proceso de calentamiento del horno observamos que durante unos 30 minutos el horno sobrepasa la temperatura deseada, incluso durante unos minutos sobrepasamos los 1300°C, temperatura que puede provocar que la pieza pueda tener alguna pequeña fusión parcial (**Figura 5.4**).
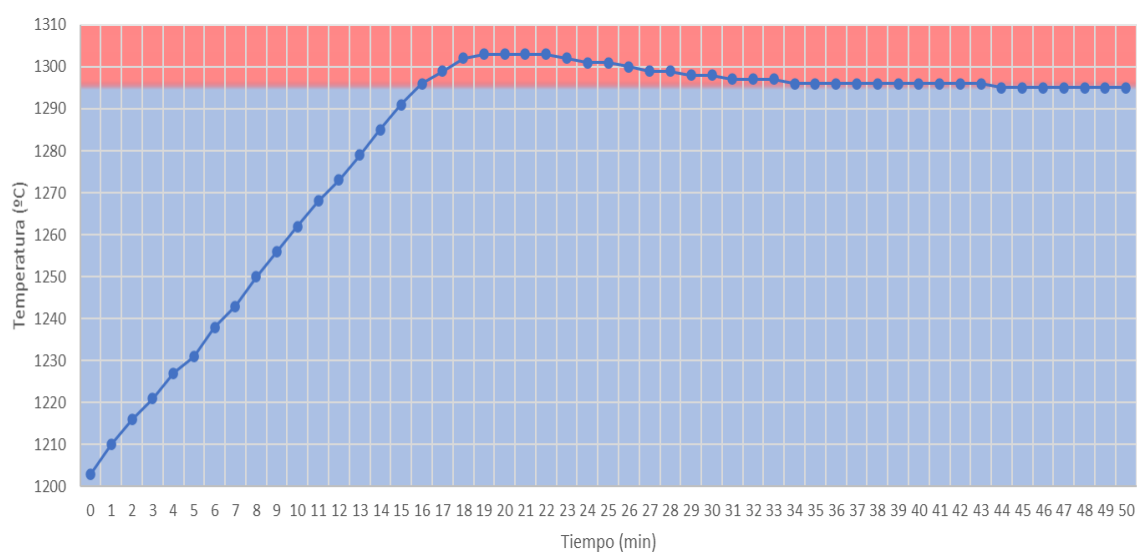
Figura 5.4 Temperatura de sinterizado

Durante todo el proceso de sinterizado, el flujo de argón influye a la hora de evitar que las piezas se oxiden. Se ha podido observar que las piezas que se sinterizan con un flujo de argón bajo generan piezas con distorsión, en la **Figura 5.5** podemos visualizar las piezas del ensayo B y C que han sufrido distorsión en todos los modelos (1 ,2 y 3), mientras que las piezas sinterizadas con un flujo de argón alto no pierden su forma, en la **Figura 5.6** podemos observar que las piezas del ensayo A, D y F que no han sufrido distorsión. Con los resultados obtenidos; vemos que el flujo de argón debe influir en la temperatura en el interior del tubo, ya que el mayor o menor flujo de argón en el tubo de alúmina del horno, debe estar relacionado con la temperatura alcanzada en el interior del tubo, y al controlarse de manera diferente la temperatura, se producen diferentes distorsiones en el tubo. Se utiliza un termopar que mide la temperatura que está fuera del horno para ayuda a mantener la atmósfera inerte.

Una vez terminado el tiempo de sinterizado, se puede apreciar que sí se puede fabricar piezas con un cierto volumen sin perder su forma estructural, también podemos observar a simple vista que hay una reducción volumen. En **Tabla 4.4** de apartado 4.6 podemos relacionar los modelos (1, 2 y 3) con el tratamiento de sinterizado (A, B, C, D y F) aplicado en cada grupo.
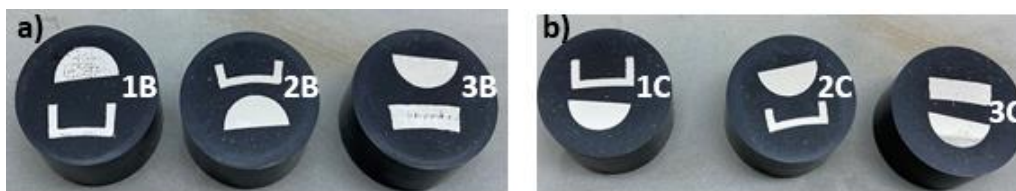
Figura 5.5. a) piezas sinterizadas a 1295 y flujo de Argón bajo b) piezas sinterizadas a 1292 y flujo de Argón bajo. Todas presentan distorsión.
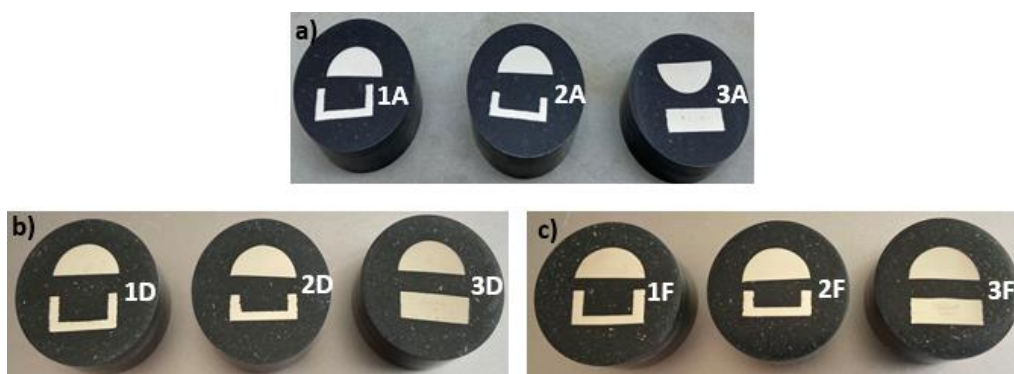
Figura 5.6. a) piezas sinterizadas a 1295 y flujo de Argón alto b) piezas sinterizadas a 1292 y flujo de Argón alto c) piezas sinterizadas a 1292 y flujo de Argón alto

5.4.1. Estudio dimensional después del sinterizado.

Después de sinterizar se puede apreciar la contracción que sufre la cada una de las piezas después de la exposición a altas temperaturas y también podemos ver que las densidades en todas las piezas son más alta (**Tabla 5.5).**

	h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	P (Sinterizado)	volumen	ρ (densidad)
	(mm)	(mm)	(mm)	(mm)	(g)	(cm^3)	(g/cm^3)
Boquilla 0,8mm							
Pieza 1A	5,17	7,06	14,06	10,09	4,889	0,683	7,77
Pieza 1B	4,91	6,97	14,21	10,52	4,485	0,679	7,78
Pieza 1C	5,06	7,05	14,11	9,93	4,905	0,711	7,84
Pieza 1D	5,32	7,03	14	9,9	5,017	0,673	8,00
Pieza 2A	3,57	5,35	14,29	10,03	3,132	0,551	7,87
Pieza 2B	3,42	5,29	14,15	10,45	2,957	0,520	7,90
Pieza 2C	3,63	5,27	14,15	10,15	2,997	0,512	7,88
Pieza 2D	3,39	5,3	14,2	9,82	3,194	0,557	7,88
Pieza 3A	3,52	5,11	14,16	10,51	5,115	0,786	7,86
Pieza 3B	3,19	5,52	14,59	11,11	4,838	0,908	7,60
Pieza 3C	3,25	5,12	13,88	9,73	4,733	0,753	7,77
Pieza 3D	3,44	5,43	14,05	10,7	5,484	0,827	7,80
Boquilla 0,5mm							
Pieza 1F	5,24	6,96	14,55	9,79	5,595	0,7628	8,20
Pieza 2F	3,44	5,39	14,4	9,67	3,227	0,5948	7,78
Pieza 3F	3,51	5,34	14,61	10,95	5,731	0,8768	7,94

Figura 5.5. Dimensiones, pesos y densidades de las piezas (piezas en sinterizadas).

A continuación se visualizará la **Tabla 5.6** donde se comparan las dimensiones de las piezas diseñadas con valores experimentales (Teórico), con la media de las dimensiones de las

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piezas impresas (piezas en verde) con su coeficiente de variación y la media de las dimensiones de las piezas sinterizada con su coeficiente de variación. Podemos ver que el coeficiente de variación tiene valores inferiores al 10% por lo que la desviación no es muy alta.

		h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	Peso	volumen
		(mm)	(mm)	(mm)	(mm)	(g)	(cm^3)
1(A,B,C,D)	Teórico	6	8	16	12	-	0,930
	Valores medios y coeficientes de variación (En verde)	6,01 ± 0,97%	8,11 ± 0,58%	16,19 ± 1,42%	11,51 ± 1,32%	5,222 ± 9,63%	1,043 ± 5,19%
	Valores medios y coeficientes de variación (sinterizado)	5,14 ± 3,12%	7,01 ± 0,68%	14,19 ± 1,53%	10,05 ± 2,85%	4,978 ± 8,026%	0,701 ± 5,31%
2(A,B,C,D)	Teórico	4	6	16	12	-	0,729
	Valores medios y coeficientes de variación (En verde)	4,04 ± 1,07%	6,11 ± 1,01%	16,23 ± 0,72%	11,47 ± 1,94%	3,338 ± 5,72%	0,810 ± 4,12%
	Valores medios y coeficientes de variación (sinterizado)	3,49 ± 2,98%	5,32 ± 0,92%	14,24 ± 0,75%	10,02 ± 3,00%	3,101 ± 3,85%	0,547 ± 6,01%
3(A,B,C,D)	Teórico	4	6	16	12	-	1,181
	Valores medios y coeficientes de variación (En verde)	4,01 ± 1,03%	6,03 ± 2,28%	16,21 ± 0,93%	11,97 ± 4,45%	5,302 ± 8,36%	1,215 ± 2,35%
	Valores medios y coeficientes de variación (sinterizado)	3,38 ± 4,51%	5,30 ± 3,47%	14,26 ± 2,30%	10,6 ± 5,08%	5,180 ± 8,17%	0,830 ± 7,65%

Tabla 5.6 Los valores teóricos, valores experimentales obtenidos (verde y sinterizado) con el coeficiente de variación.

Podemos apreciar como hay una reducción del tamaño de todas las dimensiones de las piezas, también vemos una reducción del peso, eso significa que si se eliminó el aglutinante que faltaba por eliminar antes de sinterizar.

En la **Tabla 5.7** podemos visualizar que las contracciones de volumen obtenidas oscilan entre los 26,36% y 35,64%. Hay una gran diferencia si lo comparamos con la contracción obtenida con el sistema MIM usando el material Inconel 718, que tiene una contracción de un 20%. Esa diferencia viene dada por el mismo proceso de fabricación, ya que el material extruido se inyecta en un molde mediante presión para poder rellenar la forma del molde y no dejar zonas sin rellenar, eso evita que pueda haber bolsas de aire dentro de la pieza.

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	h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	volumen
	%	%	%	%	%
Boquilla 0,8mm					
Pieza 1A	14,12	13,27	13,10	13,76	33,48
Pieza 1B	19,64	14,27	11,24	8,84	31,98
Pieza 1C	15,10	12,53	12,25	13,50	30,33
Pieza 1D	11,63	13,95	13,10	14,21	35,05
Pieza 2A	12,29	12,44	11,68	12,86	31,01
Pieza 2B	16,38	14,26	12,38	11,37	33,89
Pieza 2C	9,25	12,46	12,33	12,12	34,29
Pieza 2D	15,04	12,83	12,67	12,79	32,56
Pieza 3A	11,56	14,12	12,75	13,64	34,76
Pieza 3B	18,75	13,66	13,90	11,79	35,64
Pieza 3C	21,81	9,51	9,99	8,63	26,36
Pieza 3D	13,57	12,98	12,41	11,72	33,16
Boquilla 0,5mm					
Pieza 1F	13,82	13,75	12,30	13,21	32,90
Pieza 2F	14,64	12,50	12,30	14,09	30,92
Pieza 3F	12,69	9,95	11,13	11,41	28,86

Tabla 5.7. porcentaje de contracción de todas las piezas

En la tabla se puede visualizar que no hay una relación en la contracción si la pieza sufre de distorsión o no la sufre. En la **Tabla 5.8** tenemos los promedios de los porcentajes de cada modelo y su coeficiente de variación. Podemos observar que la altura interna (h) tiene un coeficiente de variación moderadamente alto, entre 19,9% y 28,07% eso significa que tienen una desviación moderadamente elevada, también lo podemos encontrar en algunas acotaciones que se encuentran entre 10% y 18%. Por otro lado tenemos otras acotaciones que están por debajo del 10%. Se debe de tener en cuenta que uno de los motivos por el cual nos dan esos valores, es la dificultad de medir con precisión las piezas, sobre todo zonas con difícil acceso.

		h (Altura interior)	H (Altura total)	D (Diámetro exterior)	d (Diámetro interior)	volumen
		%	%	%	%	%
1(A,B,C,D)	Valores medios y coeficientes de variación	14,86 ± 19,90%	13,56 ± 5,00%	12,40 ± 6,18%	12,70 ± 17,25%	32,75 ± 5,35%
2(A,B,C,D)	Valores medios y coeficientes de variación	13,52 ± 20,76%	12,90 ± 6,04%	12,27 ± 2,95%	12,64 ± 7,96%	32,53 ± 4,83%
3(A,B,C,D)	Valores medios y coeficientes de variación	15,67 ± 28,07%	12,04 ± 17,91%	12,04 ± 12,53%	11,43 ± 15,71%	31,76 ± 12,55%

Tabla 5.8. Promedios de los porcentajes de cada modelo y su coeficiente de variación.

5.4.2. Estudio de densidades

En este aparatado analizaremos el comportamiento de la densidad antes y después del sinterizado. Se puede apreciar en la **Tabla 5.9** que las densidades de las piezas en verde impresas con la boquilla de 0,5 mm (1F, 2F, 3F) tiene una densidad mayor que las impresas con la boquilla de 0,8mm.

Hemos de tener en cuenta que las boquillas de diámetros pequeños (0,5mm) incrementan el nivel de detalle, eso significa que realiza más pasadas para imprimir una capa, por lo que se rellena mejor cada capa de la pieza y eso garantiza que pueda dejar poros grandes, el inconveniente es el aumentamos del tiempo de impresión, por lo que tenemos una relación entre tiempo y diámetro de boquilla, entre más pequeña sea el diámetro de la boquilla más tiempo necesitara la impresora para terminar la pieza. Mientras que las boquillas con diámetro más grande (0,8mm), se pueden imprimir con mayor rapidez pero sin tanta precisión y al tener menos pasadas de impresión por cada capa, nos puede dejar poros grandes.

Una vez realizado el sinterizado de 4 horas y enfriamiento lento, podemos apreciar que tenemos un aumento considerable de la densidad en todas las piezas, eso es debido a que la pieza ha sufrido una reducción del volumen a causa de la unión del polvo metálico por el tratamiento térmico, también por mantener la masa del polvo constante ya que solo se eliminó la masa del aglutinante.

La densidad teórica del material es de 8,19g/cm^3, en la **Tabla 5.9** apreciaremos los resultados obtenidos de las piezas y podemos apreciar que algunas piezas rozan los 8 g/cm^3, eso significa que la parte interna de la pieza debe tener unas zonas que están huecas (poros).

Con los resultados obtenidos podemos notar que las piezas con la densidad más cercana a la teórica son las que se imprimieron con la boquilla 0,5mm (pieza 1F y 3F). También podemos ver que la pieza 2B tiene la mayor densidad del modelo 2, curiosamente es una pieza que ha sufrido distorsión. En general, las piezas con distorsión no parecen tener valores más bajos de densidad. Es por ese motivo que parece difícil poder relacionar una buena densidad con un buen sinterizado.

	ρ (Verde)	ρ (Sinterizado)	ρ Ganada
	(cm^3/g)	(cm^3/g)	%
Boquilla 0,8mm			
Pieza 1A	5,37	7,77	44,56
Pieza 1B	5,17	7,78	50,59
Pieza 1C	5,40	7,84	45,27
Pieza 1D	5,34	8,00	49,92
Pieza 2A	5,42	7,87	45,20
Pieza 2B	5,32	7,90	48,38
Pieza 2C	5,40	7,88	46,05
Pieza 2D	5,45	7,88	44,58
Pieza 3A	5,31	7,86	47,85
Pieza 3B	5,12	7,60	48,33
Pieza 3C	5,29	7,77	46,98
Pieza 3D	5,40	7,80	44,40
Boquilla 0,5mm			
Pieza 1F	5,57	8,20	47,22
Pieza 2F	5,45	7,78	42,88
Pieza 3F	5,60	7,94	41,99

Tabla 5.9. densidad de las piezas en verde, densidad piezas sinterizadas y densidad ganada después de sinterizado.

Otro dato importante para tener en cuenta es el porcentaje de la densidad que aumenta después del sinterizado, vemos que ronda entre los 41,99% y el 50,59%. Pero si analizamos el promedio de los modelos de las piezas como se muestra en la **Tabla 5.10,** podemos ver que el aumento de densidad promedia de todas las piezas oscila entre 45,42% y el 47,51% con un coeficiente de variación inferior al 10%, por lo que la desviación de los datos no es excesiva.

		ρ (Verde)	ρ (Sinterizado)	ρ Ganada
		(cm^3/g)	(cm^3/g)	%
1(A,B,C,D,F)	Valores medios y coeficientes de variación (sinterizado)	5,37 ± 2,68%	7,92 ± 2,29%	47,51 ± 5,67%
2(A,B,C,D,F)	Valores medios y coeficientes de variación (sinterizado)	5,41 ± 0,96%	7,86 ± 0,58%	45,42 ± 4,46%
3(A,B,C,D,F)	Valores medios y coeficientes de variación (sinterizado)	5,34 ± 3,24%	7,79 ± 1,65%	45,91 ± 5,80%

Tabla 5.10. Media de las densidades de cada modelo de pieza (1, 2 y 3) y Media del porcentaje del aumento de la densidad y sus coeficientes de variación

5.5. Ensayos de dureza

Como explicamos en el apartado 4.11, aplicamos la dureza Vickers con una carga aplicada de 200g y un periodo de 20 segundos. Las marcas resultantes se observan en **Figura 5.13** mediante el microscopio óptico.

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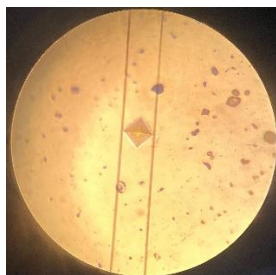
Figura 5.13. Prueba de dura Vickers de la pieza 1A

Con los valores obtenidos podemos ver la resistencia de la pieza a la deformación plástica provocada por el penetrador. A cada una de las muestras se le practicó ensayos de dureza, tanto en la base como en el perfil después de realizarles un corte transversal en el centro de la pieza (**Figura 5.14**).
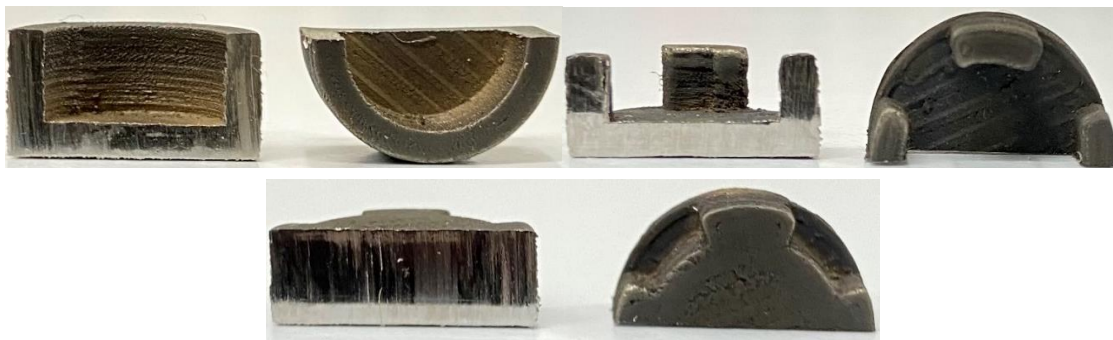
Figura 5.14. Piezas cortadas transversalmente 1A, 2A, 3ª

A cada una de las piezas se ha realizado un total de 15 repeticiones de dureza HV en la base, y 9 repeticiones en las diferentes zonas del corte transversal de las muestras que no sufrieron distorsión, mientras que a las piezas con distorsión se le realizaron 10 repeticiones en la base y 3 repeticiones en las diferentes zonas del corte transversal. Las razón es que son muestras que se han descartado al salir distorsionas, pero aun así, nos sirve para comparar resultados. Se han resumido los datos obtenidos haciendo el promedio de los ensayos y su deviación estándar correspondiente a cada modelo (en el anexo se muestra las tablas con todos los ensayos de dureza HV). A continuación mostramos los resultados obtenidos de los promedios.

- Piezas sin distorsión:
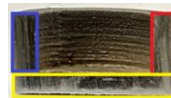
1A boquilla 0,8		1D boquilla 0,8		1F boquilla 0,5	
BASE		**BASE**		**BASE**	
Valor medio	305	Valor medio	326	Valor medio	334
Desviación estandar	29	Desviación estandar	11	Desviación estandar	24
CENTRO		**CENTRO**		**CENTRO**	
Valor medio	301	Valor medio	328	Valor medio	351
Desviación estandar	29	Desviación estandar	22	Desviación estandar	15
PICO IZQUI		**PICO IZQUI**		**PICO IZQUI**	
Valor medio	314	Valor medio	340	Valor medio	344
Desviación estandar	29	Desviación estandar	15	Desviación estandar	39
PICO DERE		**PICO DERE**		**PICO DERE**	
Valor medio	301	Valor medio	309	Valor medio	347
Desviación estandar	32	Desviación estandar	17	Desviación estandar	22

Tabla 5.11. Valor medio, desviación estándar de las piezas 1A, 1D, 1F sin distorsión
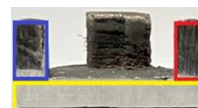
2A boquilla 0,8		2D boquilla 0,8	
BASE		**BASE**	
Valor medio	323	Valor medio	361
Desviación estandar	23	Desviación estandar	19
CENTRO		**CENTRO**	
Valor medio	314	Valor medio	331
Desviación estandar	30	Desviación estandar	34
PICO IZQUI		**PICO IZQUI**	
Valor medio	325	Valor medio	317
Desviación estandar	20	Desviación estandar	36
PICO DERE		**PICO DERE**	
Valor medio	325	Valor medio	330
Desviación estandar	8	Desviación estandar	20

2F boquilla 0,5	
BASE	
Valor medio	332
Desviación estandar	31
CENTRO	
Valor medio	343
Desviación estandar	37
PICO IZQUI	
Valor medio	326
Desviación estandar	22
PICO DERE	
Valor medio	331
Desviación estandar	27

Tabla 5.12. Valor medio, desviación estándar de las piezas 2A, 2D, 2F sin distorsión

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3A boquilla 0,8		3D boquilla 0,8	
BASE		**BASE**	
Valor medio	310	Valor medio	340
Desviación estandar	18	Desviación estandar	18
CENTRO		**CENTRO**	
Valor medio	292	Valor medio	308
Desviación estandar	46	Desviación estandar	27

3F boquilla 0,5	
BASE	
Valor medio	334
Desviación estandar	31
CENTRO	
Valor medio	353
Desviación estandar	15

Tabla 5.13. Valor medio, desviación estándar de las piezas 3A, 3D, 3F sin distorsión

- Piezas con distorsión:
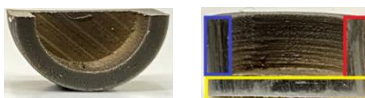
1B boquilla 0,8		1C boquilla 0,8	
BASE		**BASE**	
Valor medio	244	Valor medio	291
Desviación estandar	62	Desviación estandar	28
CENTRO		**CENTRO**	
Valor medio	263	Valor medio	300
Desviación estandar	17	Desviación estandar	17
PICO IZQUI		**PICO IZQUI**	
Valor medio	254	Valor medio	294
Desviación estandar	11	Desviación estandar	5
PICO DERE		**PICO DERE**	
Valor medio	262	Valor medio	284
Desviación estandar	8	Desviación estandar	14

Tabla 5.14. Valor medio, desviación estándar de las piezas 1B, 1C con distorsión

2B boquilla 0,8		2C boquilla 0,8	
BASE		**BASE**	
Valor medio	242	Valor medio	259
sviación estandar	17	Desviación estandar	15
CENTRO		**CENTRO**	
Valor medio	241	Valor medio	274
sviación estandar	35	Desviación estandar	9
PICO IZQUI		**PICO IZQUI**	
Valor medio	259	Valor medio	238
sviación estandar	6	Desviación estandar	4
PICO DERE		**PICO DERE**	
Valor medio	232	Valor medio	248
sviación estandar	13	Desviación estandar	6

Tabla 5.14. Valor medio, desviación estándar de las piezas 2B, 2C con distorsión

2B boquilla 0,8		2C boquilla 0,8	
BASE		**BASE**	
Valor medio	234	Valor medio	260
sviación estandar	21	Desviación estandar	31
CENTRO		**CENTRO**	
Valor medio	230	Valor medio	275
Desviación estandar	28	Desviación estandar	9

Tabla 5.16. Valor medio, desviación estándar de las piezas 3B, 3C con distorsión

Con los datos obtenidos podemos agrupar todas las durezas de un modelo en gráficas y comparar los resultados de una manera más cómoda.
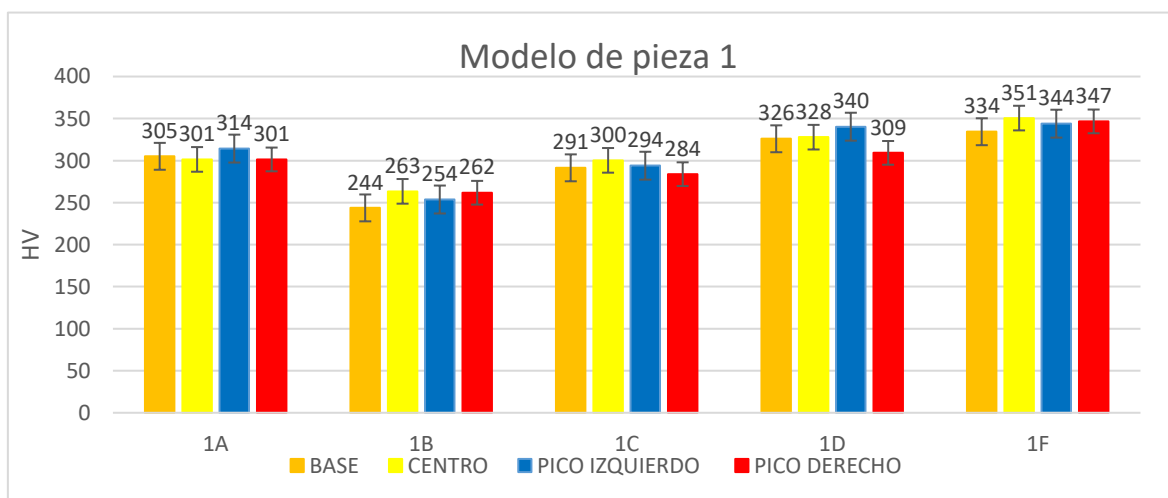

Figura 5.15. Modelo de pieza 1(A, B, C, D, F)

Analizando la gráfica del modelo 1 (**Figura 5.15**), podemos observar que las piezas con distorsión (1B, 1C) tienen menor durezas en todas sus partes estudiadas (base e interior de la pieza) a comparación de las que no tiene distorsión. También podemos observar un pequeño aumento de la dureza entre las piezas impresas con la boquilla de 0,5mm (1F) y las impresas con la de 0,8mm (1A, 1D).
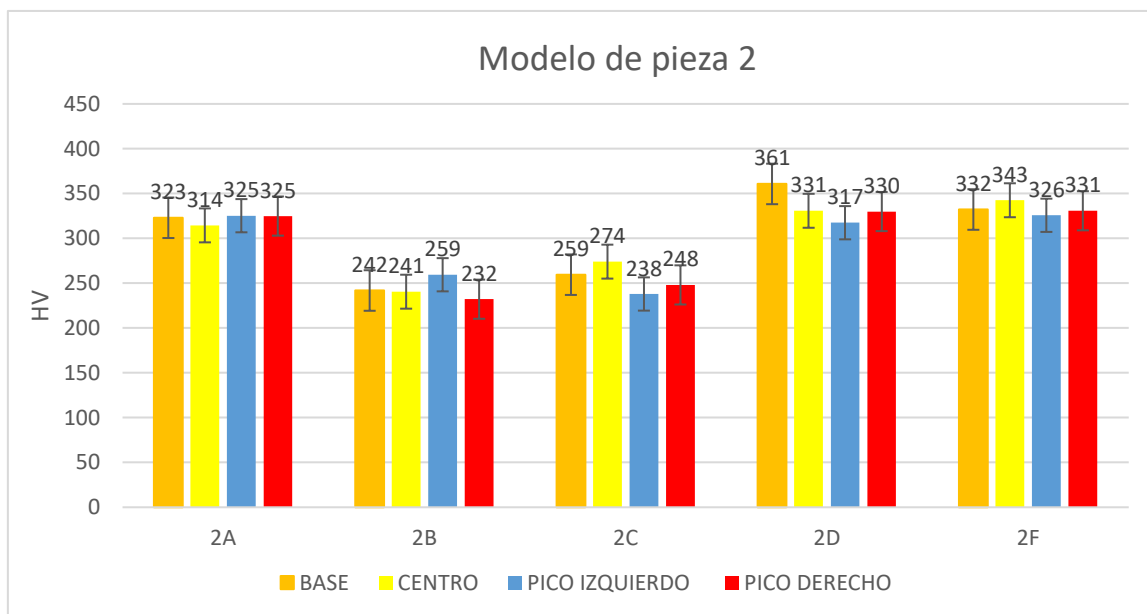
Figura 5.16. Modelo de pieza 2(A, B, C, D, F)

En el modelo 2 (**Figura 5.16**) encontramos la misma relación de perdida de durezas en las piezas distorsionadas (2B, 2C). también observamos que las piezas sin distorsión mantienen una relación de durezas muy semejante, independientemente de si se imprimieron con boquilla de 0,5mm o 0,8mm. Cabe destacar que la zona que obtuvo la mayor dureza ha sido la base de la pieza 2D, impresa con la boquilla de 0,8mm, por lo que entendemos que esa pieza tubo una buena impresión de relleno en la base.

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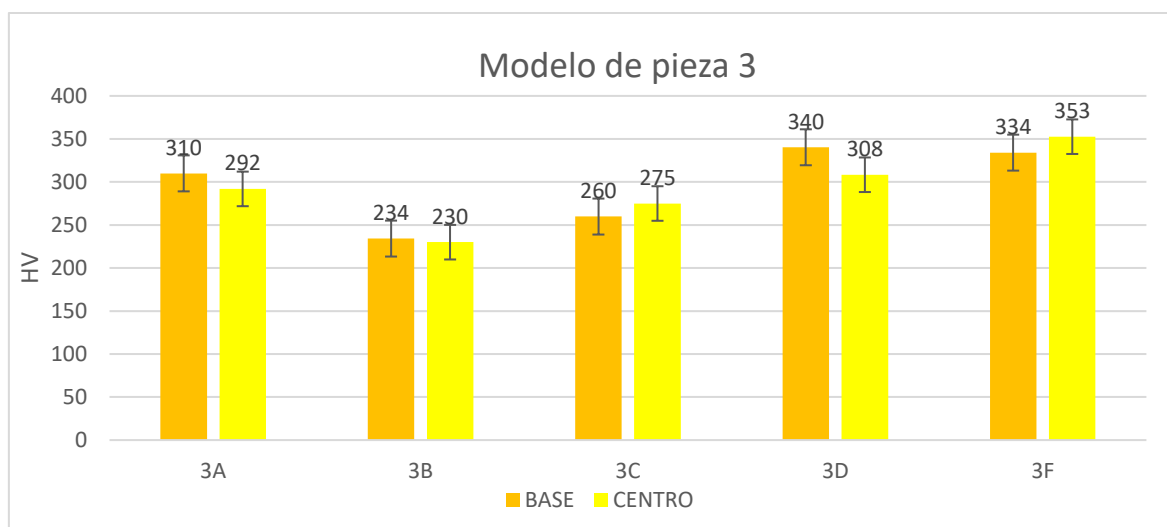
Figura 5.17. Modelo de pieza 3(A, B, C, D, F)

En el modelo 3 (Figura 5.17) mantenemos la misma similitud que los resultados de los modelos anteriores. Estos valores nos ayudan a confirmar que la distorsión de una pieza durante el proceso de sinterizado empeora la dureza del material.

Si calculamos la dureza con el valor de la densidad teórica del Inconel 718 (8,19 g/cm3) obtenemos un valor de 367,20 HV. Los valores obtenidos se aproximan al teórico; si hiciéramos un precipitado los más probable es que el valor de la dureza llegue a aproximarse a ese valor.

5.6. Estudio de la superficie interna de las probetas mediante microscopía SEM

Para el estudio de porosidad y de la microestructura, lo primero que se les hizo a las piezas fue atacarlas con el compuesto Kalling, para seguidamente poder estudiarlas con el microscopio electrónico (SEM) y el óptico.

5.6.1. Estudio de la porosidad general

En estés apartado estudiaremos la porosidad de las imágenes obtenidas por el microscopio ópticos y el SEM a bajo aumento. Podremos observar que al imprimir con la boquilla de 0,8mm tenemos más posibilidad de obtener poros grandes. Al mismo tiempo, también permite visualizar en ocasiones el patrón de impresión que realiza la máquina, ya que podemos apreciar la intersección entre el hilo que se deposita y el hilo que ya está adherido

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en la pieza que se encuentra en posición perpendicular a la que se está extruyendo. En la **Figura 5.18** podemos observar el recorrido del hilo extrudo, y los poros que va dejando la boquilla al cruzar de forma perpendicular la extrusión anteriormente depositada en la pieza.

En el caso de la **Figura 5.19** tratamos con una extrusión realizada con una boquilla de 0,5mm, analizando la imagen, no se aprecia ningún patrón de impresión, tampoco vemos poros grandes comparándolo con la boquilla 0,8.

Por último tenemos la **Figura 5.20,** se trata de la pieza 1B que ha sufrido distorsión, en la imagen podemos ver como la distorsión afecta a la pieza, causando una porosidad excesiva y zonas donde no hubo unión a causa de deformación de la pieza.

Estos patrones se repiten en todas las piezas impresas con las boquillas de 0,5 y 0,8mm.
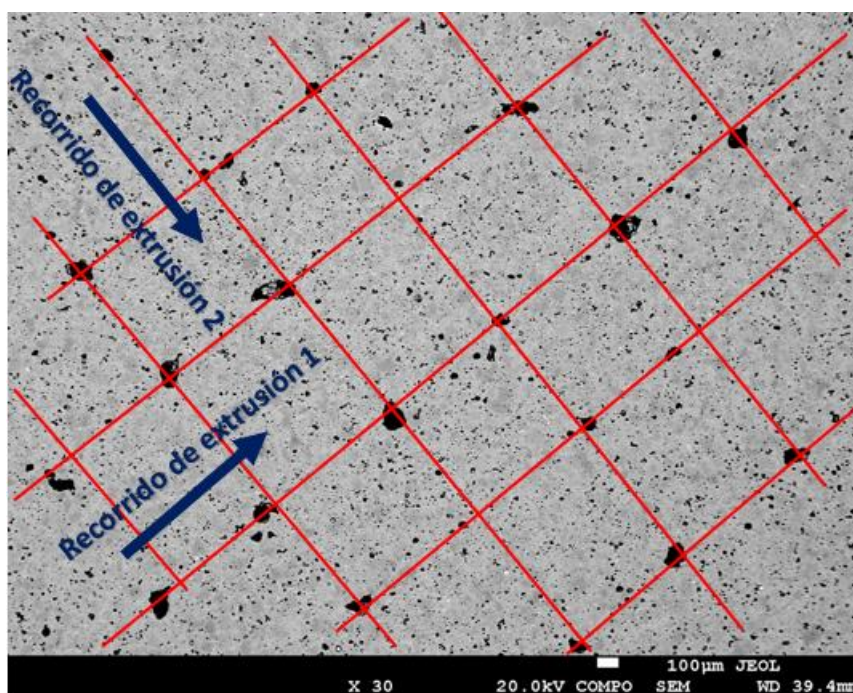
Figura 5.18. Imagen de la pieza 1A (Base) con boquilla de 0,8mm
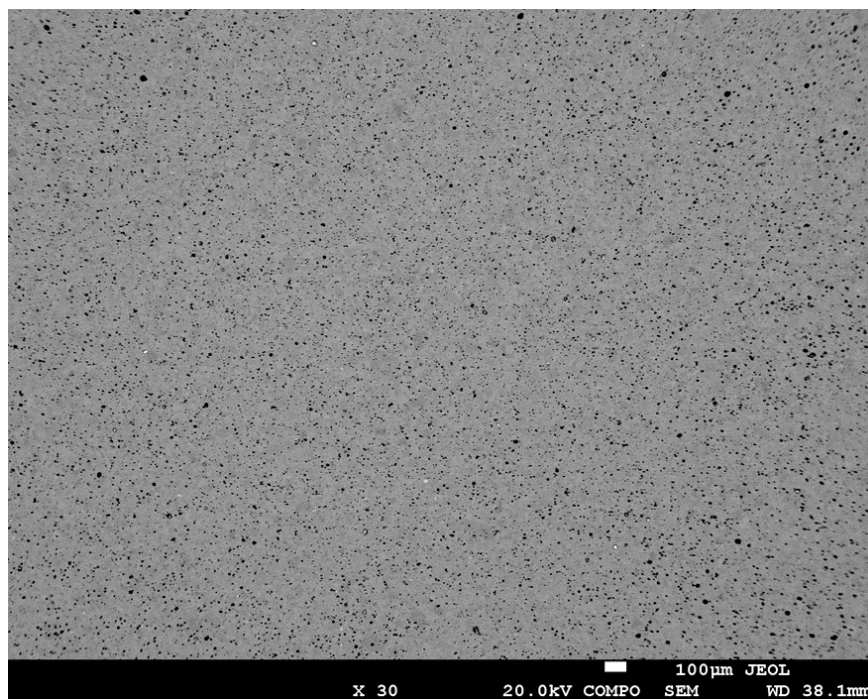
Figura 5.19. Imagen de la pieza 1F (Base) con boquilla de 0,5mm
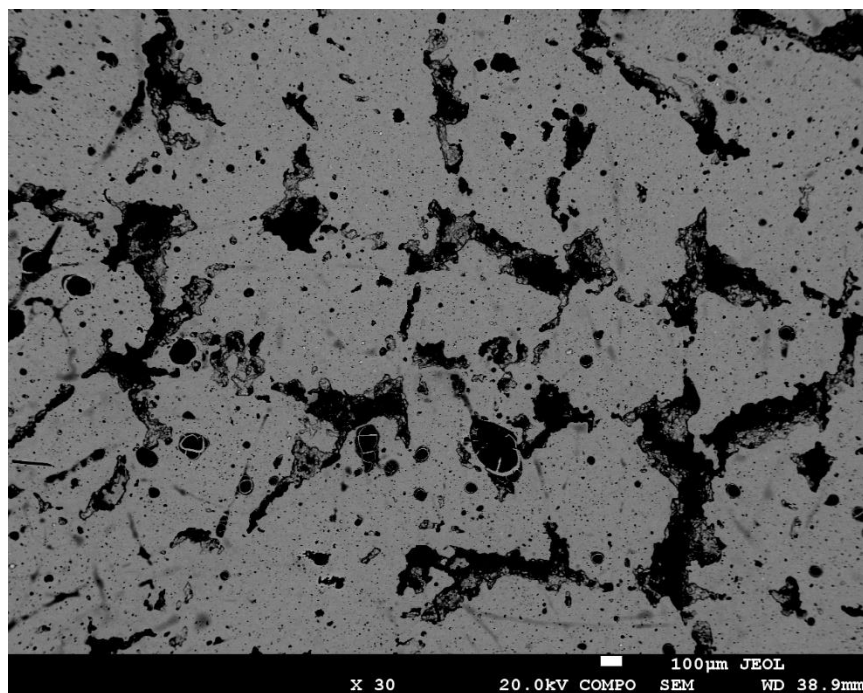
Figura 5.20. Imagen de la pieza 1F (Base) pieza distorsionada, con boquilla de 0,8mm

Seguidamente analizamos el corte transversal de las imágenes obtenidas en el SEM con poco aumento; se puede apreciar una clara diferencia entre las piezas impresas con la boquilla de 0,8mm y 0,5mm. En la **Figura 5.21** vemos el corte transversal de la pieza 1A (boquilla 0,8mm), podemos observar las irregularidades en las paredes, por lo que la pieza

no está bien definida. También se puede destacar la porosidad que encontramos en el interior de la pieza, esos poros son los que podemos ver en la **Figura 5.19**, causadas por la intersección entre el hilo que está depositado en la base y el hilo que está siendo extrudió con un recorrido perpendicular al anterior.

Por otro lado tenemos la **Figura 5.22,** que se trata de la pieza 1F (boquilla 0,5mm), podemos destacar que esta pieza tiene un mejor acabado, las paredes están bien definidas y podemos apreciar una porosidad muy inferior.

Estos patrones se repiten en todas las piezas impresas con las boquillas de 0,5 y 0,8mm. Los resultados obtenidos nos dan a entender que con la boquilla de 0,5 tenemos una impresión de capa mucho más compacta y uniforme.
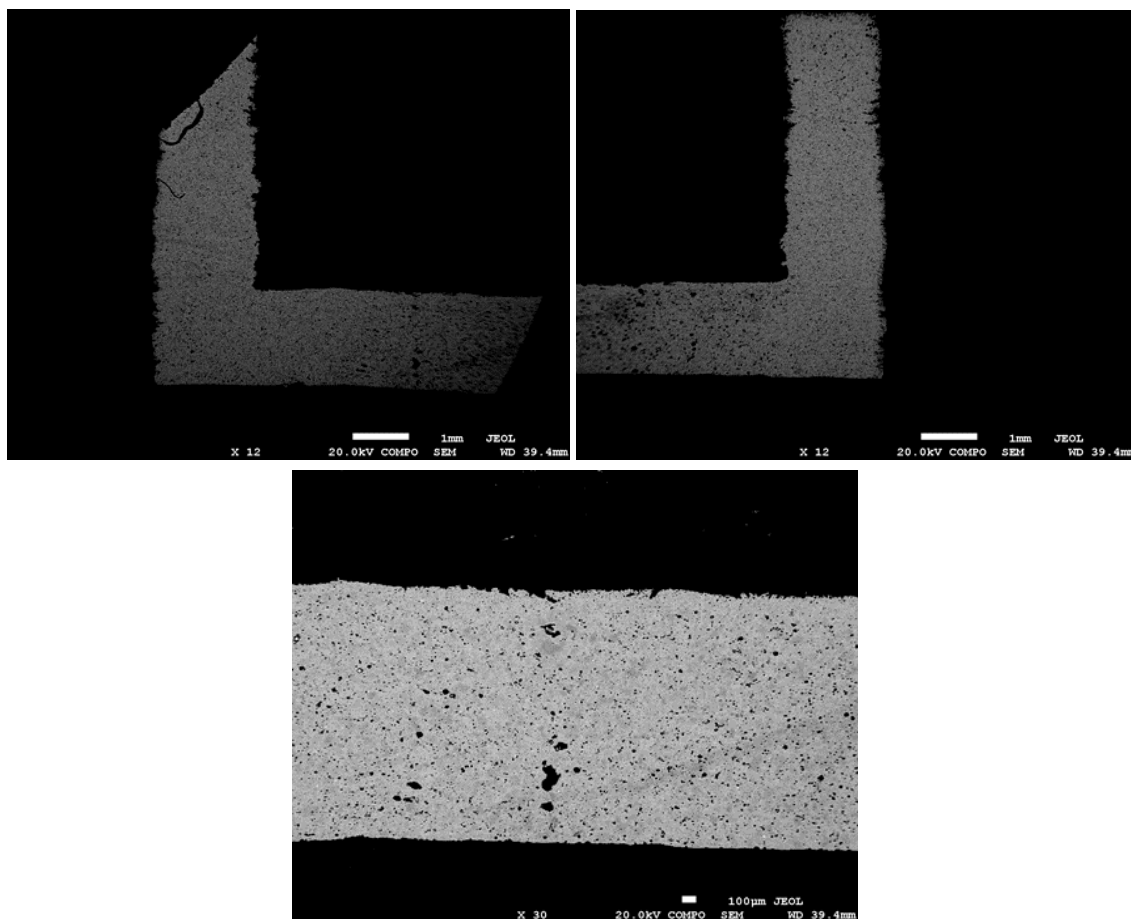
Figura 5.21. Corte transversal de la pieza 1A con boquilla 0,8mm
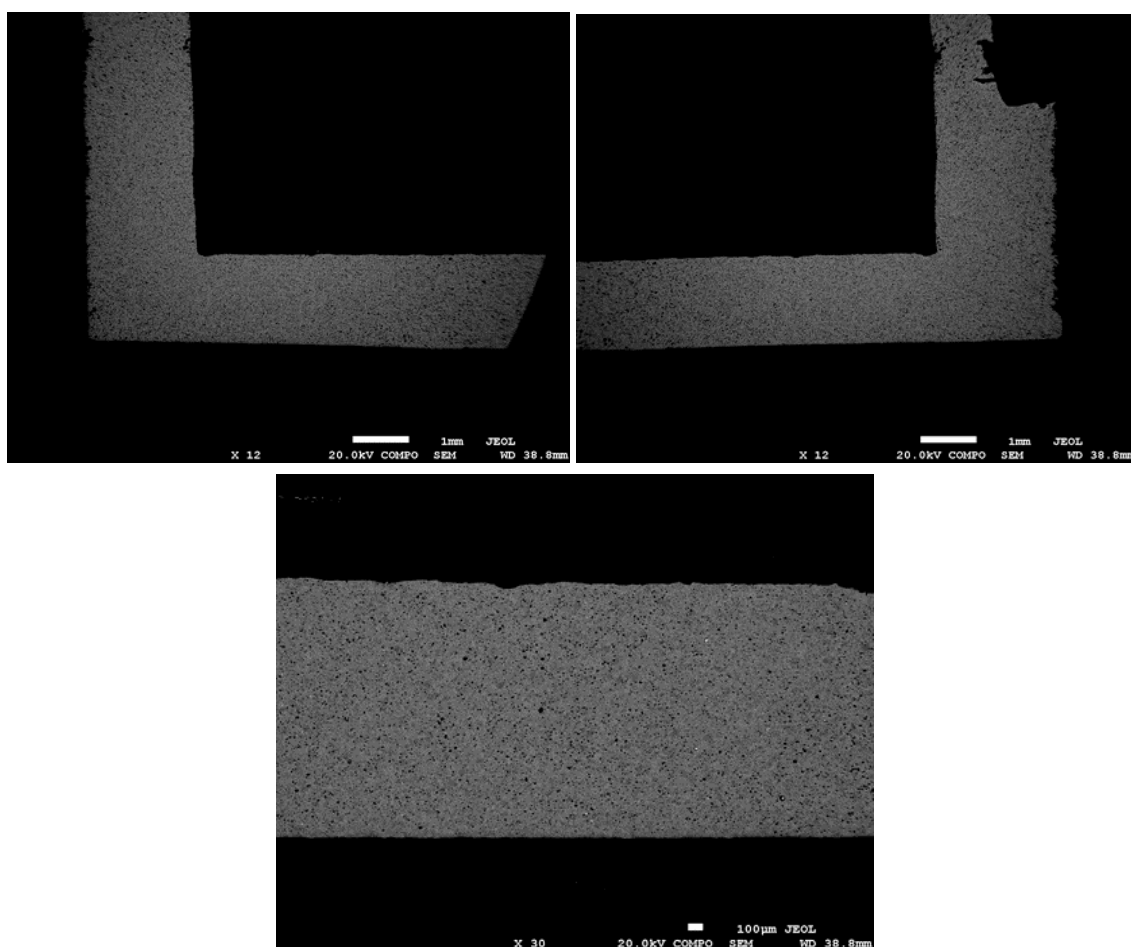
Figura 5.22. Corte transversal de la pieza 1F con boquilla 0,5mm

5.6.2. Estudio de la microestructura

En este apartado se ha trabajado con las imágenes obtenidas en el SEM a mayor aumento que en el apartado anterior. Las **Figura 5.23 y 5.24** muestran las microestructuras correspondientes a las piezas 1A y 1F, respectivamente. Para ambas muestras fabricadas los límites de grano son visibles después del ataque químico. Gracias a eso, es posible determinar el tamaño de grano y comparar los tamaños de grano después de la sinterización. Además, es importante notar que los precipitados se encuentran principalmente en los límites de los granos.

Podemos observar que tenemos una similitud en el tamaño de grano, pero en la pieza 1F los poros son más pequeños, tiene lógica ya que es la pieza que se imprimió con la boquilla de 0,5mm.

Otro punto importante de ver son las manchas blancas que se ven (flechas blancas) se trata del precipitado. Los cristales que se observan son austenita y los precipitados tienen un

contenido importante de Niobio. Esto se puede observar en la **Figura 5.25 (**que se trata de un espectro de la muestra 1A) y destaca la cantina de Niobio en el precipitado.
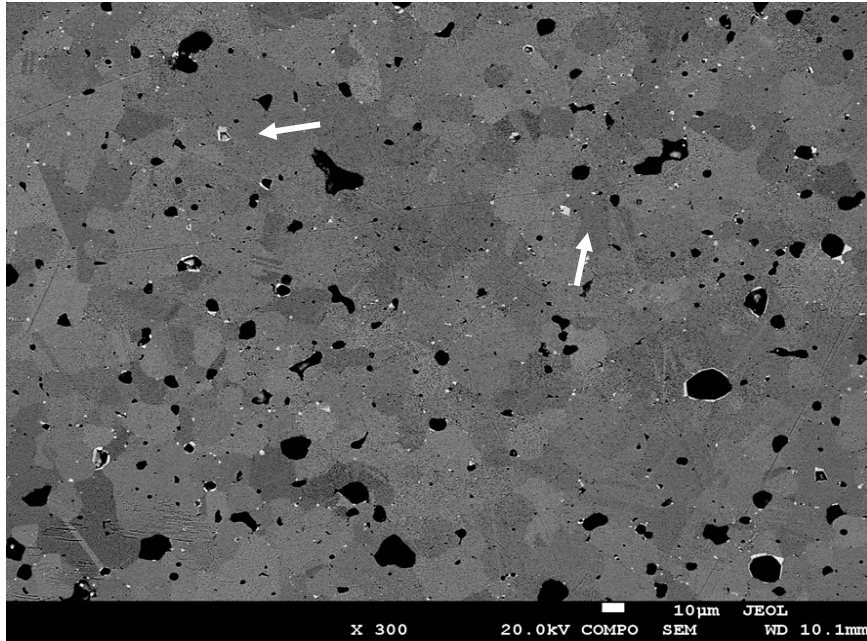
Figura 5.23. La muestra 1A vista a 300 aumentos.
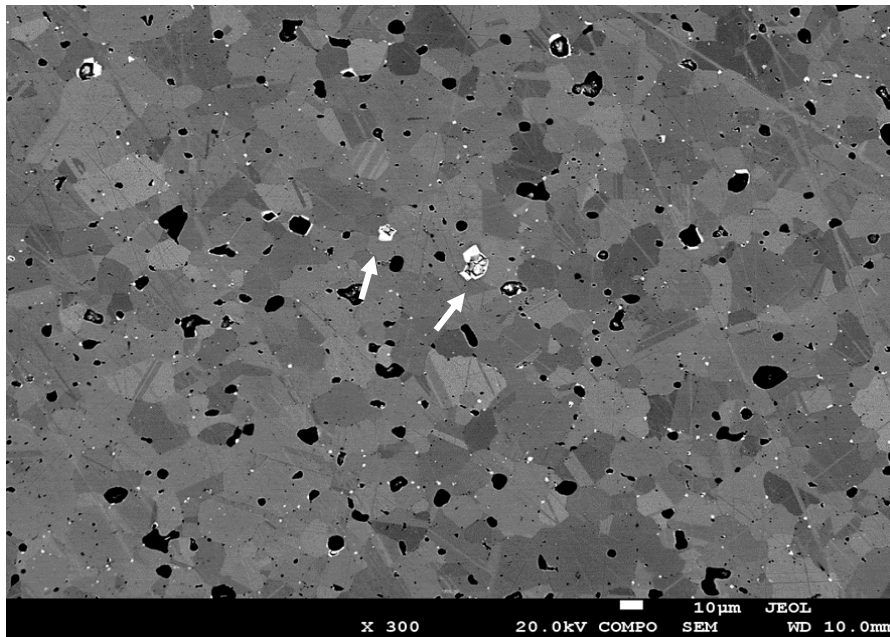
Figura 5.24. La muestra 1F vista a 300 aumentos.
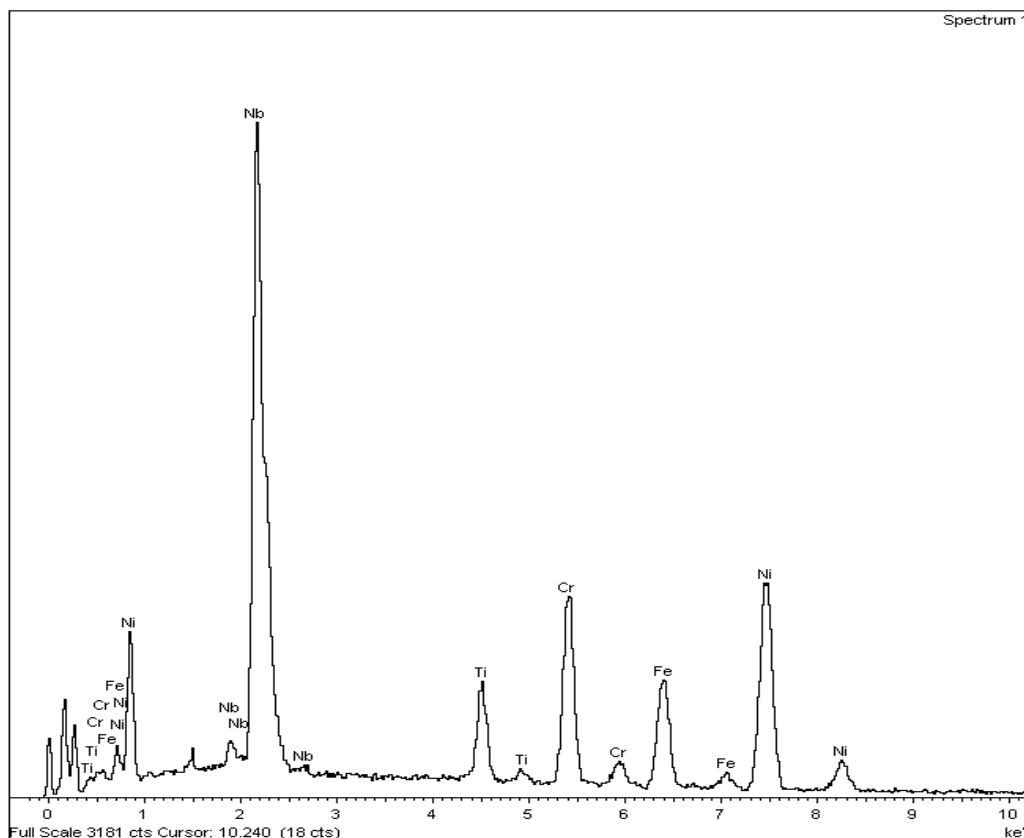
Figura 5.25. Espectro de la muestra 1A en el precipitado

El tamaño de grano se puede estimar mediante el método de Heyn utilizando diferentes imágenes similares a las Figura 5.24 pero de las otras piezas del estudio; obtuvimos el promedio de tamaño de grano medio junto con su desviación estándar (**Tabla 5.17**).

Tamaño de grano medio	
	μm
Valor medio	21,95
Desviación estándar	0,56

Tabla 5.17. Tamaño de grano medio y su desviación estándar

5.7. Fabricación de una pieza compleja

Una vez hemos podido comprobar que se pueden fabricar piezas con una cierta complejidad queremos averiguar si es posible fabricar una pieza con una forma un poco más complicada a la hora de imprimir.

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La pieza en cuestión es la que se muestra en la **Figura 5.26,** un modelo que tiene unas aspas como si se tratara de una turbina; como vemos en la figura las paredes no son lisas, si no que tienen una ligera inclinación según va cogiendo altura.
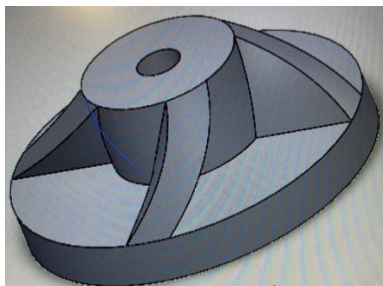
Figura 5.26. Diseño de pieza compleja (con aspas)

5.7.1.   Parámetros de impresión

Como en todo proceso de impresión experimental, hemos tenido que realizar varios intentos para encontrar los parámetros correctos para imprimir esta pieza con la boquilla de 0,5mm. Pudimos observar que los parámetros que habíamos obtenido para imprimir las piezas (1F 2F Y 3F) servían perfectamente para poder fabricar esta pieza de forma correcta a la primera o segunda impresión, como veremos en la **Figura 5.27.**

- Temperatura de boquilla 245ºC
- Temperatura de la plataforma 105ºC
- Añadir al G-code la acción M221 en la primera capa de 850
- Añadir al G-code la acción M221 a partir de la segunda capa de 350

Figura 5.27. Pieza compleja impresa (boquilla 0,5mm)

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5.7.2. Debinding y tratamiento de sinterización

En este apartado hemos seguido los mismos pasos que en todos los ensayos anteriores:

- Debinding primario: Eliminar aglutinante soluble en agua a 60°C y 500rpm.
- Debinding secundario: Mantener la pieza a 600°C durante una hora para eliminar el aglutinante no soluble en aguan.
- Sinterizado: Temperatura de trabajo 1292°C durante cuatro horas.

Lo que se quiere comprobar en este ensayo es verificar la posibilidad de hacer piezas con paredes inclinadas; en la **Figura 5.27** vemos el resultado obtenido después del sinterizado, se puede apreciar como la estructura ha mantenido su forma, es interesante ver que las aspas inclinadas no se han deformado, por lo que nos abre las puertas a seguir investigando con formas cada vez más complejas.

Figura 5.27. Pieza compleja sinterizada (boquilla 0,5mm)

5.7.3. Ensayo de dureza

A continuación se muestra los resultados obtenidos de las pruebas de dureza Vickers en la **Tabla 5.18.**

Base		CENTRO	
Valor medio	336	Valor medio	332
Desviación estandar	26	Desviación estandar	13

Tabla 5.18. Valor medio, desviación estándar de la pieza compleja

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Los valores obtenidos están dentro de los resultados conseguidos en los ensayos hechos a los modelos de piezas (1,2,3) que no tuvieron distorsión. En la **Figura 5.28** comparamos los resultados de las durezas del modelo pieza 3 (A, B, C, D y F) y la pieza compleja.
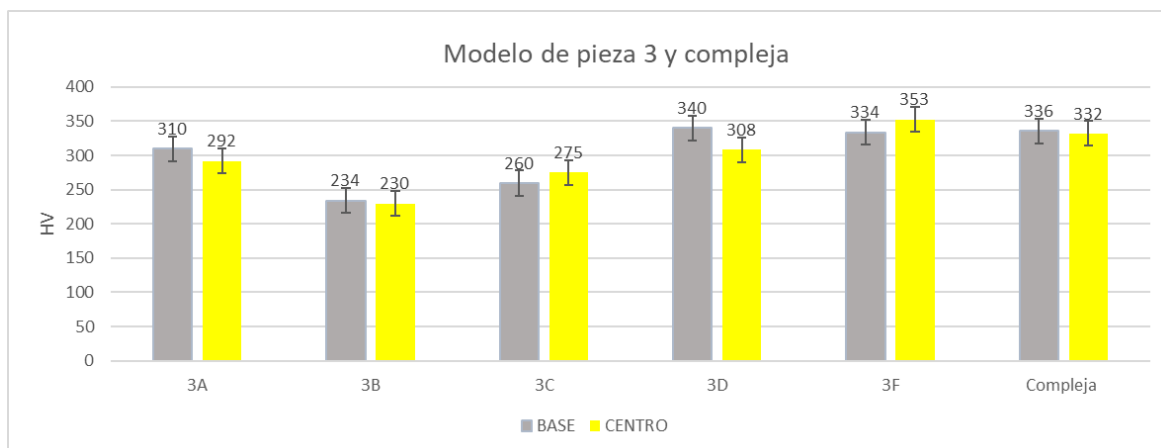
Figura 5.28. Modelo de pieza 3(A, B, C, D, F) y pieza compleja

5.7.4. Estudio de la superficie interna de la probeta mediante microscopía SEM

5.7.4.1. Estudio de la porosidad general

Como podemos ver en la **Figura 5.29** la imagen es similar a la Figura 5.19 ya que es una extrusión realizada con una boquilla de 0,5mm, no se aprecia ningún patrón de impresión, tampoco se ven poros grandes si lo comparamos con la Figura 5.18, que se trata de una pieza impresa con una boquilla 0,8mm.
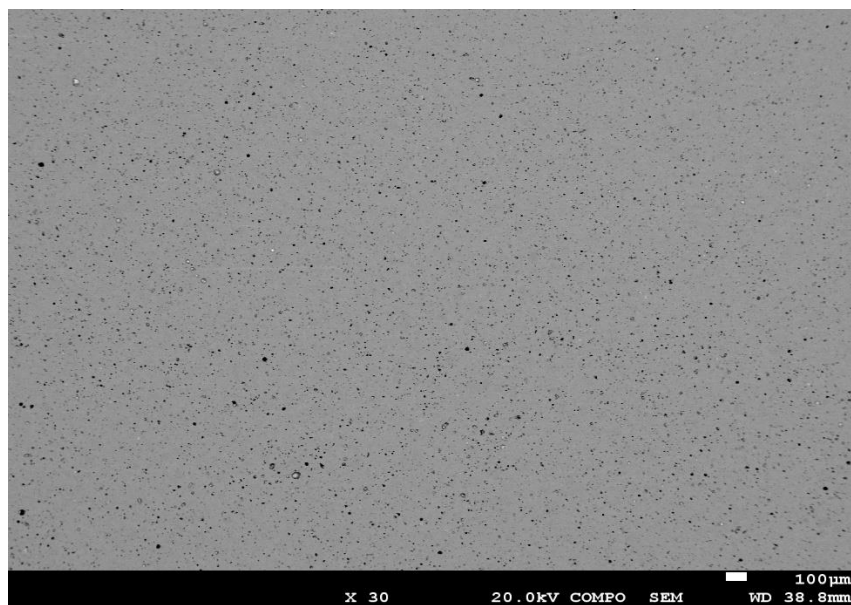
Figura 5.29. Imagen de la pieza compleja (Base) con boquilla de 0,5mm

5.7.4.2. Estudio de la microestructura

Como en el apartado anterior la **Figura 5.30** se asemeja a las imágenes de las piezas impresas con la boquilla 0,5mm (Figura 5.24). Lo único que podemos destacar es el aumento de puntos blancos (precipitados).
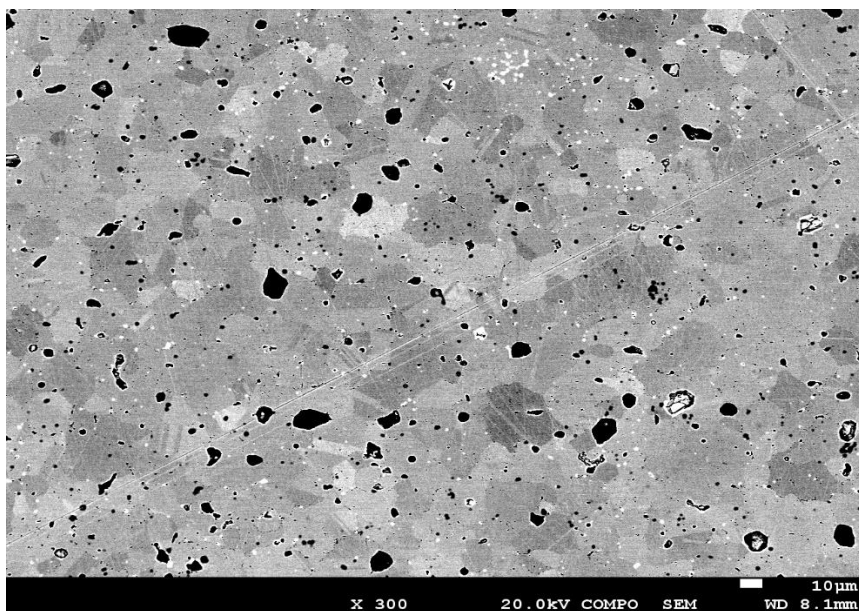
Figura 5.30. La muestra compleja vista a 300 aumentos.

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Conclusiones

El objetivo de este TFG fue la fabricación de piezas mediante el método MEAM-HP usando el componente inconel 718 y comprobar si nos permite realizar piezas de paredes delgadas con grosor de 2mm y altura 6mm, también piezas que puedan encajar, por lo que se crearon 3 modelos diferentes.

Pudimos comprobar lo complejo que es la fabricación de una pieza mediante el método MEAM-HP. El primer reto es poder encontrar los parámetros adecuado de impresión, ya que en estudios anteriores solo se creaban probetas o formas planas (cuadrados, circunferencia) y los parámetros que se utilizaban no eran los apropiados para conseguir un flujo estacionario a la hora de imprimir una pieza con una forma y dimensión más grande.

Las piezas, sinterizadas a temperatura de 1292ºC llegan a tener la media de densidad siguiente; modelo 1 (7,92g/cm^3), modelo 2 (7,86g/cm^3) y modelo 3 (7,79g/cm^3). Al tener que trabajar a alta temperatura de sinterización, se pueden genera distorsiones en las piezas. Las distorsiones, además de provocar una pérdida de las dimensiones, generan un aumento de la porosidad y una pérdida de dureza de las piezas. Para las muestras con buena densidad se ha observado un elevado número de precipitados; que contienen una gran cantidad de Niobio que se encuentran en los límites de los granos.

Las piezas fabricadas con boquilla de 0,5 mm tienen mejor densidad en verde, y en general, presentan una densidad más elevada que para las piezas fabricadas con boquilla 0,8; aunque en algunos casos podemos encontrar piezas con densidades similares he incluso superiores a las impresas con la boquilla de 0,5mm.

En la prueba de dureza Vickers, se obtuvieron valores que nos demostró que las piezas distorsionadas en el sinterizado tienen menos resistencia mecánica que las piezas que no sufrieron distorsión, alcanzado obtener la dureza experimental más alta de 361 HV.

Impacto medioambiental

El fabricante de la materia prima no nos aportó con detalle el gasto energético que se requiere para su fabricación por lo que, se va a realizar una aproximación del gasto energético usando los datos obtenidos en la literatura. La energía que se consume desde que se extrae el mineral hasta conseguir un lingote recibe el nombre de embodied energy; con la base de datos del programa CES Selector se obtuvo un embodied energy en el Inconel 718 del 291-321 MJ/Kg con una emisión de CO_2 de 16,6 -18,3 kg/kg y consumo de agua de 235- 259 l/kg.

El estudio desarrollado por Fredriksson [41] se estima que la energía requerida durante el proceso de atomización es de 55.6 MJ/Kg. Eso significa que para la obtención de 1 kg de polvo de Inconel 718 se necesita entre 346,6 y 376,6 MJ de energía (96,27 y 104,6 kWh). Añadiendo la embodied energy de los materiales que conforman el aglutinante (PEG, PP y AS) y la energía que consume la mezcla del aglutinante con el polvo metálico; pero, la energía consumida en la obtención de los componentes del aglutinante se puede despreciar, ya que el polvo de Inconel es el 92% de la fracción en peso de la materia prima.

Durante este proyecto se ha impresión un total de 70 muestras, suponiendo que para imprimir cada muestra se necesita un promedio de 4,12 gramos de materia prima y como el peso del polvo metálico en el Inconel 718 es del 92 %, la cantidad de material requerido para llevar a cabo este estudio ha sido de unos 265 gramos.

Para producir la materia prima que hemos usado en este proyecto se ha consumido una energía superior a 99,8 MJ (27.72 kWh) con un consumo de agua y una huella de carbono de más de 69,13 litros y 4,61 kg de CO_2 respectivamente.

Analizando la ficha técnica del cabezal Direct3D y de la impresora Prusa i3 MK3 obtenemos que la potencia consumida de los dos es de 0.3 kW/h aproximadamente. Se han imprimido 70 muestras y el promedio de impresión de las piezas hechas tanto con la boquilla de 0,5mm como con las de 0,8mm es de 54m y 15 segundos, el tiempo aproximado de uso ha sido de 63 horas lo que es equivalente a un consumo aproximando de 18,9 kW.

El siguiente equipo que estudiar es el agitador magnético junto con la placa calefactora, dicha maquina tiene un consumo aproximado de 0.5 kW/h por lo que el sí el tiempo de uso de la agitadora ha sido de unas 75 horas, el consumo aproximado ha sido de 37,5 kW.

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El horno tubular usado para el sinterizado oscila entre 3 y 9 kW según la potencia utilizada. Suponiendo que aplicamos la máxima potencia y que el tiempo total de uso ha sido de 60 horas, el consumido aproximado es 540 kW. El consumo de la pulidora, encastadora y resto de máquinas usadas en el proyecto tienen un gasto energético aproximado de 19kW. No he tenido en cuenta el consumo energético de las instalaciones (luces, sistema de ventilación...). También desconoce el gasto energético del SEM.

El portátil usado para la redacción de este proyecto y uso del software (SolidWorks, Pronterface...) tiene un consumo medio de 0,2 kW/h y se usó aproximadamente 400 horas, por lo que el consumo ha sido 80 kW.

Por lo tanto, el coste energético aproximado ha sido de 676,4 kWh, ya que tendríamos que sumarle la energía consumida por el SEM y las instalaciones. Se estima que el gasto medio para cada tratamiento de debinding ha sido de unos 510 ml de agua destilada, por lo que el gasto total ha sido de unos 2,6 litros.

En cuanto al argón usado en el proceso de sinterización no se conocen efectos ambientales nocivos causados por este material; el argón es un gas que se da de forma natural en el medio ambiente y este se disipa rápidamente.

Para la preparación metalográfica, el uso de resina epoxi y el uso de un reactivo químico tienen un impacto en el medio ambiente. Para lograr el grabador de Kalling, los usos de componentes tóxicos y nocivos aumentan el impacto ambiental. Es importante hacer una evaluación más profunda de los componentes utilizados y su efecto sobre el fenómeno de la eutrofización, o las emisiones de GEI (gases de efecto invernadero).

la ventaja del MEAM-HP es que el material no sufre degradación hasta llegar a la etapa de sinterización, pero sí sufre degradación el aglutinante polimérico. Manonukul et al. [42] estudiaron la viabilidad de reutilizar piezas en verde defectuosas obtenidas mediante MIM. Observo una degradación de las propiedades mecánicas de las piezas en verde, pero no afectaba a la densidad final que se conseguía una vez sinterizada la pieza. Por lo contrario, sí que decrecía la contracción linealmente según va aumentando la cantidad de material reciclado; Manonukul et al. recomiendan no superar el 4,5 % de materia prima reciclada para poder seguir respetando las tolerancias de productos MIM.

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Análisis económico

A continuación se muestra los cálculos aproximados de los costes de adquisición del material necesario para la fabricación y estudio de las muestras. También se tuvo en cuenta al gasto que supuso la utilización de la maquinaria donde se le estima un precio de 0,1€/Kw. También se añade el coste del personal que realiza el trabajo.

Maquinaria	Coste	Coste por horas	Gasto energético (kW/h)	Número de horas usado	Gasto energético total tras realizar el estudio	Coste de la energía consumida	Coste total
	(€)	(€/h)		(h)	(kW)	(€)	(€)
Impresora 3D Prusa MK3	769	-	0,3	63	18,9	1,89	3.570,89
Cabezal extrusor Direct3D	2.800						
Agitador magnético con placa calefactora	110	-	0,5	75	37,5	3,75	113,75
Horno tubular Hobersal ST-16	10.000	-	9	60	540	54	10.054
Pulidora automática	2.000	-	0,55	4	2,2	0,22	2.000,22
Buehler					0		
Encastadora Struers LaboPress-3	2.000	-	1,5	2,5	3,75	0,375	2.000,37
SEM	-	100	-	1			100
Balanza de precisión KERN EMB-V	297,5	-	0,01	2	0,02	0,002	297,5
Microscopio óptico Buehler Omnimet	600	-	0,03	2	0,06	0,006	600
Cortadora Struers Accutom-50	1000	-	0,55	4	2,2	0,22	1.000,22
Total							19.736,95

Tabla A1. Precio de compra aproximado de cada una de las máquinas, su consumo eléctrico, el tiempo que se han usado durante el estudio y el coste de la energía que han consumido.

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Coste del material usado para fabricar y preparar las muestras para su estudio			
Material	Cantidad	Precio unitario	Precio final (€)
	(Unidades, l, Kg)	[€/(u, l, Kg)]	
Pellets de Inconel 718	10	80	800
Boquillas para el cabezal Direct3D	2	25	50
Pie de rey electrónico	1	13	13
Disco magnético para pulir	1	15	15
Papel abrasivo (400, 600, 800, 1000, 1200 y 2400)	6	40	240
Paños de pulido	4	30	120
Pasta de diamante (9,6,3 y 1)	1	125	125
Software de diseño 3D SolidWorks	1	1010	1.010
Etanol	2	5	10
Jabón	1	2	2
Agua	10	0,002	0,02
Baquelita	1	15	15
Otros (vasos de precipitados, cuchara, varilla metálica, guantes, papel…)	1	150	150
Subtotal			2.550,02
Costes del material de oficina			
Material	Cantidad	Precio unitario	Precio final (€)
Material de oficina (bolígrafo, lápiz, libreta…)	1	150	150
Ordenador	1	1500	1.500
Subtotal			1.650
Total			**4.200,02**

Tabla A2. Coste del material que ha sido necesario para la fabricación y estudio de las muestras.

Personal	Coste hora (€/h)	Horas totales (h)	Coste total (€)
Ingeniero junior	18	900	16.200
Director del proyecto	34	50	1.700
Técnico de laboratorio	25	20	500
Total			**18.400**

Tabla A3. Salario del personal que ha participado en este estudio junto con el coste total que ha supuesto

Total de proyecto: 42.336,97€

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Bibliografía

[1]. Norma ISO/ASTM 52900:2015. Principios generales para la fabricación aditiva, Terminología. (2015). Recuperado 17 de mayo de 2016.

[2] N. Guo y M. C. Leu, «Additive manufacturing: Technology, applications and research needs», *Front. Mech. Eng.*, vol. 8, n.o 3, pp. 215-243, 2013, doi: 10.1007/s11465-013-0248-8.

[3] A. Balbás, M. Espinosa, M. Dominguez, "Últimos avances en la fabricación aditiva con materiales metálicos", Lámpsakos, no. 19, pp 47-54, 2018

[4]. << Diseño Generativo con Solid Edge, Procesos de Fabricación Aditiva (AM) >> https://generativedesignpro.wordpress.com/category/tecnologia/ (accedí 18/02/2021).

[5]. I. Gibson, D. Rosen, y B. Stucker, *Additive Manufacturing Technologies*, Second Edi. 2015.

[6] J. Gonzalez-Gutierrez, S. Cano, S. Schuschnigg, C. Kukla, J. Sapkota, y C. Holzer, «Additive manufacturing of metallic and ceramic components by the material extrusion of highly-filled polymers: A review and future perspectives», *Materials*, vol. 11, n.o 5.MDPI AG, may 18, 2018, doi: 10.3390/ma11050840.

[7] M. Spoerk, C. Holzer, y J. Gonzalez-Gutierrez, «Material extrusion-based additive manufacturing of polypropylene: A review on how to improve dimensional inaccuracy and warpage», *J. Appl. Polym. Sci.*, vol. 137, n.o 12, p. 48545, mar. 2020,

[8] "European Powder Metallurgy Association (EPMA) - Introduction to Metal Injection Moulding (Brochure)." https://www.epma.com/epma-free-publications/product/introduction-to-metal-injection-moulding-brochure (accedí 24/ 02/2021).

[9] Braun AR, Radavich JF, Stinner CP. A microstructural and mechanical properties comparison of P/M 718 and P/M TA 718. Superalloys 718 metallurgy and applications; 1989; p. 623–629.

[10] Chang K-M, Nahm AH. Rene 220: 100°F improvement over alloy 718. Superalloys 718 metallurgy and applications; 1989; p. 631–646.

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[11] V. Ramaswamy, P. R. Swann and D. R. F. West, "Observations on intermetallic compound and carbide precipitation in two commercial nickel-base superalloys", Journal of the Less Common Metals, vol. 27 (1), pp. 17-26, 1972.

[12] D.F. Paulonis, J.M. Oblak,and D.S. Duvall, "Precipitation in Nickel-Base Alloy 718", *Transactions of American Society of Metals (ASM)*, vol. 62, pp. 611-22, 1969.

[13] Jambor, Michal, Otakar Bokůvka, František Nový, Libor Trško, and Juraj Belan. 2017. "Phase Transformations in Nickel Base Superalloy INCONEL 718 during Cyclic Loading at High Temperature." Production Engineering Archives 15: 15–18. https://doi.org/10.30657/pea.2017.15.04

[14] Burke, M.K. Miller, "Precipitation in alloy 718: A combined AEM and APFIM investigation", Superalloys 718, 625 and various Derivates, Edited by E. Loria, pp. 337-

350, 1991.

[15] Nickel Based Superalloys, *Bhadeshia university of Cambridge,* 2009. http://www.phase-trans.msm.cam.ac.uk/2003/Superalloys/superalloys.html

[16] G. H. K. Bouse, "Applications of a modified phase diagram to the production of cast

alloy 718 components", *Superalloy 718-Metallurgy and Applications*, Edited by E. Loria,

pp. 69-77, 1989.

[17] A. Bose, J.J. Valencia, J. Spirko, R. Schmees, "Powder injection molding of Inconel 718 alloy", *Advances in Powder Metallurgy and Particulate Materials*, vol. 3, pp. 18-99, 1997.

[18] Cao WD, Kennedy RL. New developments in wrought 718-type superalloys. Acta Metall Sin. 2005;18(1): 39–46.

[19] Azadian S,Wei L-Y,Warren R.Delta phase precipitation in Inconel 718. Mater Charact. 2004;53(1):7 16.

[20]P. D. M. C. G. Traducción y Adaptación:Profesor D. José Manuel Torralba Castelló, «Producción de componentes sinterizados», *Hoganas*, pp. 68-70, 2014.

[21] J. J. Valencia, T. McCabc, K. Hens, J. O. Hansen, y A. Bose, «Microstructure and Mechanical Properties of Inconel 625 and 718 Alloys Processed by Powder Injection Molding», 1994, doi: 10.7449/1994/superalloys_1994_935_945.

[22] << DESCRIPCIÓN DEL *FUNCIONAMIENTO* DE UNA *EXTRUSORA*.>> https://rua.ua.es/dspace/bitstream/10045/16897/1/TEMA_4_extrusion.pdf (accedí 10/ 03/2021).

[23] Pachauri, Praveen, and Md. Hamiuddin. 2015. "Optimization of Injection Moulding Process Parameters in MIM for Impact Toughness of Sintered Parts." Undefined.

[24] Turner, Brian N., Robert Strong, and Scott A. Gold. 2014. "A Review of Melt Extrusion Additive Manufacturing Processes: I. Process Design and Modeling." Rapid Prototyping Journal 20 (3): 192–204. https://doi.org/10.1108/RPJ-01-2013-0012

[25] Wu, G., N. A. Langrana, R. Sadanji, and S. Danforth. 2002. "Solid Freeform Fabrication of Metal Components Using Fused Deposition of Metals." Materials and Design 23 (1): 97–105. https://doi.org/10.1016/s0261-3069(01)00079-6

[26] Zinniel, Robert L., and John S. Batchelder. 2000. "Volumetric feed control for flexible fila- ment". US Patent 6,085,957.

[27] Rane, Kedarnath, Luca Di Landro, and Matteo Strano. 2019. "Processability of SS316L Powder - Binder Mixtures for Vertical Extrusion and Deposition on Table Tests." Powder Technology 345: 553–562. https://doi.org/10.1016/j.powtec.2019.01.010

[28] Wang, Jiwen, Leon L. Shaw, and Thomas B. Cameron. 2006. "Solid Freeform Fabrication of Permanent Dental Restorations via Slurry Micro-Extrusion." Journal of the American Ceramic Society 89 (1): 346–349. https://doi.org/10.1111/j.1551-2916.2005.00672.x

[29] Spoerk, Martin, Florian Arbeiter, Hrvoje Cajner, Janak Sapkota, and Clemens Holzer. 2017. "Parametric Optimization of Intra- and Inter-Layer Strengths in Parts Produced by Extrusion-Based Additive Manufacturing of Poly(Lactic Acid)." Journal of Applied Polymer Science 134 (41): 45401. https://doi.org/10.1002/app.45401

[30] <<How to Use Infill Percentage and Pattern – Enhance Strength, Save Material>> Sep-06-2019 https://bit.ly/30UM1kN (accedí 16/ 03/2021).

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
UPC
Escola d'Enginyeria de Barcelona Est

[31] Slic3r. 2019. "Slic3r Manual – Flow Math." https://bit.ly/2QehwVf (accedí 16/03/2021).

[32] Kvantaliani, Saba, Trabajo final de grado, "Caracterización mecánica y microestructural de piezas de superaleación fabricadas mediante técnicas de manufactura aditiva". http://hdl.handle.net/2117/345923

[33] Huyenh Valérie, Master in Materials Science and Engineering, "3D PRINTING OF INCONEL 718 BY MEAM (METAL EXTRUSION ADDITIVE MANUFACTURING)

[34] Ouradnik, Timothy. 2019. "Manufacturing components and fused of produced deposition modeling (fdm) utilizing metal injection molding (mim) feedstock with a focus on steel alloy 316l" UPCommons.

[35] Royer, Alexandre, Thierry Barrière, and Jean Claude Gelin. 2016. "Development and Characterization of a Metal Injection Molding Bio Sourced Inconel 718 Feedstock Based on Polyhydroxyalkanoates." Metals 6 (4). https://bit.ly/3rctBXD

[36] "Original Prusa I3 MK3S - Prusa3D - 3D Printers from Josef Průša." n.d. Accessed June 13, 2020. https://bit.ly/3c8o5AW (accedido 3/04/2021).

[37] M. G. Molina, "Trabajo de Fin de Grado Grado en Ingeniería Aeroespacial," 2020.

[38] KERN & SOHN GmbH, Balanza de precisión EMB-V https://bit.ly/2Q03tSW (accedido 10/04/2021).

[39] «Ultimate Guide to Etching Specialty Alloys for Microstructural Evaluation». https://bit.ly/3uG6YNn (accedido 10/04/2021).

[40] George Vander Voort, Metals Handbook, Ninth Edition American Society for Metals. 1985.

[41] C. Fredriksson, "Sustainability of metal powder additive manufacturing," in Procedia Manufacturing, 2019, vol. 33, pp. 139–144, doi: 10.1016/j.promfg.2019.04.018.

[42] A. MANONUKUL et al., «Study of Recycled and Virgin Compounded Metal Injection Moulded Feedstock for Stainless Steel 630», J. Solid Mech. Mater. Eng., vol. 1, n.o 4, pp. 411-420, 2007, doi: 10.1299/jmmp.1.411.

Anexo A

A1. G-CODE usado para imprimir Los modelos 1

; generated by PrusaSlicer 2.3.0+win64 on 2021-03-25 at 10:03:40 UTC

; external perimeters extrusion width = 0.80mm
; perimeters extrusion width = 0.80mm
; infill extrusion width = 0.80mm
; solid infill extrusion width = 0.90mm
; top infill extrusion width = 0.80mm
; first layer extrusion width = 0.80mm

M73 P0 R31
P0.8 ; nozzle diameter check
M115 U3.9.1 ; tell printer latest fw version
G90 ; use absolute coordinates
M83 ; extruder relative mode
M104 S210 ; set extruder temp
M140 S90 ; set bed temp
M190 S90 ; wait for bed temp
M109 S210 ; wait for extruder temp

M73 Q1 S31
M73 P1 R31
G92 E0.0

; Don't change E values below. Excessive value can damage the printer.
M907 E430 ; set extruder motor current
G21 ; set units to millimeters
G90 ; use absolute coordinates
M83 ; use relative distances for extrusion
M900 K0.01 ; Filament gcode LA 1.5
; ; Filament gcode LA 1.0
;LAYER_CHANGE
;Z:0.2
;HEIGHT:0.2
;BEFORE_LAYER_CHANGE
G92 E0.0
;0.2

G1 Z0.200 F3600.000
;AFTER_LAYER_CHANGE

M73 Q0 S31
M201 X1000 Y1000 Z1000 E5000 ; sets maximum accelerations, mm/sec^2
M203 X200 Y200 Z12 E120 ; sets maximum feedrates, mm/sec
M204 P1250 R1250 T1250 ; sets acceleration (P, T) and retract acceleration (R), mm/sec^2
M205 X8.00 Y8.00 Z0.40 E1.50 ; sets the jerk limits, mm/sec
;0.2
G1 X29.671 Y27.226
M204 S1000
;TYPE:Skirt
;WIDTH:0.8
G1 F300.000
G1 X30.541 Y26.242 E1.40690
G1 X31.411 Y25.445 E1.26357
G1 X32.404 Y24.707 E1.32518
G1 X33.473 Y24.076 E1.32994
G1 X34.536 Y23.589 E1.25213
G1 X35.782 Y23.168 E1.40818
G1 X36.924 Y22.915 E1.25312
G1 X38.909 Y22.746 E2.13380
G1 X40.880 Y22.914 E2.11870
G1 X42.018 Y23.165 E1.24784
G1 X43.258 Y23.582 E1.40173
G1 X44.337 Y24.075 E1.26980
G1 X45.403 Y24.703 E1.32523
G1 X46.391 Y25.437 E1.31869
G1 X47.270 Y26.240 E1.27492
G1 X48.133 Y27.216 E1.39546
G1 X48.851 Y28.231 E1.33108
G1 X49.465 Y29.332 E1.35080
G1 X49.895 Y30.332 E1.16605
G1 X50.367 Y31.891 E1.74429
G1 X50.563 Y32.976 E1.18030
G1 X50.661 Y34.291 E1.41295
G1 X50.625 Y35.456 E1.24829
G1 X50.458 Y36.686 E1.32899
G1 X50.164 Y37.893 E1.33130
G1 X49.743 Y39.062 E1.33015
G1 X49.195 Y40.192 E1.34544
G1 X48.543 Y41.238 E1.31990
G1 X47.773 Y42.224 E1.34039

M205 S0 T0 ; sets the minimum extruding and travel feed rate, mm/sec
M107

M221 S550

M862.3 P "MK3S" ; printer model check
M862.1

G1 X47.015 Y43.012 E1.17120
G1 X45.756 Y44.054 E1.74942
G1 X44.833 Y44.655 E1.18024
G1 X43.610 Y45.275 E1.46915
G1 X42.575 Y45.673 E1.18675
G1 X41.367 Y45.999 E1.34043
G1 X40.161 Y46.192 E1.30845
G1 X38.905 Y46.260 E1.34665
G1 X37.671 Y46.194 E1.32383
G1 X36.448 Y46.000 E1.32612
G1 X35.240 Y45.673 E1.34038
G1 X34.206 Y45.276 E1.18660
G1 X32.996 Y44.665 E1.45170
G1 X32.058 Y44.055 E1.19798
G1 X30.808 Y43.021 E1.73790
G1 X30.042 Y42.226 E1.18239
G1 X29.271 Y41.240 E1.34054
G1 X28.619 Y40.194 E1.31990
G1 X28.070 Y39.064 E1.34551
G1 X27.650 Y37.896 E1.33015
G1 X27.358 Y36.704 E1.31362
G1 X27.188 Y35.459 E1.34645
G1 X27.152 Y34.289 E1.25349
G1 X27.248 Y32.984 E1.40172
G1 X27.445 Y31.900 E1.18030
G1 X27.918 Y30.330 E1.75571
G1 X28.344 Y29.340 E1.15458
G1 X28.963 Y28.229 E1.36206
G1 X29.602 Y27.324 E1.18617
; printing object Pieza4.STL id:0 copy 0
G1 X33.683 Y30.402 F3600.000
;TYPE:Perimeter
G1 F300.000
G1 X34.148 Y29.870 E0.75712
G1 X34.668 Y29.390 E0.75712

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G1 X35.235 Y28.969 E0.75712

G1 X35.844 Y28.610 E0.75712

G1 X36.488 Y28.318 E0.75712

G1 X37.159 Y28.096 E0.75712

G1 X37.850 Y27.946 E0.75712

G1 X38.556 Y27.871 E0.75998

G1 X39.257 Y27.871 E0.75143

G1 X39.963 Y27.946 E0.75998

G1 X40.654 Y28.096 E0.75712

G1 X41.325 Y28.318 E0.75712

G1 X41.968 Y28.610 E0.75712

G1 X42.578 Y28.969 E0.75712

G1 X43.145 Y29.390 E0.75712

G1 X43.664 Y29.870 E0.75712

G1 X44.130 Y30.402 E0.75712

G1 X44.536 Y30.980 E0.75712

G1 X44.879 Y31.598 E0.75712

G1 X45.154 Y32.250 E0.75712

G1 X45.358 Y32.927 E0.75712

G1 X45.489 Y33.621 E0.75712

M73 P1 R31

M73 Q1 S31

G1 X45.545 Y34.326 E0.75712

G1 X45.526 Y35.032 E0.75712

G1 X45.432 Y35.733 E0.75712

G1 X45.265 Y36.420 E0.75712

G1 X45.025 Y37.085 E0.75712

G1 X44.716 Y37.721 E0.75712

G1 X44.341 Y38.320 E0.75712

G1 X43.904 Y38.876 E0.75712

G1 X43.411 Y39.382 E0.75712

G1 X42.867 Y39.833 E0.75712

G1 X42.278 Y40.224 E0.75712

G1 X41.651 Y40.550 E0.75712

G1 X40.992 Y40.808 E0.75712

G1 X40.310 Y40.994 E0.75712

G1 X39.612 Y41.106 E0.75712

G1 X38.906 Y41.144 E0.75712

G1 X38.200 Y41.106 E0.75712

G1 X37.503 Y40.994 E0.75712

G1 X36.821 Y40.808 E0.75712

G1 X36.162 Y40.550 E0.75712

G1 X35.535 Y40.224 E0.75712

G1 X34.946 Y39.833 E0.75712

G1 X34.402 Y39.382 E0.75712

G1 X33.909 Y38.876 E0.75712

G1 X33.472 Y38.320 E0.75712

G1 X33.097 Y37.721 E0.75712

G1 X32.788 Y37.085 E0.75712

G1 X32.548 Y36.420 E0.75712

G1 X32.380 Y35.733 E0.75712

G1 X32.287 Y35.032 E0.75712

G1 X32.268 Y34.326 E0.75712

G1 X32.324 Y33.621 E0.75712

G1 X32.455 Y32.927 E0.75712

G1 X32.659 Y32.250 E0.75712

G1 X32.934 Y31.598 E0.75712

G1 X33.277 Y30.980 E0.75712

G1 X33.614 Y30.500 E0.62859

G1 X32.994 Y30.065 F3600.000

;TYPE:External perimeter

G1 F300.000

G1 X33.087 Y29.933 E0.17174

G1 X33.605 Y29.341 E0.84356

G1 X34.184 Y28.807 E0.84355

G1 X34.816 Y28.337 E0.84356

G1 X35.495 Y27.937 E0.84355

G1 X36.212 Y27.612 E0.84356

G1 X36.960 Y27.364 E0.84356

G1 X37.729 Y27.198 E0.84356

G1 X38.515 Y27.114 E0.84641

G1 X39.298 Y27.114 E0.83787

G1 X40.083 Y27.198 E0.84641

G1 X40.853 Y27.364 E0.84356

G1 X41.601 Y27.612 E0.84356

G1 X42.318 Y27.937 E0.84356

G1 X42.997 Y28.337 E0.84356

G1 X43.629 Y28.807 E0.84355

G1 X44.208 Y29.341 E0.84355

G1 X44.726 Y29.933 E0.84356

G1 X45.179 Y30.578 E0.84355

G1 X45.561 Y31.267 E0.84356

G1 X45.867 Y31.993 E0.84356

G1 X46.094 Y32.747 E0.84355

G1 X46.240 Y33.521 E0.84355

G1 X46.303 Y34.306 E0.84356

G1 X46.282 Y35.093 E0.84355

G1 X46.177 Y35.874 E0.84355

G1 X45.990 Y36.639 E0.84356

G1 X45.723 Y37.380 E0.84356

G1 X45.379 Y38.088 E0.84356

G1 X44.961 Y38.756 E0.84355

G1 X44.475 Y39.375 E0.84356

G1 X43.925 Y39.939 E0.84355

G1 X43.319 Y40.442 E0.84356

G1 X42.663 Y40.877 E0.84355

G1 X41.964 Y41.241 E0.84356

M73 P1 R30

M73 Q1 S30

G1 X41.230 Y41.527 E0.84356

G1 X40.470 Y41.735 E0.84355

G1 X39.693 Y41.860 E0.84356

G1 X38.906 Y41.902 E0.84355

G1 X38.120 Y41.860 E0.84355

G1 X37.342 Y41.735 E0.84356

G1 X36.582 Y41.527 E0.84355

G1 X35.849 Y41.241 E0.84356

G1 X35.150 Y40.877 E0.84356

G1 X34.494 Y40.442 E0.84355

G1 X33.887 Y39.939 E0.84356

G1 X33.338 Y39.375 E0.84355

G1 X32.852 Y38.756 E0.84356

G1 X32.434 Y38.088 E0.84356

G1 X32.089 Y37.380 E0.84356

G1 X31.822 Y36.639 E0.84355

G1 X31.635 Y35.874 E0.84356

G1 X31.531 Y35.093 E0.84355

G1 X31.510 Y34.306 E0.84355

G1 X31.573 Y33.521 E0.84356

G1 X31.719 Y32.747 E0.84356

G1 X31.946 Y31.993 E0.84355

G1 X32.252 Y31.267 E0.84355

G1 X32.634 Y30.578 E0.84356

G1 X32.925 Y30.163 E0.54328

G1 X33.154 Y30.076 F3600.000

G1 X45.032 Y31.487

;TYPE:Internal infill

G1 F300.000

G1 X43.288 Y29.743 E2.64117

G1 X43.041 Y29.515 E0.36009

G1 X42.488 Y29.104 E0.73861

G1 X41.894 Y28.754 E0.73861

G1 X41.266 Y28.469 E0.73861

G1 X40.677 Y28.274 E0.66404

G1 X45.127 Y32.724 E6.74089

G1 X45.200 Y32.965 E0.26917

G1 X45.328 Y33.643 E0.73860

G1 X45.365 Y34.104 E0.49556

G1 X39.299 Y28.038 E9.18761

M73 P2 R30

M73 Q2 S30

G1 X38.564 Y28.033 E0.78692

G1 X38.191 Y28.073 E0.40184

G1 X45.338 Y35.219 E10.82464

G1 X45.273 Y35.703 E0.52282

G1 X45.156 Y36.180 E0.52601

G1 X37.224 Y28.248 E12.01542

G1 X36.547 Y28.469 E0.76241

G1 X36.379 Y28.545 E0.19771

G1 X44.869 Y37.035 E12.85937

G1 X44.574 Y37.642 E0.72286

G1 X44.481 Y37.790 E0.18664

G1 X35.621 Y28.929 E13.42036

G1 X35.325 Y29.104 E0.36807

G1 X34.940 Y29.390 E0.51422

G1 X44.018 Y38.468 E13.75073

G1 X43.782 Y38.769 E0.40907

G1 X43.483 Y39.076 E0.45899

G1 X34.330 Y29.923 E13.86417

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G1 X33.793 Y30.528 E0.86659
G1 X42.878 Y39.613 E13.76205
M73 P3 R30
M73 Q3 S30
G1 X42.202 Y40.080 E0.87952
G1 X33.334 Y31.211 E13.43293
G1 X33.080 Y31.669 E0.56104
G1 X32.952 Y31.972 E0.35171
G1 X41.439 Y40.459 E12.85473
G1 X40.941 Y40.653 E0.57264
G1 X40.588 Y40.750 E0.39219
G1 X32.657 Y32.819 E12.01292
G1 X32.613 Y32.965 E0.16361
G1 X32.474 Y33.778 E0.88361
G1 X39.634 Y40.938 E10.84504
G1 X38.906 Y40.981 E0.78081
G1 X38.514 Y40.960 E0.42089
G1 X32.445 Y34.891 E9.19261
G1 X32.540 Y35.703 E0.87527
G1 X32.677 Y36.266 E0.62083
G1 X37.137 Y40.726 E6.75512
G1 X36.872 Y40.653 E0.29491
G1 X36.229 Y40.402 E0.73861
G1 X35.617 Y40.084 E0.73861
G1 X35.043 Y39.703 E0.73861
G1 X34.630 Y39.361 E0.57399
G1 X32.791 Y37.522 E2.78515
; stop printing object Pieza4.STL id:0
copy 0
M106 S84.15
;LAYER_CHANGE
;Z:0.3
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0

M221 S300

;0.3

G1 Z0.300 F3600.000
;AFTER_LAYER_CHANGE
;0.3
G1 X28.619 Y40.194
;TYPE:Skirt
G1 F450.000
G1 X28.070 Y39.064 E0.69182
G1 X27.650 Y37.896 E0.68393
G1 X27.358 Y36.704 E0.67543
G1 X27.188 Y35.459 E0.69231
G1 X27.152 Y34.289 E0.64451
G1 X27.248 Y32.984 E0.72073
```

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G1 X27.445 Y31.900 E0.60688
G1 X27.918 Y30.330 E0.90274
G1 X28.344 Y29.340 E0.59366
G1 X28.963 Y28.229 E0.70033
G1 X29.671 Y27.226 E0.67598
G1 X30.541 Y26.242 E0.72339
G1 X31.411 Y25.445 E0.64970
G1 X32.404 Y24.707 E0.68137
G1 X33.473 Y24.076 E0.68382
G1 X34.536 Y23.589 E0.64381
G1 X35.782 Y23.168 E0.72405
G1 X36.924 Y22.915 E0.64432
G1 X38.909 Y22.746 E1.09714
G1 X40.880 Y22.914 E1.08938
G1 X42.018 Y23.165 E0.64161
G1 X43.258 Y23.582 E0.72073
M73 P4 R30
M73 Q4 S30
G1 X44.337 Y24.075 E0.65290
G1 X45.403 Y24.703 E0.68140
G1 X46.391 Y25.437 E0.67804
G1 X47.270 Y26.240 E0.65553
G1 X48.133 Y27.216 E0.71751
G1 X48.851 Y28.231 E0.68441
G1 X49.465 Y29.332 E0.69454
G1 X49.895 Y30.332 E0.59955
G1 X50.367 Y31.891 E0.89687
G1 X50.563 Y32.976 E0.60688
G1 X50.661 Y34.291 E0.72650
G1 X50.625 Y35.456 E0.64184
G1 X50.458 Y36.686 E0.68333
G1 X50.164 Y37.893 E0.68452
G1 X49.743 Y39.062 E0.68393
G1 X49.195 Y40.192 E0.69179
G1 X48.543 Y41.238 E0.67866
G1 X47.773 Y42.224 E0.68919
G1 X47.015 Y43.012 E0.60220
G1 X45.756 Y44.054 E0.89951
G1 X44.833 Y44.655 E0.60685
G1 X43.610 Y45.275 E0.75540
G1 X42.575 Y45.673 E0.61020
G1 X41.367 Y45.999 E0.68921
G1 X40.161 Y46.192 E0.67277
G1 X38.905 Y46.260 E0.69241
G1 X37.671 Y46.194 E0.68068
G1 X36.448 Y46.000 E0.68186
G1 X35.240 Y45.673 E0.68919
G1 X34.206 Y45.276 E0.61012
G1 X32.996 Y44.665 E0.74642
G1 X32.058 Y44.055 E0.61597
G1 X30.808 Y43.021 E0.89358
G1 X30.042 Y42.226 E0.60795
G1 X29.271 Y41.240 E0.68927
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```
G1 X28.682 Y40.296 E0.61257
; printing object Pieza4.STL id:0 copy 0
G1 X33.468 Y30.397 F3600.000
M204 S800
;TYPE:Perimeter
G1 F450.000
G1 X34.020 Y29.745 E0.47075
G1 X34.554 Y29.253 E0.39977
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.558 Y27.691 E0.40791
G1 X38.919 Y27.682 E0.19866
G1 X39.254 Y27.691 E0.18454
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
G1 X42.676 Y28.820 E0.39977
G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
G1 X44.688 Y30.885 E0.39977
G1 X45.039 Y31.520 E0.39977
G1 X45.322 Y32.189 E0.39977
G1 X45.531 Y32.884 E0.39977
G1 X45.666 Y33.597 E0.39977
G1 X45.724 Y34.321 E0.39977
G1 X45.704 Y35.047 E0.39977
G1 X45.608 Y35.766 E0.39977
G1 X45.436 Y36.471 E0.39977
G1 X45.190 Y37.154 E0.39977
G1 X44.872 Y37.807 E0.39977
G1 X44.487 Y38.423 E0.39977
G1 X44.039 Y38.994 E0.39977
G1 X43.532 Y39.514 E0.39977
G1 X42.973 Y39.977 E0.39977
G1 X42.369 Y40.378 E0.39977
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G1 X39.631 Y41.284 E0.39977
G1 X38.906 Y41.322 E0.39977
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G1 X37.465 Y41.168 E0.39977
G1 X36.764 Y40.977 E0.39977
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G1 X35.444 Y40.378 E0.39977
G1 X34.839 Y39.977 E0.39977
G1 X34.280 Y39.514 E0.39977
G1 X33.774 Y38.994 E0.39977
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G1 X32.089 Y34.321 E0.39977
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.507 Y26.913 E0.44823
G1 X39.306 Y26.913 E0.43981
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
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M73 P4 R29
G1 X45.908 Y37.457 E0.44547
M73 Q4 S29
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G1 X44.392 Y38.356 E0.39298
G1 X44.771 Y37.751 E0.39298
G1 X45.083 Y37.109 E0.39298
G1 X45.325 Y36.437 E0.39381
G1 X40.850 Y40.911 E3.48508
G1 X40.323 Y41.055 E0.30076
G1 X39.619 Y41.169 E0.39298
G1 X39.471 Y41.176 E0.08154
G1 X45.586 Y35.062 E4.76209
G1 X45.608 Y34.324 E0.40646
G1 X45.578 Y33.955 E0.20395
G1 X38.356 Y41.177 E5.62476
G1 X38.194 Y41.169 E0.08954
G1 X37.391 Y41.028 E0.44883
G1 X45.433 Y32.986 E6.26314
G1 X45.172 Y32.133 E0.49152
G1 X36.540 Y40.765 E6.72316
G1 X36.136 Y40.607 E0.23862
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G1 X33.896 Y38.953 E7.36492
G1 X33.404 Y38.330 E0.43687
G1 X42.730 Y29.004 E7.26326
G1 X42.612 Y28.916 E0.08095
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G1 X32.985 Y37.635 E7.05234
M73 P6 R29
M73 Q6 S29
G1 X32.730 Y37.109 E0.32166
G1 X32.642 Y36.864 E0.14348
G1 X41.272 Y28.234 E6.72135
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G1 X32.262 Y33.613 E0.17332
G1 X32.394 Y32.912 E0.39298
G1 X32.505 Y32.544 E0.21127
G1 X36.951 Y28.098 E3.46255
G1 X36.465 Y28.259 E0.28167
G1 X35.815 Y28.554 E0.39298
G1 X35.200 Y28.916 E0.39298
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G1 X32.623 Y31.312 E1.21170
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;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;0.4

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;AFTER_LAYER_CHANGE
;0.4

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M204 S800
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G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.558 Y27.691 E0.40771
G1 X38.924 Y27.682 E0.20159
G1 X39.254 Y27.691 E0.18181
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
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G1 X44.039 Y38.994 E0.39977
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G1 X42.369 Y40.378 E0.39977
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G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.507 Y26.913 E0.44817
G1 X39.306 Y26.913 E0.43987
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
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G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
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G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547

G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
G1 X37.300 Y41.930 E0.44547
M73 P7 R29
M73 Q7 S29
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G1 X32.688 Y38.871 E0.44547
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G1 X32.058 Y31.213 E0.42545
G1 X32.465 Y30.471 E0.46588
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M204 S1000
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G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
G1 X45.551 Y33.613 E0.39298
G1 X45.576 Y33.927 E0.17339
G1 X39.481 Y27.831 E4.74703
G1 X39.248 Y27.807 E0.12923
G1 X38.564 Y27.807 E0.37648
G1 X38.363 Y27.828 E0.11108
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
G1 X45.430 Y36.009 E0.14961
G1 X37.400 Y27.979 E6.25349
G1 X37.143 Y28.035 E0.14518
G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
G1 X45.083 Y37.109 E0.14343
G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237

G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
G1 X34.460 Y29.496 E7.36493
G1 X34.103 Y29.826 E0.26765
G1 X33.904 Y30.054 E0.16680
G1 X43.358 Y39.508 E7.36302
G1 X42.904 Y39.884 E0.32451
G1 X42.733 Y39.997 E0.11301
G1 X33.413 Y30.677 E7.25897
M73 P8 R28
M73 Q8 S28
G1 X33.225 Y30.944 E0.18004
G1 X32.992 Y31.370 E0.26722
G1 X42.040 Y40.418 E7.04715
G1 X41.677 Y40.607 E0.22574
G1 X41.273 Y40.765 E0.23867
G1 X32.640 Y32.133 E6.72312
G1 X32.380 Y32.986 E0.49153
G1 X40.422 Y41.028 E6.26308
G1 X39.619 Y41.169 E0.44878
G1 X39.456 Y41.177 E0.08960
G1 X32.234 Y33.955 E5.62468
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
G1 X33.421 Y38.356 E0.39298
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;0.5

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;AFTER_LAYER_CHANGE
;0.5
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M204 S800

;TYPE:Perimeter
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G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.557 Y27.691 E0.40751
G1 X38.929 Y27.682 E0.20452
G1 X39.254 Y27.691 E0.17907
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
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G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
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G1 X45.039 Y31.520 E0.39977
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G1 X45.531 Y32.884 E0.39977
G1 X45.666 Y33.597 E0.39977
G1 X45.724 Y34.321 E0.39977
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G1 X44.872 Y37.807 E0.39977
G1 X44.487 Y38.423 E0.39977
G1 X44.039 Y38.994 E0.39977
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G1 X34.280 Y39.514 E0.39977
G1 X33.774 Y38.994 E0.39977
G1 X33.326 Y38.423 E0.39977
G1 X32.941 Y37.807 E0.39977
G1 X32.623 Y37.154 E0.39977
G1 X32.377 Y36.471 E0.39977

G1 X32.205 Y35.766 E0.39977
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
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G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.507 Y26.913 E0.44810
G1 X39.306 Y26.913 E0.43994
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
M73 P9 R28
M73 Q9 S28
G1 X46.055 Y31.925 E0.44547
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G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547
G1 X38.906 Y42.102 E0.44547

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G1 X38.099 Y42.059 E0.44547          G1 X43.709 Y29.826 E0.16675          G1 X35.136 Y28.820 E0.39977
G1 X37.300 Y41.930 E0.44547          G1 X43.352 Y29.496 E0.26770          G1 X35.762 Y28.451 E0.39977
G1 X36.520 Y41.718 E0.44547          G1 X33.896 Y38.953 E7.36492          G1 X36.423 Y28.151 E0.39977
G1 X35.766 Y41.423 E0.44547          M73 P10 R28                          G1 X37.112 Y27.923 E0.39977
G1 X35.048 Y41.050 E0.44547          M73 Q10 S28                          G1 X37.822 Y27.770 E0.39977
G1 X34.374 Y40.603 E0.44547          G1 X33.404 Y38.330 E0.43687          G1 X38.557 Y27.691 E0.40732
G1 X33.752 Y40.086 E0.44547          G1 X42.730 Y29.004 E7.26326          G1 X38.934 Y27.682 E0.20745
G1 X33.187 Y39.507 E0.44547          G1 X42.612 Y28.916 E0.08095          G1 X39.254 Y27.691 E0.17633
G1 X32.688 Y38.871 E0.44547          G1 X42.041 Y28.579 E0.36541          G1 X39.991 Y27.770 E0.40843
G1 X32.259 Y38.185 E0.44547          G1 X32.985 Y37.635 E7.05234          G1 X40.701 Y27.923 E0.39977
G1 X31.905 Y37.457 E0.44547          G1 X32.730 Y37.109 E0.32166          G1 X41.390 Y28.151 E0.39977
G1 X31.631 Y36.697 E0.44547          G1 X32.642 Y36.864 E0.14348          G1 X42.051 Y28.451 E0.39977
G1 X31.439 Y35.911 E0.44547          G1 X41.272 Y28.234 E6.72135          G1 X42.676 Y28.820 E0.39977
G1 X31.331 Y35.109 E0.44547          G1 X40.670 Y28.035 E0.34898          G1 X43.259 Y29.253 E0.39977
G1 X31.310 Y34.300 E0.44547          G1 X40.412 Y27.979 E0.14523          G1 X43.792 Y29.745 E0.39977
G1 X31.374 Y33.494 E0.44547          G1 X32.383 Y36.009 E6.25343          G1 X44.270 Y30.291 E0.39977
G1 X31.524 Y32.699 E0.44547          G1 X32.319 Y35.745 E0.14955          G1 X44.688 Y30.885 E0.39977
G1 X31.758 Y31.925 E0.44547          G1 X32.226 Y35.052 E0.38510          G1 X45.039 Y31.520 E0.39977
G1 X32.054 Y31.222 E0.41972          G1 X39.449 Y27.828 E5.62582          G1 X45.322 Y32.189 E0.39977
G1 X32.465 Y30.471 E0.47171          G1 X39.248 Y27.807 E0.11174          G1 X45.531 Y32.884 E0.39977
G1 X32.762 Y30.048 E0.28459          G1 X38.564 Y27.807 E0.37668          G1 X45.666 Y33.597 E0.39977
G1 X33.001 Y29.961 F3600.000         G1 X38.332 Y27.831 E0.12840          G1 X45.724 Y34.321 E0.39977
G1 X42.087 Y40.789                   G1 X32.237 Y33.927 E4.74692          G1 X45.704 Y35.047 E0.39977
M204 S1000                           G1 X32.262 Y33.613 E0.17332          G1 X45.608 Y35.766 E0.39977
;TYPE:Internal infill                G1 X32.394 Y32.912 E0.39298          G1 X45.436 Y36.471 E0.39977
G1 F450.000                          G1 X32.505 Y32.544 E0.21127          G1 X45.190 Y37.154 E0.39977
G1 X43.952 Y38.917 E1.45501          G1 X36.951 Y28.098 E3.46255          G1 X44.872 Y37.807 E0.39977
G1 X44.392 Y38.356 E0.39298          G1 X36.465 Y28.259 E0.28167          G1 X44.487 Y38.423 E0.39977
G1 X44.771 Y37.751 E0.39298          G1 X35.815 Y28.554 E0.39298          G1 X44.039 Y38.994 E0.39977
G1 X45.083 Y37.109 E0.39298          G1 X35.200 Y28.916 E0.39298          G1 X43.532 Y39.514 E0.39977
G1 X45.325 Y36.437 E0.39381          G1 X34.628 Y29.342 E0.39298          G1 X42.973 Y39.977 E0.39977
G1 X40.850 Y40.911 E3.48508          G1 X34.179 Y29.756 E0.33641          G1 X42.369 Y40.378 E0.39977
G1 X40.323 Y41.055 E0.30076          G1 X32.627 Y31.308 E1.20844          G1 X41.724 Y40.713 E0.39977
G1 X39.619 Y41.169 E0.39298          ; stop printing object Pieza4.STL id:0   G1 X41.048 Y40.977 E0.39977
G1 X39.471 Y41.176 E0.08154          copy 0                               G1 X40.348 Y41.168 E0.39977
G1 X45.586 Y35.062 E4.76209          ;LAYER_CHANGE                        G1 X39.685 Y41.275 E0.36976
G1 X45.608 Y34.324 E0.40646          ;Z:0.6                               G1 X38.902 Y41.322 E0.43184
G1 X45.578 Y33.955 E0.20395          ;HEIGHT:0.1                          G1 X38.181 Y41.284 E0.39755
G1 X38.356 Y41.177 E5.62476          ;BEFORE_LAYER_CHANGE                 G1 X37.465 Y41.168 E0.39977
G1 X38.194 Y41.169 E0.08954          G92 E0.0                             G1 X36.764 Y40.977 E0.39977
G1 X37.391 Y41.028 E0.44883          ;0.6                                 G1 X36.088 Y40.713 E0.39977
G1 X45.433 Y32.986 E6.26314                                               G1 X35.444 Y40.378 E0.39977
G1 X45.172 Y32.133 E0.49152                                               G1 X34.839 Y39.977 E0.39977
G1 X36.540 Y40.765 E6.72316          G1 Z0.600 F3600.000                  G1 X34.280 Y39.514 E0.39977
G1 X36.136 Y40.607 E0.23862          ;AFTER_LAYER_CHANGE                  G1 X33.774 Y38.994 E0.39977
G1 X35.772 Y40.418 E0.22578          ;0.6                                 G1 X33.326 Y38.423 E0.39977
G1 X44.823 Y31.368 E7.04859          ; printing object Pieza4.STL id:0 copy 0   G1 X32.941 Y37.807 E0.39977
G1 X44.590 Y30.947 E0.26520          G1 X33.468 Y30.397                   G1 X32.623 Y37.154 E0.39977
G1 X44.400 Y30.677 E0.18168          M204 S800                            G1 X32.377 Y36.471 E0.39977
G1 X35.079 Y39.997 E7.25899          ;TYPE:Perimeter                      G1 X32.205 Y35.766 E0.39977
G1 X34.908 Y39.884 E0.11297          G1 F450.000                          G1 X32.108 Y35.047 E0.39977
G1 X34.455 Y39.508 E0.32455          G1 X34.020 Y29.745 E0.47075          G1 X32.089 Y34.321 E0.39977
G1 X43.909 Y30.054 E7.36302          G1 X34.554 Y29.253 E0.39977          G1 X32.147 Y33.597 E0.39977
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G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977
G1 X32.752 Y31.570 E0.36976
G1 X33.127 Y30.882 E0.43184
M73 P11 R28
M73 Q11 S28
G1 X33.399 Y30.495 E0.26014
G1 X32.831 Y29.950 F3600.000
;TYPE:External perimeter
G1 F450.000
G1 X32.929 Y29.810 E0.09418
G1 X33.462 Y29.201 E0.44547
G1 X34.056 Y28.652 E0.44547
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.507 Y26.913 E0.44803
G1 X39.306 Y26.913 E0.44001
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.771 Y42.050 E0.41399
G1 X38.905 Y42.102 E0.47754
G1 X38.099 Y42.059 E0.44472
G1 X37.300 Y41.930 E0.44547
G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
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M73 P11 R27
G1 X35.048 Y41.050 E0.44547
M73 Q11 S27
G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
G1 X32.688 Y38.871 E0.44547
G1 X32.259 Y38.185 E0.44547
G1 X31.905 Y37.457 E0.44547
G1 X31.631 Y36.697 E0.44547
G1 X31.439 Y35.911 E0.44547
G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
G1 X31.374 Y33.494 E0.44547
G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.050 Y31.232 E0.41399
G1 X32.465 Y30.471 E0.47754
G1 X32.762 Y30.048 E0.28446
G1 X33.001 Y29.961 F3600.000
G1 X45.196 Y31.318
M204 S1000
;TYPE:Internal infill
G1 F450.000
G1 X43.632 Y29.755 E1.21738
G1 X43.185 Y29.342 E0.33527
G1 X42.612 Y28.916 E0.39298
G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
G1 X45.551 Y33.613 E0.39298
G1 X45.576 Y33.927 E0.17339
G1 X39.481 Y27.831 E4.74703
G1 X39.248 Y27.807 E0.12923
G1 X38.563 Y27.807 E0.37687
G1 X38.363 Y27.828 E0.11070
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
G1 X45.430 Y36.009 E0.14961
G1 X37.400 Y27.979 E6.25349
G1 X37.143 Y28.035 E0.14518
G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
G1 X45.083 Y37.109 E0.14343
G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237
G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
G1 X34.460 Y29.496 E7.36493
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M73 P12 R27
M73 Q12 S27
G1 X34.103 Y29.826 E0.26765
G1 X33.904 Y30.054 E0.16680
G1 X43.358 Y39.508 E7.36302
G1 X42.904 Y39.884 E0.32451
G1 X42.733 Y39.997 E0.11301
G1 X33.413 Y30.677 E7.25897
G1 X33.226 Y30.943 E0.17919
G1 X32.993 Y31.371 E0.26828
G1 X42.040 Y40.418 E7.04639
G1 X41.677 Y40.607 E0.22574
G1 X41.273 Y40.765 E0.23867
G1 X32.640 Y32.133 E6.72312
G1 X32.380 Y32.986 E0.49153
G1 X40.422 Y41.028 E6.26308
G1 X39.672 Y41.160 E0.41899
G1 X39.452 Y41.173 E0.12133
G1 X32.234 Y33.955 E5.62154
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
G1 X33.421 Y38.356 E0.39298
G1 X33.861 Y38.917 E0.39298
G1 X35.726 Y40.789 E1.45487
; stop printing object Pieza4.STL id:0
copy 0
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;Z:0.7
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;0.7


G1 Z0.700 F3600.000
;AFTER_LAYER_CHANGE
;0.7
; printing object Pieza4.STL id:0 copy 0
G1 X33.468 Y30.397
M204 S800
;TYPE:Perimeter
G1 F450.000
G1 X34.024 Y29.742 E0.47334
G1 X34.554 Y29.253 E0.39717
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
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G1 X36.423 Y28.151 E0.39977        G1 X37.465 Y41.168 E0.39977        G1 X44.351 Y29.201 E0.44547
G1 X37.112 Y27.923 E0.39977        G1 X36.764 Y40.977 E0.39977        G1 X44.884 Y29.810 E0.44547
G1 X37.822 Y27.770 E0.39977        G1 X36.088 Y40.713 E0.39977        G1 X45.349 Y30.472 E0.44547
G1 X38.557 Y27.691 E0.40713        G1 X35.444 Y40.378 E0.39977        G1 X45.741 Y31.179 E0.44547
G1 X38.939 Y27.682 E0.21037        G1 X34.839 Y39.977 E0.39977        G1 X46.055 Y31.925 E0.44547
G1 X39.254 Y27.691 E0.17358        G1 X34.280 Y39.514 E0.39977        G1 X46.289 Y32.699 E0.44547
G1 X39.991 Y27.770 E0.40843        G1 X33.774 Y38.994 E0.39977        G1 X46.439 Y33.494 E0.44547
G1 X40.701 Y27.923 E0.39977        G1 X33.326 Y38.423 E0.39977        G1 X46.503 Y34.300 E0.44547
G1 X41.390 Y28.151 E0.39977        G1 X32.941 Y37.807 E0.39977        G1 X46.482 Y35.109 E0.44547
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G1 X42.676 Y28.820 E0.39977        G1 X32.377 Y36.471 E0.39977        G1 X46.182 Y36.697 E0.44547
G1 X43.259 Y29.253 E0.39977        G1 X32.205 Y35.766 E0.39977        G1 X45.908 Y37.457 E0.44547
G1 X43.792 Y29.745 E0.39977        G1 X32.108 Y35.047 E0.39977        G1 X45.554 Y38.185 E0.44547
G1 X44.270 Y30.291 E0.39977        G1 X32.089 Y34.321 E0.39977        G1 X45.125 Y38.871 E0.44547
G1 X44.688 Y30.885 E0.39977        G1 X32.147 Y33.597 E0.39977        G1 X44.625 Y39.507 E0.44547
G1 X45.039 Y31.520 E0.39977        G1 X32.281 Y32.884 E0.39977        G1 X44.061 Y40.086 E0.44547
G1 X45.322 Y32.189 E0.39977        G1 X32.491 Y32.189 E0.39977        G1 X43.438 Y40.603 E0.44547
G1 X45.531 Y32.884 E0.39977        G1 X32.773 Y31.520 E0.39977        G1 X42.764 Y41.050 E0.44547
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G1 X45.724 Y34.321 E0.39977        G1 X33.399 Y30.495 E0.26236        G1 X41.293 Y41.718 E0.44547
G1 X45.704 Y35.047 E0.39977        G1 X32.831 Y29.950 F3600.000        G1 X40.513 Y41.930 E0.44547
G1 X45.608 Y35.766 E0.39977        ;TYPE:External perimeter            G1 X39.781 Y42.048 E0.40825
G1 X45.436 Y36.471 E0.39977        G1 F450.000                        G1 X38.905 Y42.102 E0.48338
G1 X45.190 Y37.154 E0.39977        G1 X33.463 Y29.200 E0.54009        G1 X38.099 Y42.059 E0.44459
G1 X44.872 Y37.807 E0.39977        G1 X34.056 Y28.652 E0.44459        G1 X37.300 Y41.930 E0.44547
G1 X44.487 Y38.423 E0.39977        G1 X34.705 Y28.170 E0.44547        G1 X36.520 Y41.718 E0.44547
G1 X44.039 Y38.994 E0.39977        G1 X35.402 Y27.759 E0.44547        G1 X35.766 Y41.423 E0.44547
G1 X43.532 Y39.514 E0.39977        G1 X36.139 Y27.425 E0.44547        G1 X35.048 Y41.050 E0.44547
G1 X42.973 Y39.977 E0.39977        G1 X36.907 Y27.171 E0.44547        G1 X34.374 Y40.603 E0.44547
G1 X42.369 Y40.378 E0.39977        G1 X37.698 Y27.000 E0.44547        G1 X33.752 Y40.086 E0.44547
G1 X41.724 Y40.713 E0.39977        G1 X38.506 Y26.913 E0.44797        G1 X33.187 Y39.507 E0.44547
M73 P13 R27                        G1 X39.306 Y26.913 E0.44007        G1 X32.688 Y38.871 E0.44547
M73 Q13 S27                        G1 X40.115 Y27.000 E0.44841        G1 X32.259 Y38.185 E0.44547
G1 X41.048 Y40.977 E0.39977        G1 X40.906 Y27.171 E0.44547        G1 X31.905 Y37.457 E0.44547
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G1 X38.902 Y41.322 E0.43767        G1 X43.107 Y28.170 E0.44547        G1 X31.331 Y35.109 E0.44547
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34.300 E0.44547                    G1 X45.083 Y37.109 E0.39298        G1 X36.136 Y40.607 E0.23864
G1 X31.374 Y33.494 E0.44547        G1 X45.325 Y36.437 E0.39380        G1 X35.772 Y40.418 E0.22575
G1 X31.524 Y32.699 E0.44547        G1 X40.850 Y40.911 E3.48506        G1 X44.823 Y31.368 E7.04857
G1 X31.758 Y31.925 E0.44547        G1 X40.323 Y41.055 E0.30077        M73 P14 R27
G1 X32.072 Y31.179 E0.44547        G1 X39.682 Y41.158 E0.35773        M73 Q14 S27
G1 X32.464 Y30.472 E0.44547        G1 X39.477 Y41.171 E0.11341        G1 X44.590 Y30.947 E0.26523
G1 X32.762 Y30.048 E0.28521        G1 X45.586 Y35.062 E4.75782        G1 X44.400 Y30.677 E0.18165
G1 X33.624 Y30.052 F3600.000       G1 X45.608 Y34.324 E0.40647        G1 X35.079 Y39.997 E7.25897
G1 X42.087 Y40.789                 G1 X45.578 Y33.955 E0.20393        G1 X34.908 Y39.884 E0.11300
M204 S1000                         G1 X38.356 Y41.177 E5.62473        G1 X34.455 Y39.508 E0.32451
;TYPE:Internal infill              G1 X38.194 Y41.169 E0.08956        G1 X43.909 Y30.054 E7.36302
G1 F450.000                        G1 X37.391 Y41.028 E0.44881        G1 X43.709 Y29.826 E0.16679
G1 X43.952 Y38.917 E1.45500        G1 X45.433 Y32.986 E6.26312        G1 X43.352 Y29.496 E0.26766
G1 X44.392 Y38.356 E0.39298        G1 X45.172 Y32.133 E0.49152        G1 X33.896 Y38.953 E7.36493
G1 X44.771 Y37.751 E0.39298        G1 X36.540 Y40.765 E6.72314        G1 X33.404 Y38.330 E0.43687
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G1 X42.730 Y29.004 E7.26328
G1 X42.612 Y28.916 E0.08100
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M73 P14 R26
M73 Q14 S26
G1 X32.730 Y37.109 E0.32171
G1 X32.642 Y36.864 E0.14342
G1 X41.272 Y28.234 E6.72140
G1 X40.670 Y28.035 E0.34904
G1 X40.413 Y27.979 E0.14516
G1 X32.383 Y36.009 E6.25351
G1 X32.319 Y35.745 E0.14962
G1 X32.226 Y35.052 E0.38502
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G1 X32.262 Y33.613 E0.17343
G1 X32.394 Y32.912 E0.39298
G1 X32.505 Y32.545 E0.21111
G1 X36.951 Y28.098 E3.46283
G1 X36.465 Y28.259 E0.28184
G1 X35.815 Y28.554 E0.39298
G1 X35.200 Y28.916 E0.39298
G1 X34.628 Y29.342 E0.39298
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G1 X32.617 Y31.318 E1.21829
; stop printing object Pieza4.STL id:0
copy 0
;LAYER_CHANGE
;Z:0.8
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;0.8


G1 Z0.800 F3600.000
;AFTER_LAYER_CHANGE
;0.8
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M204 S800
;TYPE:Perimeter
G1 F450.000
G1 X34.020 Y29.745 E0.47075
G1 X34.554 Y29.253 E0.39977
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977

G1 X37.822 Y27.770 E0.39977
G1 X38.556 Y27.691 E0.40695
G1 X38.944 Y27.683 E0.21330
G1 X39.254 Y27.691 E0.17084
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
M73 P15 R26
M73 Q15 S26
G1 X41.390 Y28.151 E0.39977
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G1 X42.676 Y28.820 E0.39977
G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
G1 X44.688 Y30.885 E0.39977
G1 X45.039 Y31.520 E0.39977
G1 X45.322 Y32.189 E0.39977
G1 X45.531 Y32.884 E0.39977
G1 X45.666 Y33.597 E0.39977
G1 X45.724 Y34.321 E0.39977
G1 X45.704 Y35.047 E0.39977
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G1 X45.436 Y36.471 E0.39977
G1 X45.190 Y37.154 E0.39977
G1 X44.872 Y37.807 E0.39977
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G1 X36.764 Y40.977 E0.39977
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G1 X33.323 Y38.418 E0.44351
G1 X32.941 Y37.807 E0.39681
G1 X32.623 Y37.154 E0.39977
G1 X32.377 Y36.471 E0.39977
G1 X32.205 Y35.766 E0.39977
G1 X32.108 Y35.047 E0.39977
G1 X32.089 Y34.321 E0.39977
G1 X32.147 Y33.597 E0.39977
G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977

G1 X32.773 Y31.520 E0.39977
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.506 Y26.913 E0.44791
G1 X39.306 Y26.913 E0.44013
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
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G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
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G1 X39.714 Y42.059 E0.44547
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
G1 X37.300 Y41.930 E0.44547
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G1 X35.766 Y41.423 E0.44547
G1 X35.048 Y41.050 E0.44547
G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.242 Y39.563 E0.40252
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G1 X31.905 Y37.457 E0.44547
G1 X31.631 Y36.697 E0.44547
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G1 X31.331 Y35.109 E0.44547
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G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
G1 X45.551 Y33.613 E0.39298
G1 X45.576 Y33.927 E0.17339
G1 X39.481 Y27.831 E4.74703
G1 X39.248 Y27.807 E0.12923
G1 X38.563 Y27.807 E0.37723
G1 X38.363 Y27.828 E0.11033
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
G1 X45.430 Y36.009 E0.14961
G1 X37.400 Y27.979 E6.25349
G1 X37.143 Y28.035 E0.14518
G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
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M73 Q16 S26
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G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237
G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
G1 X34.460 Y29.496 E7.36493
G1 X34.103 Y29.826 E0.26765
G1 X33.904 Y30.054 E0.16680
G1 X43.358 Y39.508 E7.36301
G1 X42.904 Y39.884 E0.32451
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G1 X42.040 Y40.418 E7.04856
G1 X41.677 Y40.607 E0.22574
G1 X41.273 Y40.765 E0.23867
G1 X32.640 Y32.133 E6.72312
G1 X32.380 Y32.986 E0.49153
G1 X40.422 Y41.028 E6.26308
G1 X39.619 Y41.169 E0.44878
G1 X39.456 Y41.177 E0.08960
G1 X32.234 Y33.955 E5.62468
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
M73 P17 R26
M73 Q17 S26
G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
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G1 X33.913 Y38.970 E0.43671
G1 X35.726 Y40.789 E1.41416
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;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
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;0.9


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;AFTER_LAYER_CHANGE
;0.9
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M204 S800
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G1 X34.020 Y29.745 E0.47075
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G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.556 Y27.691 E0.40677
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G1 X38.949 Y27.683 E0.21623
G1 X39.254 Y27.691 E0.16808
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
G1 X42.676 Y28.820 E0.39977
G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
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G1 X45.724 Y34.327 E0.44934
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G1 X45.608 Y35.766 E0.39977
G1 X45.436 Y36.471 E0.39977
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G1 X44.039 Y38.994 E0.39977
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G1 X32.108 Y35.047 E0.39977
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G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977
G1 X32.740 Y31.598 E0.35327
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G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.506 Y26.914 E0.44785
G1 X39.306 Y26.913 E0.44019
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
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G1 X46.289 Y32.699 E0.44547
G1 X46.422 Y33.407 E0.39678
G1 X46.503 Y34.302 E0.49504
G1 X46.482 Y35.109 E0.44435
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
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G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
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G1 X43.438 Y40.603 E0.44547
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G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547
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G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
G1 X32.688 Y38.871 E0.44547
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G1 X31.905 Y37.457 E0.44547
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G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.038 Y31.261 E0.39678
M73 P17 R25
M73 Q17 S25
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G1 X45.083 Y37.109 E0.39298
G1 X45.325 Y36.437 E0.39381
G1 X40.850 Y40.911 E3.48508
G1 X40.323 Y41.055 E0.30076
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G1 X39.471 Y41.176 E0.08154
G1 X45.586 Y35.062 E4.76209
G1 X45.608 Y34.331 E0.40281
G1 X45.574 Y33.959 E0.20547
G1 X38.356 Y41.177 E5.62149
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G1 X37.391 Y41.028 E0.44883
G1 X45.433 Y32.986 E6.26314
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M73 Q18 S25
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G1 X44.400 Y30.677 E0.18168
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G1 X34.908 Y39.884 E0.11297
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G1 X33.896 Y38.953 E7.36492
G1 X33.404 Y38.330 E0.43687
G1 X42.730 Y29.004 E7.26326
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G1 X32.383 Y36.009 E6.25343
G1 X32.319 Y35.745 E0.14955
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G1 X39.449 Y27.828 E5.62582
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M73 Q19 S25
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G1 X32.394 Y32.912 E0.39298
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G1 X36.465 Y28.259 E0.28167
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G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
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G1 X39.254 Y27.691 E0.16532
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G1 X39.991 Y27.770 E0.40843
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G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
G1 X45.551 Y33.613 E0.39298
G1 X45.576 Y33.927 E0.17339
G1 X39.481 Y27.831 E4.74703
M73 P20 R25
M73 Q20 S25
G1 X39.248 Y27.807 E0.12922
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G1 X38.363 Y27.828 E0.10998
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
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G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
G1 X45.083 Y37.109 E0.14343
G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237
G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
G1 X34.460 Y29.496 E7.36493
G1 X34.103 Y29.826 E0.26765
G1 X33.904 Y30.054 E0.16680
G1 X43.358 Y39.508 E7.36302
G1 X42.904 Y39.884 E0.32451
G1 X42.733 Y39.997 E0.11301
G1 X33.413 Y30.677 E7.25897
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G1 X32.380 Y32.986 E0.49153
G1 X40.422 Y41.028 E6.26308
M73 P21 R24
M73 Q21 S24
G1 X39.619 Y41.169 E0.44878
G1 X39.456 Y41.177 E0.08960
G1 X32.234 Y33.955 E5.62468
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
G1 X33.421 Y38.356 E0.39298
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G1 X35.726 Y40.789 E1.45487
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;Z:1.1
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;1.1


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;AFTER_LAYER_CHANGE
;1.1
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M204 S800
;TYPE:Perimeter
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G1 X34.554 Y29.253 E0.39977
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.555 Y27.691 E0.40642
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G1 X44.872 Y37.807 E0.39977
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G1 X42.369 Y40.378 E0.39977
G1 X41.724 Y40.713 E0.39977
G1 X41.048 Y40.977 E0.39977
G1 X40.348 Y41.168 E0.39977
G1 X39.631 Y41.284 E0.39977
G1 X38.906 Y41.322 E0.39977
G1 X38.181 Y41.284 E0.39977
G1 X37.465 Y41.168 E0.39977
G1 X36.764 Y40.977 E0.39977
G1 X36.088 Y40.713 E0.39977
G1 X35.444 Y40.378 E0.39977
G1 X34.839 Y39.977 E0.39977
G1 X34.280 Y39.514 E0.39977
G1 X33.774 Y38.994 E0.39977
G1 X33.326 Y38.423 E0.39977
G1 X32.941 Y37.807 E0.39977
G1 X32.623 Y37.154 E0.39977
G1 X32.377 Y36.471 E0.39977
G1 X32.205 Y35.766 E0.39977
G1 X32.108 Y35.047 E0.39977
G1 X32.089 Y34.321 E0.39977
G1 X32.147 Y33.597 E0.39977
G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977
G1 X32.733 Y31.617 E0.34224
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;TYPE:External perimeter
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G1 X35.402 Y27.759 E0.44547
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G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.506 Y26.914 E0.44773
G1 X39.306 Y26.913 E0.44031
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
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G1 X46.374 Y35.911 E0.44547
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G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
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G1 X44.392 Y38.356 E0.39298
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M73 Q22 S24
G1 X44.771 Y37.751 E0.39298
G1 X45.083 Y37.109 E0.39298
G1 X45.325 Y36.437 E0.39381
G1 X40.850 Y40.911 E3.48508
G1 X40.323 Y41.055 E0.30076
G1 X39.619 Y41.169 E0.39298
G1 X39.471 Y41.176 E0.08154
G1 X45.586 Y35.062 E4.76209
G1 X45.608 Y34.324 E0.40646
G1 X45.578 Y33.955 E0.20395
G1 X38.356 Y41.177 E5.62476
G1 X38.194 Y41.169 E0.08954
G1 X37.391 Y41.028 E0.44883
G1 X45.433 Y32.986 E6.26314
G1 X45.172 Y32.133 E0.49152
G1 X36.540 Y40.765 E6.72316
G1 X36.136 Y40.607 E0.23862
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G1 X35.079 Y39.997 E7.25899
G1 X34.908 Y39.884 E0.11297
G1 X34.455 Y39.508 E0.32455
G1 X43.909 Y30.054 E7.36302
G1 X43.709 Y29.826 E0.16675
G1 X43.352 Y29.496 E0.26770
G1 X33.896 Y38.953 E7.36492
G1 X33.404 Y38.330 E0.43687
G1 X42.730 Y29.004 E7.26326
G1 X42.612 Y28.916 E0.08095
G1 X42.041 Y28.579 E0.36541
G1 X32.985 Y37.635 E7.05234
M73 P23 R24
M73 Q23 S24
G1 X32.730 Y37.109 E0.32166
G1 X32.642 Y36.864 E0.14348
G1 X41.272 Y28.234 E6.72135
G1 X40.670 Y28.035 E0.34898

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G1 X32.383 Y36.009 E6.25343
G1 X32.319 Y35.745 E0.14955
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G1 X39.449 Y27.828 E5.62581
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G1 X32.262 Y33.613 E0.17332
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G1 X32.505 Y32.544 E0.21127
G1 X36.951 Y28.098 E3.46255
G1 X36.465 Y28.259 E0.28167
G1 X35.815 Y28.554 E0.39298
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;BEFORE_LAYER_CHANGE
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;1.2


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;AFTER_LAYER_CHANGE
;1.2
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M204 S800
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G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
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G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
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G1 X43.259 Y29.253 E0.39977

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G1 X44.039 Y38.994 E0.39977
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
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G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
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G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
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G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
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M73 P24 R24
M73 Q24 S24
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G1 X31.904 Y37.455 E0.51255
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G1 X31.439 Y35.911 E0.44547
G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
G1 X31.374 Y33.494 E0.44547
G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547

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G1 X33.001 Y29.961 F3600.000
G1 X45.196 Y31.318
M204 S1000
;TYPE:Internal infill
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G1 X43.185 Y29.342 E0.33527
G1 X42.612 Y28.916 E0.39298
G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
M73 P24 R23
M73 Q24 S23
G1 X45.419 Y32.912 E0.21117
G1 X45.530 Y33.501 E0.33034
G1 X45.569 Y33.920 E0.23151
G1 X39.481 Y27.831 E4.74154
G1 X39.248 Y27.807 E0.12922
G1 X38.561 Y27.807 E0.37792
G1 X38.363 Y27.828 E0.10965
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
G1 X45.430 Y36.009 E0.14961
G1 X37.400 Y27.979 E6.25349
G1 X37.143 Y28.035 E0.14518
G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
G1 X45.083 Y37.109 E0.14343
G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237
G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
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G1 X33.904 Y30.054 E0.16680
G1 X43.358 Y39.508 E7.36301
G1 X42.904 Y39.884 E0.32451
G1 X42.733 Y39.997 E0.11301
G1 X33.413 Y30.677 E7.25897
M73 P25 R23
M73 Q25 S23
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G1 X32.990 Y31.368 E0.26524
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G1 X41.677 Y40.607 E0.22574
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G1 X39.456 Y41.177 E0.08960
G1 X32.234 Y33.955 E5.62468
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
G1 X32.727 Y37.101 E0.38895
G1 X33.102 Y37.847 E0.46005
G1 X33.421 Y38.356 E0.33034
G1 X33.861 Y38.917 E0.39298
G1 X35.726 Y40.789 E1.45487
; stop printing object Pieza4.STL id:0
copy 0
;LAYER_CHANGE
;Z:1.3
;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
G92 E0.0
;1.3


G1 Z1.300 F3600.000
;AFTER_LAYER_CHANGE
;1.3
; printing object Pieza4.STL id:0 copy 0
G1 X33.468 Y30.397
M204 S800
;TYPE:Perimeter
G1 F450.000
G1 X34.027 Y29.739 E0.47540
G1 X34.554 Y29.253 E0.39509
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.555 Y27.691 E0.40609
G1 X38.969 Y27.683 E0.22795
G1 X39.254 Y27.691 E0.15703
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
G1 X42.676 Y28.820 E0.39977
G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
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G1 X44.688 Y30.885 E0.39977
G1 X45.039 Y31.520 E0.39977
G1 X45.322 Y32.189 E0.39977
G1 X45.531 Y32.884 E0.39977
G1 X45.666 Y33.597 E0.39977
G1 X45.724 Y34.321 E0.39977
G1 X45.704 Y35.047 E0.39977
G1 X45.608 Y35.766 E0.39977
G1 X45.436 Y36.471 E0.39977
G1 X45.190 Y37.154 E0.39977
G1 X44.872 Y37.807 E0.39977
G1 X44.487 Y38.423 E0.39977
G1 X44.039 Y38.994 E0.39977
G1 X43.532 Y39.514 E0.39977
G1 X42.973 Y39.977 E0.39977
G1 X42.369 Y40.378 E0.39977
G1 X41.724 Y40.713 E0.39977
G1 X41.048 Y40.977 E0.39977
G1 X40.348 Y41.168 E0.39977
G1 X39.754 Y41.264 E0.33117
G1 X38.898 Y41.322 E0.47268
G1 X38.181 Y41.284 E0.39509
G1 X37.465 Y41.168 E0.39977
G1 X36.764 Y40.977 E0.39977
G1 X36.088 Y40.713 E0.39977
G1 X35.444 Y40.378 E0.39977
G1 X34.839 Y39.977 E0.39977
G1 X34.280 Y39.514 E0.39977
G1 X33.774 Y38.994 E0.39977
G1 X33.326 Y38.423 E0.39977
G1 X32.941 Y37.807 E0.39977
G1 X32.623 Y37.154 E0.39977
G1 X32.377 Y36.471 E0.39977
G1 X32.205 Y35.766 E0.39977
G1 X32.108 Y35.047 E0.39977
G1 X32.089 Y34.321 E0.39977
G1 X32.147 Y33.597 E0.39977
G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977
G1 X32.773 Y31.520 E0.39977
G1 X33.125 Y30.885 E0.39977
G1 X33.399 Y30.495 E0.26236
G1 X32.831 Y29.950 F3600.000
;TYPE:External perimeter
G1 F450.000
G1 X33.464 Y29.199 E0.54079
G1 X34.056 Y28.652 E0.44389
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.506 Y26.914 E0.44762

G1 X39.306 Y26.913 E0.44042
G1 X40.115 Y27.000 E0.44841
G1 X40.906 Y27.171 E0.44547
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
M73 P26 R23
M73 Q26 S23
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.843 Y42.038 E0.37379
G1 X38.903 Y42.102 E0.51839
G1 X38.099 Y42.059 E0.44389
G1 X37.300 Y41.930 E0.44547
G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
G1 X35.048 Y41.050 E0.44547
G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
G1 X32.688 Y38.871 E0.44547
G1 X32.259 Y38.185 E0.44547
G1 X31.905 Y37.457 E0.44547
G1 X31.631 Y36.697 E0.44547
G1 X31.439 Y35.911 E0.44547
G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
G1 X31.374 Y33.494 E0.44547
G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
G1 X32.762 Y30.048 E0.28521

G1 X33.624 Y30.052 F3600.000
G1 X42.087 Y40.789
M204 S1000
;TYPE:Internal infill
G1 F450.000
G1 X43.952 Y38.917 E1.45500
G1 X44.392 Y38.356 E0.39298
G1 X44.771 Y37.751 E0.39298
G1 X45.083 Y37.109 E0.39298
G1 X45.325 Y36.437 E0.39379
G1 X40.850 Y40.911 E3.48504
G1 X40.323 Y41.055 E0.30078
G1 X39.741 Y41.149 E0.32484
G1 X39.481 Y41.166 E0.14352
G1 X45.586 Y35.062 E4.75430
G1 X45.608 Y34.324 E0.40649
G1 X45.578 Y33.955 E0.20391
G1 X38.356 Y41.177 E5.62471
G1 X38.194 Y41.169 E0.08958
G1 X37.391 Y41.028 E0.44879
G1 X45.433 Y32.986 E6.26310
G1 X45.172 Y32.133 E0.49152
G1 X36.540 Y40.765 E6.72313
G1 X36.136 Y40.607 E0.23866
G1 X35.773 Y40.418 E0.22573
G1 X44.823 Y31.368 E7.04856
G1 X44.590 Y30.947 E0.26525
G1 X44.400 Y30.677 E0.18162
G1 X35.079 Y39.997 E7.25896
G1 X34.908 Y39.884 E0.11303
G1 X34.455 Y39.508 E0.32449
G1 X43.909 Y30.054 E7.36301
G1 X43.709 Y29.826 E0.16682
G1 X43.352 Y29.496 E0.26762
G1 X33.896 Y38.953 E7.36493
M73 P27 R23
M73 Q27 S23
G1 X33.404 Y38.330 E0.43686
G1 X42.730 Y29.004 E7.26329
G1 X42.612 Y28.916 E0.08103
G1 X42.041 Y28.579 E0.36532
G1 X32.985 Y37.635 E7.05239
G1 X32.730 Y37.109 E0.32175
G1 X32.642 Y36.864 E0.14338
G1 X41.272 Y28.234 E6.72144
G1 X40.670 Y28.035 E0.34909
G1 X40.413 Y27.979 E0.14511
G1 X32.383 Y36.009 E6.25356
M73 P27 R22
M73 Q27 S22
G1 X32.319 Y35.745 E0.14967
G1 X32.226 Y35.052 E0.38496
G1 X39.450 Y27.828 E5.62599

G1 X39.248 Y27.807 E0.11187

G1 X38.561 Y27.807 E0.37808

G1 X38.332 Y27.831 E0.12680

G1 X32.237 Y33.927 E4.74721

G1 X32.262 Y33.613 E0.17351

G1 X32.394 Y32.912 E0.39298

G1 X32.505 Y32.545 E0.21100

G1 X36.951 Y28.098 E3.46304

G1 X36.465 Y28.259 E0.28196

G1 X35.815 Y28.554 E0.39298

G1 X35.200 Y28.916 E0.39298

G1 X34.628 Y29.342 E0.39298

G1 X34.183 Y29.752 E0.33301

G1 X32.617 Y31.318 E1.21994

; stop printing object Pieza4.STL id:0

copy 0

;LAYER_CHANGE

;Z:1.4

;HEIGHT:0.1

;BEFORE_LAYER_CHANGE

G92 E0.0

;1.4

G1 Z1.400 F3600.000

;AFTER_LAYER_CHANGE

;1.4

; printing object Pieza4.STL id:0 copy 0

G1 X33.468 Y30.397

M204 S800

;TYPE:Perimeter

G1 F450.000

G1 X34.020 Y29.745 E0.47075

G1 X34.554 Y29.253 E0.39977

G1 X35.136 Y28.820 E0.39977

G1 X35.762 Y28.451 E0.39977

G1 X36.423 Y28.151 E0.39977

G1 X37.112 Y27.923 E0.39977

G1 X37.822 Y27.770 E0.39977

G1 X38.555 Y27.691 E0.40593

G1 X38.974 Y27.683 E0.23087

G1 X39.254 Y27.691 E0.15426

G1 X39.991 Y27.770 E0.40843

G1 X40.701 Y27.923 E0.39977

G1 X41.390 Y28.151 E0.39977

G1 X42.051 Y28.451 E0.39977

G1 X42.676 Y28.820 E0.39977

G1 X43.259 Y29.253 E0.39977

G1 X43.792 Y29.745 E0.39977

G1 X44.270 Y30.291 E0.39977

G1 X44.688 Y30.885 E0.39977

G1 X45.039 Y31.520 E0.39977

G1 X45.322 Y32.189 E0.39977

G1 X45.531 Y32.884 E0.39977

G1 X45.666 Y33.597 E0.39977

G1 X45.724 Y34.321 E0.39977

G1 X45.704 Y35.047 E0.39977

G1 X45.608 Y35.766 E0.39977

G1 X45.436 Y36.471 E0.39977

G1 X45.190 Y37.154 E0.39977

G1 X44.872 Y37.807 E0.39977

G1 X44.487 Y38.423 E0.39977

G1 X44.039 Y38.994 E0.39977

G1 X43.532 Y39.514 E0.39977

G1 X42.973 Y39.977 E0.39977

G1 X42.369 Y40.378 E0.39977

G1 X41.724 Y40.713 E0.39977

G1 X41.048 Y40.977 E0.39977

G1 X40.348 Y41.168 E0.39977

G1 X39.631 Y41.284 E0.39977

G1 X38.906 Y41.322 E0.39977

G1 X38.181 Y41.284 E0.39977

G1 X37.465 Y41.168 E0.39977

G1 X36.764 Y40.977 E0.39977

G1 X36.088 Y40.713 E0.39977

G1 X35.444 Y40.378 E0.39977

G1 X34.839 Y39.977 E0.39977

G1 X34.280 Y39.514 E0.39977

G1 X33.774 Y38.994 E0.39977

G1 X33.326 Y38.423 E0.39977

G1 X32.941 Y37.807 E0.39977

G1 X32.623 Y37.154 E0.39977

G1 X32.377 Y36.471 E0.39977

G1 X32.205 Y35.766 E0.39977

G1 X32.108 Y35.047 E0.39977

G1 X32.089 Y34.321 E0.39977

G1 X32.147 Y33.597 E0.39977

G1 X32.281 Y32.884 E0.39977

G1 X32.491 Y32.189 E0.39977

G1 X32.773 Y31.520 E0.39977

G1 X33.125 Y30.885 E0.39977

G1 X33.399 Y30.495 E0.26236

G1 X32.831 Y29.950 F3600.000

;TYPE:External perimeter

G1 F450.000

G1 X32.929 Y29.810 E0.09418

G1 X33.462 Y29.201 E0.44547

G1 X34.056 Y28.652 E0.44547

G1 X34.705 Y28.170 E0.44547

M73 P28 R22

M73 Q28 S22

G1 X35.402 Y27.759 E0.44547

G1 X36.139 Y27.425 E0.44547

G1 X36.907 Y27.171 E0.44547

G1 X37.698 Y27.000 E0.44547

G1 X38.506 Y26.914 E0.44756

G1 X39.306 Y26.913 E0.44047

G1 X40.115 Y27.000 E0.44841

G1 X40.906 Y27.171 E0.44547

G1 X41.674 Y27.425 E0.44547

G1 X42.410 Y27.759 E0.44547

G1 X43.107 Y28.170 E0.44547

G1 X43.757 Y28.652 E0.44547

G1 X44.351 Y29.201 E0.44547

G1 X44.884 Y29.810 E0.44547

G1 X45.349 Y30.472 E0.44547

G1 X45.741 Y31.179 E0.44547

G1 X46.055 Y31.925 E0.44547

G1 X46.289 Y32.699 E0.44547

G1 X46.439 Y33.494 E0.44547

G1 X46.503 Y34.300 E0.44547

G1 X46.482 Y35.109 E0.44547

G1 X46.374 Y35.911 E0.44547

G1 X46.182 Y36.697 E0.44547

G1 X45.908 Y37.457 E0.44547

G1 X45.554 Y38.185 E0.44547

G1 X45.125 Y38.871 E0.44547

G1 X44.625 Y39.507 E0.44547

G1 X44.061 Y40.086 E0.44547

G1 X43.438 Y40.603 E0.44547

G1 X42.764 Y41.050 E0.44547

G1 X42.047 Y41.423 E0.44547

G1 X41.293 Y41.718 E0.44547

G1 X40.513 Y41.930 E0.44547

G1 X39.835 Y42.040 E0.37808

G1 X38.906 Y42.102 E0.51254

G1 X38.099 Y42.059 E0.44547

G1 X37.300 Y41.930 E0.44547

G1 X36.520 Y41.718 E0.44547

G1 X35.766 Y41.423 E0.44547

G1 X35.048 Y41.050 E0.44547

G1 X34.374 Y40.603 E0.44547

G1 X33.752 Y40.086 E0.44547

G1 X33.187 Y39.507 E0.44547

G1 X32.688 Y38.871 E0.44547

G1 X32.259 Y38.185 E0.44547

G1 X31.905 Y37.457 E0.44547

G1 X31.631 Y36.697 E0.44547

G1 X31.439 Y35.911 E0.44547

G1 X31.331 Y35.109 E0.44547

G1 X31.310 Y34.300 E0.44547

G1 X31.374 Y33.494 E0.44547

G1 X31.524 Y32.699 E0.44547

G1 X31.758 Y31.925 E0.44547

G1 X32.072 Y31.179 E0.44547

G1 X32.464 Y30.472 E0.44547

G1 X32.762 Y30.048 E0.28521

G1 X33.001 Y29.961 F3600.000

G1 X45.196 Y31.318

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M204 S1000
;TYPE:Internal infill
G1 F450.000
G1 X43.632 Y29.755 E1.21738
G1 X43.185 Y29.342 E0.33527
G1 X42.612 Y28.916 E0.39298
G1 X41.997 Y28.554 E0.39298
G1 X41.348 Y28.259 E0.39298
G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
G1 X45.551 Y33.613 E0.39298
G1 X45.576 Y33.927 E0.17339
G1 X39.481 Y27.831 E4.74703
G1 X39.248 Y27.807 E0.12922
G1 X38.561 Y27.807 E0.37824
G1 X38.363 Y27.828 E0.10933
G1 X45.587 Y35.052 E5.62588
G1 X45.494 Y35.745 E0.38505
G1 X45.430 Y36.009 E0.14961
G1 X37.400 Y27.979 E6.25349
G1 X37.143 Y28.035 E0.14518
G1 X36.541 Y28.234 E0.34903
G1 X45.171 Y36.864 E6.72139
G1 X45.083 Y37.109 E0.14343
G1 X44.827 Y37.635 E0.32170
G1 X35.772 Y28.579 E7.05237
G1 X35.200 Y28.916 E0.36536
G1 X35.082 Y29.004 E0.08100
G1 X44.408 Y38.330 E7.26328
G1 X43.917 Y38.953 E0.43687
G1 X34.460 Y29.496 E7.36493
M73 P29 R22
M73 Q29 S22
G1 X34.104 Y29.825 E0.26731
G1 X33.906 Y30.056 E0.16727
G1 X43.358 Y39.508 E7.36119
G1 X42.904 Y39.884 E0.32451
G1 X42.733 Y39.997 E0.11301
G1 X33.413 Y30.677 E7.25897
G1 X33.223 Y30.947 E0.18163
G1 X32.990 Y31.368 E0.26524
G1 X42.040 Y40.418 E7.04856
G1 X41.677 Y40.607 E0.22574
G1 X41.273 Y40.765 E0.23867
G1 X32.640 Y32.133 E6.72312
G1 X32.380 Y32.986 E0.49153
G1 X40.422 Y41.028 E6.26308
G1 X39.619 Y41.169 E0.44878
G1 X39.456 Y41.177 E0.08960
G1 X32.234 Y33.955 E5.62468
G1 X32.205 Y34.324 E0.20389
G1 X32.227 Y35.062 E0.40653
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G1 X38.342 Y41.176 E4.76198
G1 X38.194 Y41.169 E0.08147
G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
G1 X32.488 Y36.437 E3.48493
G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
G1 X33.421 Y38.356 E0.39298
G1 X33.861 Y38.917 E0.39298
G1 X35.726 Y40.789 E1.45487
; stop printing object Pieza4.STL id:0
copy 0
;LAYER_CHANGE
;Z:1.5
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;1.5


G1 Z1.500 F3600.000
;AFTER_LAYER_CHANGE
;1.5
; printing object Pieza4.STL id:0 copy 0
G1 X33.468 Y30.397
M204 S800
;TYPE:Perimeter
G1 F450.000
G1 X34.020 Y29.745 E0.47075
G1 X34.554 Y29.253 E0.39977
G1 X35.136 Y28.820 E0.39977
G1 X35.762 Y28.451 E0.39977
G1 X36.423 Y28.151 E0.39977
G1 X37.112 Y27.923 E0.39977
G1 X37.822 Y27.770 E0.39977
G1 X38.554 Y27.691 E0.40578
G1 X38.979 Y27.684 E0.23380
G1 X39.254 Y27.691 E0.15148
G1 X39.991 Y27.770 E0.40843
G1 X40.701 Y27.923 E0.39977
G1 X41.390 Y28.151 E0.39977
G1 X42.051 Y28.451 E0.39977
G1 X42.676 Y28.820 E0.39977
G1 X43.259 Y29.253 E0.39977
G1 X43.792 Y29.745 E0.39977
G1 X44.270 Y30.291 E0.39977
G1 X44.688 Y30.885 E0.39977
G1 X45.039 Y31.520 E0.39977
G1 X45.322 Y32.189 E0.39977
G1 X45.531 Y32.884 E0.39977
G1 X45.666 Y33.597 E0.39977
G1 X45.724 Y34.321 E0.39977
G1 X45.704 Y35.047 E0.39977
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G1 X45.608 Y35.766 E0.39977
G1 X45.436 Y36.471 E0.39977
G1 X45.190 Y37.154 E0.39977
G1 X44.872 Y37.807 E0.39977
G1 X44.487 Y38.423 E0.39977
G1 X44.039 Y38.994 E0.39977
G1 X43.532 Y39.514 E0.39977
G1 X42.973 Y39.977 E0.39977
G1 X42.369 Y40.378 E0.39977
G1 X41.724 Y40.713 E0.39977
G1 X41.048 Y40.977 E0.39977
G1 X40.348 Y41.168 E0.39977
G1 X39.631 Y41.284 E0.39977
G1 X38.906 Y41.322 E0.39977
G1 X38.181 Y41.284 E0.39977
M73 P30 R22
M73 Q30 S22
G1 X37.465 Y41.168 E0.39977
G1 X36.764 Y40.977 E0.39977
G1 X36.088 Y40.713 E0.39977
G1 X35.444 Y40.378 E0.39977
G1 X34.839 Y39.977 E0.39977
G1 X34.280 Y39.514 E0.39977
G1 X33.838 Y39.059 E0.34937
G1 X33.326 Y38.423 E0.44992
G1 X32.941 Y37.807 E0.39977
G1 X32.623 Y37.154 E0.39977
G1 X32.377 Y36.471 E0.39977
G1 X32.205 Y35.766 E0.39977
G1 X32.108 Y35.047 E0.39977
G1 X32.089 Y34.321 E0.39977
G1 X32.147 Y33.597 E0.39977
G1 X32.281 Y32.884 E0.39977
G1 X32.491 Y32.189 E0.39977
G1 X32.773 Y31.520 E0.39977
G1 X33.125 Y30.885 E0.39977
G1 X33.399 Y30.495 E0.26236
G1 X32.831 Y29.950 F3600.000
;TYPE:External perimeter
G1 F450.000
G1 X32.929 Y29.810 E0.09418
G1 X33.462 Y29.201 E0.44547
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G1 X34.705 Y28.170 E0.44547
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G1 X35.762 Y28.451 E0.39977
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G1 X35.402 Y27.759 E0.44547
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G1 X40.862 Y28.098 E0.28177
G1 X45.308 Y32.544 E3.46272
G1 X45.419 Y32.912 E0.21117
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G1 X39.471 Y41.176 E0.08154          G1 X32.639 Y31.296 E1.19915          G1 X41.724 Y40.713 E0.39977
G1 X45.586 Y35.062 E4.76209          ; stop printing object Pieza4.STL id:0  G1 X41.048 Y40.977 E0.39977
G1 X45.608 Y34.324 E0.40646          copy 0                               G1 X40.348 Y41.168 E0.39977
G1 X45.578 Y33.955 E0.20395          ;LAYER_CHANGE                        G1 X39.631 Y41.284 E0.39977
G1 X38.356 Y41.177 E5.62476          ;Z:1.8                               G1 X38.906 Y41.322 E0.39977
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G1 X37.391 Y41.028 E0.44883          ;BEFORE_LAYER_CHANGE                 G1 X37.465 Y41.168 E0.39977
G1 X45.433 Y32.986 E6.26314          G92 E0.0                             G1 X36.764 Y40.977 E0.39977
M73 P35 R20                          ;1.8                                 G1 X36.088 Y40.713 E0.39977
M73 Q35 S20                                                               G1 X35.444 Y40.378 E0.39977
G1 X45.172 Y32.133 E0.49152                                               G1 X34.839 Y39.977 E0.39977
G1 X36.540 Y40.765 E6.72316          G1 Z1.800 F3600.000                  G1 X34.280 Y39.514 E0.39977
G1 X36.136 Y40.607 E0.23862          ;AFTER_LAYER_CHANGE                  G1 X33.774 Y38.994 E0.39977
G1 X35.772 Y40.418 E0.22578          ;1.8                                 G1 X33.326 Y38.423 E0.39977
G1 X44.823 Y31.368 E7.04859          ; printing object Pieza4.STL id:0 copy 0  G1 X33.006 Y37.912 E0.33178
G1 X44.590 Y30.947 E0.26520          G1 X33.468 Y30.397                   G1 X32.623 Y37.154 E0.46743
G1 X44.400 Y30.677 E0.18168          M204 S800                           G1 X32.377 Y36.471 E0.39977
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G1 X43.909 Y30.054 E7.36302          G1 X34.554 Y29.253 E0.39977          G1 X32.147 Y33.597 E0.39977
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G1 X32.319 Y35.745 E0.14955          G1 X43.792 Y29.745 E0.39977          G1 X36.907 Y27.171 E0.44547
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G1 X38.332 Y27.831 E0.12638          G1 X45.531 Y32.884 E0.39977          G1 X40.906 Y27.171 E0.44547
G1 X32.237 Y33.927 E4.74692          G1 X45.666 Y33.597 E0.39977          G1 X41.674 Y27.425 E0.44547
M73 P36 R20                          G1 X45.724 Y34.321 E0.39977          G1 X42.410 Y27.759 E0.44547
M73 Q36 S20                          G1 X45.704 Y35.047 E0.39977          G1 X43.107 Y28.170 E0.44547
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G1 X32.505 Y32.544 E0.21127          G1 X45.190 Y37.154 E0.39977          G1 X44.884 Y29.810 E0.44547
G1 X36.951 Y28.098 E3.46255          G1 X44.872 Y37.807 E0.39977          G1 X45.349 Y30.472 E0.44547
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;1.9


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;AFTER_LAYER_CHANGE
;1.9
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G1 X36.423 Y28.151 E0.39977
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G1 X36.907 Y27.171 E0.44547
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G1 X39.306 Y26.913 E0.44073
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G1 X40.850 Y40.911 E3.48508
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M73 Q39 S19

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G1 X45.608 Y34.324 E0.40646
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G1 X33.896 Y38.953 E7.36492
G1 X33.404 Y38.330 E0.43687
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M73 P40 R19
M73 Q40 S19
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G1 X36.465 Y28.259 E0.28167
G1 X35.815 Y28.554 E0.39298
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;Z:2                                 G1 X39.631 Y41.284 E0.07972          G1 X46.182 Y36.697 E0.44547
;HEIGHT:0.1                          G1 X38.906 Y41.322 E0.39977          G1 X45.908 Y37.457 E0.44547
;BEFORE_LAYER_CHANGE                 G1 X38.181 Y41.284 E0.39977          G1 X45.554 Y38.185 E0.44547
G92 E0.0                             G1 X37.465 Y41.168 E0.39977          G1 X45.125 Y38.871 E0.44547
;2                                   G1 X36.764 Y40.977 E0.39977          G1 X44.625 Y39.507 E0.44547
                                     G1 X36.088 Y40.713 E0.39977          G1 X44.061 Y40.086 E0.44547
                                     G1 X35.444 Y40.378 E0.39977          G1 X43.438 Y40.603 E0.44547
G1 Z2.000 F3600.000                  G1 X34.839 Y39.977 E0.39977          G1 X42.764 Y41.050 E0.44547
;AFTER_LAYER_CHANGE                  G1 X34.280 Y39.514 E0.39977          G1 X42.047 Y41.423 E0.44547
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G1 X35.136 Y28.820 E0.39977          G1 X32.089 Y34.321 E0.39977          G1 X35.766 Y41.423 E0.44547
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G1 X39.254 Y27.691 E0.13756          G1 X32.831 Y29.950 F3600.000         G1 X32.259 Y38.185 E0.10257
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G1 X37.489 Y41.055 E0.39298
G1 X36.962 Y40.911 E0.30085
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G1 X32.730 Y37.109 E0.39373
G1 X33.042 Y37.751 E0.39298
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;BEFORE_LAYER_CHANGE
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;2.1


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G1 X45.125 Y38.871 E0.44547
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G1 X37.066 Y27.755 E0.22017
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G1 X38.542 Y27.513 E0.22261
G1 X39.266 Y27.513 E0.21406
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G1 X35.682 Y28.297 E0.16503
G1 X36.360 Y27.989 E0.22018
G1 X37.066 Y27.755 E0.22019
G1 X37.633 Y27.623 E0.17220
G1 X38.451 Y27.520 E0.24368
G1 X38.903 Y27.505 E0.13375
G1 X39.361 Y27.520 E0.13577
G1 X40.204 Y27.628 E0.25134
G1 X40.747 Y27.755 E0.16470
G1 X41.453 Y27.989 E0.22019
G1 X42.131 Y28.297 E0.22018
G1 X42.773 Y28.673 E0.22021
G1 X43.372 Y29.117 E0.22025
G1 X43.921 Y29.619 E0.22032
G1 X44.410 Y30.182 E0.22033
G1 X44.836 Y30.792 E0.22025
G1 X45.196 Y31.444 E0.22020
G1 X45.485 Y32.130 E0.22018
G1 X45.701 Y32.843 E0.22019
G1 X45.814 Y33.398 E0.16752
G1 X45.903 Y34.316 E0.27299
G1 X45.876 Y35.136 E0.24246
G1 X45.743 Y35.987 E0.25484

G1 X45.603 Y36.522 E0.16355
G1 X45.350 Y37.222 E0.22018
G1 X45.025 Y37.892 E0.22019
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G1 X43.079 Y40.119 E0.21115
G1 X42.457 Y40.529 E0.22023
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G1 X36.710 Y41.143 E0.15490
G1 X36.017 Y40.871 E0.22018
G1 X35.356 Y40.529 E0.22019
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G1 X33.640 Y39.111 E0.22949
G1 X33.068 Y38.356 E0.28010
G1 X32.788 Y37.892 E0.16038
G1 X32.464 Y37.222 E0.22018
G1 X32.210 Y36.522 E0.22018
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G1 X31.932 Y35.061 E0.22026
G1 X31.910 Y34.302 E0.22462
G1 X31.972 Y33.574 E0.21602
G1 X32.112 Y32.843 E0.22024
G1 X32.328 Y32.130 E0.22019
G1 X32.617 Y31.444 E0.22017
G1 X32.854 Y30.994 E0.15058
G1 X33.235 Y30.414 E0.20521
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;2.3


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;AFTER_LAYER_CHANGE
;2.3
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G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
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G1 X39.306 Y28.115 E0.22894
G1 X40.083 Y28.211 E0.43086
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G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.893 Y29.498 E0.41650
G1 X43.501 Y30.046 E0.45082
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G1 X45.231 Y33.521 E0.43400
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G1 X41.219 Y40.471 E0.43400
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G1 F450.000
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G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
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G1 X39.306 Y26.913 E0.44091
G1 X40.115 Y27.000 E0.44841
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G1 X45.741 Y31.179 E0.44547
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G1 X46.374 Y35.911 E0.44547
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G1 X45.125 Y38.871 E0.44547
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M73 Q45 S17
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G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
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G1 X35.206 Y28.566 E0.27879
G1 X35.682 Y28.297 E0.16168
G1 X36.360 Y27.989 E0.22019
G1 X37.066 Y27.755 E0.22021
G1 X37.794 Y27.596 E0.22025
G1 X38.541 Y27.513 E0.22253
G1 X39.266 Y27.513 E0.21422
G1 X40.019 Y27.596 E0.22425
G1 X40.747 Y27.755 E0.22025
G1 X41.453 Y27.989 E0.22021
G1 X42.131 Y28.297 E0.22020
G1 X42.600 Y28.561 E0.15924
G1 X43.257 Y29.024 E0.23763
G1 X43.922 Y29.619 E0.26395
G1 X44.410 Y30.182 E0.22035
G1 X44.958 Y30.994 E0.28987
G1 X45.196 Y31.444 E0.15059
G1 X45.485 Y32.130 E0.22020
G1 X45.701 Y32.843 E0.22021
G1 X45.822 Y33.442 E0.18086
G1 X45.903 Y34.300 E0.25491
G1 X45.882 Y35.061 E0.22519
G1 X45.737 Y36.012 E0.28442
G1 X45.603 Y36.522 E0.15608
G1 X45.350 Y37.222 E0.22020
G1 X45.025 Y37.892 E0.22021
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G1 X44.173 Y39.111 E0.22030
G1 X43.631 Y39.666 E0.22951
G1 X43.079 Y40.119 E0.21117
G1 X42.457 Y40.529 E0.22025
G1 X41.796 Y40.871 E0.22021
G1 X41.103 Y41.143 E0.22020
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G1 X38.906 Y41.503 E0.25863

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G1 X35.356 Y40.529 E0.22021
G1 X34.854 Y40.206 E0.17654
G1 X34.182 Y39.666 E0.25489
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G1 X33.068 Y38.356 E0.28012
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G1 X31.933 Y35.061 E0.22026
G1 X31.910 Y34.303 E0.22429
G1 X31.972 Y33.574 E0.21638
G1 X32.112 Y32.843 E0.22026
G1 X32.327 Y32.130 E0.22021
G1 X32.617 Y31.444 E0.22020
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;2.4


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G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.884 Y28.103 E0.20823
G1 X39.306 Y28.115 E0.23233
G1 X40.083 Y28.211 E0.43097
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
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G1 X43.501 Y30.046 E0.45756
G1 X44.014 Y30.645 E0.43474
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G1 X45.063 Y32.751 E0.43400
G1 X45.231 Y33.521 E0.43400
G1 X45.304 Y34.306 E0.43399
G1 X45.280 Y35.093 E0.43400
G1 X45.159 Y35.872 E0.43400
G1 X44.943 Y36.630 E0.43399
G1 X44.636 Y37.356 E0.43400
G1 X44.242 Y38.038 E0.43400
G1 X43.767 Y38.667 E0.43400
G1 X43.219 Y39.233 E0.43400
G1 X42.639 Y39.699 E0.40951
G1 X41.936 Y40.141 E0.45756
G1 X41.219 Y40.471 E0.43474
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G1 X39.693 Y40.855 E0.43400
G1 X38.906 Y40.903 E0.43400
G1 X38.120 Y40.855 E0.43400
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G1 X36.594 Y40.471 E0.43400
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G1 X35.209 Y39.728 E0.45756
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G1 X32.870 Y36.631 E0.45756
G1 X32.654 Y35.872 E0.43474
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G1 X32.581 Y33.521 E0.43400
G1 X32.740 Y32.794 E0.40952
G1 X33.011 Y32.009 E0.45756
G1 X33.363 Y31.302 E0.43474
G1 X33.708 Y30.782 E0.34343
G1 X33.458 Y29.947 F3600.000
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G1 F450.000
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G1 X34.056 Y28.652 E0.44547
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
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G1 X36.907 Y27.171 E0.44547
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G1 X44.884 Y29.810 E0.44547
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G1 X46.439 Y33.494 E0.44547
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G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
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G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
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M73 Q46 S17
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G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.889 Y27.506 E0.12975
G1 X39.361 Y27.520 E0.13951
G1 X40.204 Y27.628 E0.25153
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.371 Y29.118 E0.22020
G1 X43.922 Y29.619 E0.22028
G1 X44.410 Y30.182 E0.22030
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
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G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
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G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.528 E0.22019
G1 X41.796 Y40.871 E0.22015
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G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.527 E0.22013
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G1 X34.182 Y39.666 E0.25563
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
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G1 X32.464 Y37.221 E0.22014
G1 X32.210 Y36.522 E0.22014

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G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.328 Y32.130 E0.22015
G1 X32.617 Y31.444 E0.22014
G1 X32.854 Y30.994 E0.15056
G1 X33.235 Y30.413 E0.20537
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;Z:2.5
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;2.5


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;AFTER_LAYER_CHANGE
;2.5
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G1 X36.966 Y28.403 E0.43494
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.878 Y28.103 E0.20474
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M73 P46 R16
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M73 Q47 S16
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G1 X36.360 Y27.989 E0.22022
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G1 X32.329 Y32.131 E0.22023
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G1 X41.219 Y40.471 E0.43514
G1 X40.468 Y40.710 E0.43399
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G1 X38.876 Y27.506 E0.12579
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M73 Q48 S16
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G1 X38.853 Y28.104 E0.19081
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G1 X41.582 Y28.688 E0.43400

G1 X42.276 Y29.061 E0.43399
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G1 X35.358 Y40.525 E0.22027
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M73 P52 R15
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G1 X32.466 Y37.221 E0.16991
G1 X32.210 Y36.522 E0.22029
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;BEFORE_LAYER_CHANGE
G92 E0.0
;3.1


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;3.1
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G1 X36.360 Y27.989 E0.22015
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G1 X38.451 Y27.520 E0.24365
G1 X38.843 Y27.507 E0.11597
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G1 X40.204 Y27.628 E0.25844
G1 X40.747 Y27.755 E0.16468
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G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
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G1 X42.047 Y41.423 E0.44547
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G1 X38.099 Y42.059 E0.44547          G1 X45.603 Y36.522 E0.15605          G1 X34.311 Y30.047 E0.43400
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G1 X31.905 Y37.457 E0.44547          G1 X40.385 Y41.340 E0.22017          G1 X39.304 Y28.114 E0.26281
G1 X31.631 Y36.697 E0.44547          G1 X39.779 Y41.445 E0.18195          G1 X40.083 Y28.211 E0.43177
G1 X31.439 Y35.911 E0.44547          G1 X38.906 Y41.503 E0.25858          G1 X40.847 Y28.403 E0.43400
G1 X31.331 Y35.109 E0.44547          G1 X38.163 Y41.460 E0.22031          G1 X41.582 Y28.688 E0.43400
G1 X31.310 Y34.300 E0.44547          G1 X37.212 Y41.290 E0.28550          G1 X42.276 Y29.061 E0.43399
G1 X31.374 Y33.494 E0.44547          G1 X36.710 Y41.143 E0.15488          G1 X42.919 Y29.516 E0.43400
G1 X31.524 Y32.699 E0.44547          G1 X36.017 Y40.871 E0.22015          G1 X43.502 Y30.047 E0.43400
G1 X31.758 Y31.925 E0.44547          G1 X35.356 Y40.529 E0.22016          G1 X44.014 Y30.645 E0.43400
G1 X32.072 Y31.179 E0.44547          G1 X34.854 Y40.206 E0.17650          G1 X44.450 Y31.302 E0.43400
G1 X32.464 Y30.472 E0.44547          G1 X34.182 Y39.666 E0.25484          G1 X44.801 Y32.008 E0.43400
G1 X32.762 Y30.048 E0.28521          G1 X33.640 Y39.111 E0.22946          G1 X45.063 Y32.751 E0.43400
G1 X33.001 Y29.961 F3600.000         G1 X33.068 Y38.356 E0.28006          G1 X45.231 Y33.521 E0.43400
G1 X33.238 Y30.409                   G1 X32.788 Y37.892 E0.16036          G1 X45.304 Y34.306 E0.43399
;TYPE:Gap fill                       G1 X32.463 Y37.222 E0.22016          G1 X45.280 Y35.093 E0.43400
;WIDTH:0.439535                      G1 X32.210 Y36.522 E0.22015          G1 X45.159 Y35.872 E0.43400
G1 F450.000                          G1 X32.032 Y35.799 E0.22018          G1 X44.943 Y36.630 E0.43399
G1 X33.403 Y30.182 E0.08290          G1 X31.931 Y35.061 E0.22024          G1 X44.636 Y37.356 E0.43400
G1 X33.891 Y29.619 E0.22030          G1 X31.910 Y34.300 E0.22514          G1 X44.242 Y38.038 E0.43400
G1 X34.509 Y29.059 E0.24675          G1 X31.972 Y33.574 E0.21546          G1 X43.767 Y38.667 E0.43400
G1 X35.213 Y28.561 E0.25479          G1 X32.112 Y32.843 E0.22021          G1 X43.219 Y39.233 E0.43400
G1 X35.682 Y28.297 E0.15920          G1 X32.327 Y32.130 E0.22017          G1 X42.605 Y39.727 E0.43400
G1 X36.360 Y27.989 E0.22015          G1 X32.470 Y31.765 E0.11600          G1 X41.935 Y40.142 E0.43400
G1 X37.066 Y27.755 E0.22016          G1 X32.842 Y31.016 E0.24725          G1 X41.219 Y40.471 E0.43400
G1 X37.633 Y27.623 E0.17217          G1 X33.171 Y30.508 E0.17894          G1 X40.468 Y40.710 E0.43399
G1 X38.451 Y27.520 E0.24365          ; stop printing object Pieza4.STL id:0    G1 X39.693 Y40.855 E0.43400
G1 X38.836 Y27.507 E0.11401          copy 0                               G1 X38.906 Y40.903 E0.43400
G1 X39.337 Y27.518 E0.14818          ;LAYER_CHANGE                        G1 X38.120 Y40.855 E0.43400
G1 X40.204 Y27.628 E0.25857          ;Z:3.3                               G1 X37.345 Y40.710 E0.43399
G1 X40.747 Y27.755 E0.16468          ;HEIGHT:0.0999999                    G1 X36.594 Y40.471 E0.43400
G1 X41.453 Y27.989 E0.22016          ;BEFORE_LAYER_CHANGE                 G1 X35.878 Y40.142 E0.43400
G1 X42.131 Y28.297 E0.22015          G92 E0.0                             G1 X35.208 Y39.727 E0.43400
G1 X42.773 Y28.673 E0.22018          ;3.3                                 G1 X34.594 Y39.233 E0.43399
G1 X43.372 Y29.116 E0.22023                                               G1 X34.046 Y38.667 E0.43400
G1 X43.923 Y29.621 E0.22082                                               G1 X33.571 Y38.038 E0.43400
G1 X44.410 Y30.182 E0.21979          G1 Z3.300 F3600.000                  G1 X33.177 Y37.356 E0.43400
G1 X44.836 Y30.792 E0.22022          ;AFTER_LAYER_CHANGE                  G1 X32.869 Y36.630 E0.43400
G1 X45.196 Y31.444 E0.22017          ;3.3                                 G1 X32.654 Y35.872 E0.43399
G1 X45.485 Y32.130 E0.22015          ; printing object Pieza4.STL id:0 copy 0   G1 X32.533 Y35.093 E0.43400
G1 X45.701 Y32.843 E0.22016          G1 X33.732 Y30.746                   G1 X32.509 Y34.306 E0.43400
G1 X45.818 Y33.417 E0.17331          ;TYPE:External perimeter             G1 X32.581 Y33.521 E0.43400
G1 X45.903 Y34.300 E0.26234          ;WIDTH:0.8                           G1 X32.750 Y32.751 E0.43400
G1 X45.882 Y35.061 E0.22514          G1 F450.000                          G1 X33.012 Y32.008 E0.43399
G1 X45.737 Y36.012 E0.28436          G1 X33.798 Y30.645 E0.06627          G1 X33.363 Y31.302 E0.43400
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G1 X33.666 Y30.846 E0.30164
G1 X33.676 Y30.639 F3600.000
G1 X32.831 Y29.950
G1 F450.000
G1 X32.929 Y29.810 E0.09418
G1 X33.462 Y29.201 E0.44547
G1 X34.056 Y28.652 E0.44547
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
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G1 X38.504 Y26.914 E0.44672
G1 X39.306 Y26.913 E0.44132
G1 X40.115 Y27.000 E0.44841
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G1 X46.182 Y36.697 E0.44547
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G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
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G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
G1 X37.300 Y41.930 E0.44547
G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
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G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
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G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
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G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
G1 X32.762 Y30.048 E0.28521
G1 X33.001 Y29.961 F3600.000
G1 X33.238 Y30.409
;TYPE:Gap fill
;WIDTH:0.439535
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G1 X33.891 Y29.619 E0.22030
G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.829 Y27.507 E0.11207
G1 X39.337 Y27.518 E0.15000
G1 X40.204 Y27.628 E0.25870
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
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G1 X43.923 Y29.621 E0.22082
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G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
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G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
G1 X41.103 Y41.143 E0.22015

G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
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G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11601
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;LAYER_CHANGE
;Z:3.4
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;3.4


G1 Z3.400 F3600.000
;AFTER_LAYER_CHANGE
;3.4
; printing object Pieza4.STL id:0 copy 0
G1 X33.732 Y30.746
;TYPE:External perimeter
;WIDTH:0.8
G1 F450.000
G1 X33.798 Y30.645 E0.06627
G1 X34.311 Y30.047 E0.43400
G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.821 Y28.105 E0.17344
G1 X39.304 Y28.114 E0.26620
G1 X40.083 Y28.211 E0.43184
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G1 X40.847 Y28.403 E0.43400

G1 X41.582 Y28.688 E0.43400

M73 P55 R14

M73 Q55 S14

G1 X42.276 Y29.061 E0.43399

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G1 X43.502 Y30.047 E0.43400

G1 X44.014 Y30.645 E0.43400

G1 X44.450 Y31.302 E0.43400

G1 X44.801 Y32.008 E0.43400

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G1 X45.231 Y33.521 E0.43400

G1 X45.304 Y34.306 E0.43399

G1 X45.280 Y35.093 E0.43400

G1 X45.159 Y35.872 E0.43400

G1 X44.943 Y36.630 E0.43399

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G1 X44.242 Y38.038 E0.43400

G1 X43.767 Y38.667 E0.43400

G1 X43.219 Y39.233 E0.43400

G1 X42.605 Y39.727 E0.43400

G1 X41.935 Y40.142 E0.43400

G1 X41.219 Y40.471 E0.43400

G1 X40.468 Y40.710 E0.43399

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G1 X38.906 Y40.903 E0.43400

G1 X38.120 Y40.855 E0.43400

G1 X37.345 Y40.710 E0.43399

G1 X36.594 Y40.471 E0.43400

G1 X35.878 Y40.142 E0.43400

G1 X35.208 Y39.727 E0.43400

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G1 X33.571 Y38.038 E0.43400

G1 X33.177 Y37.356 E0.43400

G1 X32.869 Y36.630 E0.43400

G1 X32.654 Y35.872 E0.43399

G1 X32.533 Y35.093 E0.43400

G1 X32.509 Y34.306 E0.43400

G1 X32.581 Y33.521 E0.43400

G1 X32.750 Y32.751 E0.43400

G1 X33.012 Y32.008 E0.43399

G1 X33.363 Y31.302 E0.43400

G1 X33.666 Y30.846 E0.30164

G1 X33.676 Y30.639 F3600.000

G1 X32.831 Y29.950

G1 F450.000

G1 X32.929 Y29.810 E0.09418

G1 X33.462 Y29.201 E0.44547

G1 X34.056 Y28.652 E0.44547

G1 X34.705 Y28.170 E0.44547

G1 X35.402 Y27.759 E0.44547

G1 X36.139 Y27.425 E0.44547

G1 X36.907 Y27.171 E0.44547

G1 X37.698 Y27.000 E0.44547

G1 X38.504 Y26.914 E0.44668

G1 X39.306 Y26.913 E0.44135

G1 X40.115 Y27.000 E0.44841

G1 X40.906 Y27.171 E0.44547

G1 X41.674 Y27.425 E0.44547

G1 X42.410 Y27.759 E0.44547

G1 X43.107 Y28.170 E0.44547

G1 X43.757 Y28.652 E0.44547

G1 X44.351 Y29.201 E0.44547

G1 X44.884 Y29.810 E0.44547

G1 X45.349 Y30.472 E0.44547

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G1 X46.482 Y35.109 E0.44547

G1 X46.374 Y35.911 E0.44547

G1 X46.182 Y36.697 E0.44547

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G1 X41.293 Y41.718 E0.44547

G1 X40.513 Y41.930 E0.44547

G1 X40.045 Y42.006 E0.26084

G1 X39.714 Y42.059 E0.18463

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G1 X38.099 Y42.059 E0.44547

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G1 X35.048 Y41.050 E0.44547

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G1 X33.187 Y39.507 E0.44547

G1 X32.688 Y38.871 E0.44547

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G1 X31.758 Y31.925 E0.44547

G1 X32.072 Y31.179 E0.44547

G1 X32.464 Y30.472 E0.44547

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G1 X33.238 Y30.409

;TYPE:Gap fill

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G1 X34.509 Y29.059 E0.24675

G1 X35.213 Y28.561 E0.25479

G1 X35.682 Y28.297 E0.15920

G1 X36.360 Y27.989 E0.22015

G1 X37.066 Y27.755 E0.22016

G1 X37.633 Y27.623 E0.17217

G1 X38.451 Y27.520 E0.24365

G1 X38.823 Y27.508 E0.11012

G1 X39.336 Y27.518 E0.15182

G1 X40.204 Y27.628 E0.25882

G1 X40.747 Y27.755 E0.16468

G1 X41.453 Y27.989 E0.22016

G1 X42.131 Y28.297 E0.22015

G1 X42.773 Y28.673 E0.22018

G1 X43.372 Y29.116 E0.22023

G1 X43.923 Y29.621 E0.22082

G1 X44.410 Y30.182 E0.21979

G1 X44.836 Y30.792 E0.22022

G1 X45.196 Y31.444 E0.22017

G1 X45.485 Y32.130 E0.22015

G1 X45.701 Y32.843 E0.22016

G1 X45.818 Y33.417 E0.17331

G1 X45.903 Y34.300 E0.26234

G1 X45.882 Y35.061 E0.22514

G1 X45.737 Y36.012 E0.28436

G1 X45.603 Y36.522 E0.15605

G1 X45.350 Y37.222 E0.22016

G1 X45.025 Y37.892 E0.22016

G1 X44.631 Y38.524 E0.22019

G1 X44.173 Y39.111 E0.22025

G1 X43.631 Y39.666 E0.22946

G1 X43.079 Y40.119 E0.21112

G1 X42.457 Y40.529 E0.22020

G1 X41.796 Y40.871 E0.22016

G1 X41.103 Y41.143 E0.22015

G1 X40.385 Y41.340 E0.22017

G1 X39.779 Y41.445 E0.18195

G1 X38.906 Y41.503 E0.25858

G1 X38.163 Y41.460 E0.22031

G1 X37.212 Y41.290 E0.28550

G1 X36.710 Y41.143 E0.15488

G1 X36.017 Y40.871 E0.22015

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G1 X33.068 Y38.356 E0.28006
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G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22017
G1 X32.470 Y31.765 E0.11600
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;Z:3.5
;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
G92 E0.0
;3.5


G1 Z3.500 F3600.000
;AFTER_LAYER_CHANGE
;3.5
; printing object Pieza4.STL id:0 copy 0
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;TYPE:External perimeter
;WIDTH:0.8
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G1 X34.311 Y30.047 E0.43400
G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.815 Y28.105 E0.16998
G1 X39.304 Y28.114 E0.26959
G1 X40.083 Y28.211 E0.43192
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
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M73 P56 R14
M73 Q56 S14
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G1 X44.636 Y37.356 E0.43400
G1 X44.242 Y38.038 E0.43400
G1 X43.767 Y38.667 E0.43400
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G1 X33.403 Y30.182 E0.08290
G1 X33.891 Y29.619 E0.22030
G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.803 Y27.508 E0.10431
G1 X39.335 Y27.517 E0.15728
G1 X40.204 Y27.628 E0.25918
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082

G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
G1 X41.103 Y41.143 E0.22015
G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22017
G1 X32.470 Y31.765 E0.11600
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;Z:3.8
;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
G92 E0.0
;3.8
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G1 Z3.800 F3600.000

;AFTER_LAYER_CHANGE

;3.8

; printing object Pieza4.STL id:0 copy 0

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;TYPE:External perimeter

;WIDTH:0.8

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G1 X34.894 Y29.516 E0.43400

G1 X35.537 Y29.061 E0.43399

G1 X36.231 Y28.688 E0.43400

G1 X36.966 Y28.403 E0.43400

G1 X37.730 Y28.211 E0.43400

G1 X38.506 Y28.115 E0.43059

G1 X38.796 Y28.106 E0.15959

G1 X39.304 Y28.114 E0.27975

G1 X40.083 Y28.211 E0.43213

G1 X40.847 Y28.403 E0.43400

G1 X41.582 Y28.688 E0.43400

G1 X42.276 Y29.061 E0.43399

G1 X42.919 Y29.516 E0.43400

G1 X43.502 Y30.047 E0.43400

G1 X44.014 Y30.645 E0.43400

G1 X44.450 Y31.302 E0.43400

G1 X44.801 Y32.008 E0.43400

G1 X45.063 Y32.751 E0.43400

G1 X45.231 Y33.521 E0.43400

G1 X45.304 Y34.306 E0.43399

G1 X45.280 Y35.093 E0.43400

G1 X45.159 Y35.872 E0.43400

G1 X44.943 Y36.630 E0.43399

G1 X44.636 Y37.356 E0.43400

G1 X44.242 Y38.038 E0.43400

G1 X43.767 Y38.667 E0.43400

G1 X43.219 Y39.233 E0.43400

G1 X42.605 Y39.727 E0.43400

G1 X41.935 Y40.142 E0.43400

G1 X41.219 Y40.471 E0.43400

G1 X40.468 Y40.710 E0.43399

G1 X39.693 Y40.855 E0.43400

G1 X38.906 Y40.903 E0.43400

G1 X38.120 Y40.855 E0.43400

G1 X37.345 Y40.710 E0.43399

G1 X36.594 Y40.471 E0.43400

G1 X35.878 Y40.142 E0.43400

G1 X35.208 Y39.727 E0.43400

G1 X34.594 Y39.233 E0.43399

G1 X34.046 Y38.667 E0.43400

G1 X33.571 Y38.038 E0.43399

G1 X33.177 Y37.356 E0.43400

G1 X32.869 Y36.630 E0.43400

M73 Q59 S13

G1 X32.654 Y35.872 E0.43399

M73 P59 R13

G1 X32.533 Y35.093 E0.43400

G1 X32.509 Y34.306 E0.43400

G1 X32.581 Y33.521 E0.43400

G1 X32.750 Y32.751 E0.43400

G1 X33.012 Y32.008 E0.43399

G1 X33.363 Y31.302 E0.43400

G1 X33.666 Y30.846 E0.30164

G1 X33.676 Y30.639 F3600.000

G1 X32.831 Y29.950

G1 F450.000

G1 X32.929 Y29.810 E0.09418

G1 X33.462 Y29.201 E0.44547

G1 X34.056 Y28.652 E0.44547

G1 X34.705 Y28.170 E0.44547

G1 X35.402 Y27.759 E0.44547

G1 X36.139 Y27.425 E0.44547

G1 X36.907 Y27.171 E0.44547

G1 X37.698 Y27.000 E0.44547

G1 X38.504 Y26.914 E0.44654

G1 X39.306 Y26.913 E0.44149

G1 X40.115 Y27.000 E0.44841

G1 X40.906 Y27.171 E0.44547

G1 X41.674 Y27.425 E0.44547

G1 X42.410 Y27.759 E0.44547

G1 X43.107 Y28.170 E0.44547

G1 X43.757 Y28.652 E0.44547

G1 X44.351 Y29.201 E0.44547

G1 X44.884 Y29.810 E0.44547

G1 X45.349 Y30.472 E0.44547

G1 X45.741 Y31.179 E0.44547

G1 X46.055 Y31.925 E0.44547

G1 X46.289 Y32.699 E0.44547

G1 X46.439 Y33.494 E0.44547

G1 X46.503 Y34.300 E0.44547

G1 X46.482 Y35.109 E0.44547

G1 X46.374 Y35.911 E0.44547

G1 X46.182 Y36.697 E0.44547

G1 X45.908 Y37.457 E0.44547

G1 X45.554 Y38.185 E0.44547

G1 X45.125 Y38.871 E0.44547

G1 X44.625 Y39.507 E0.44547

G1 X44.061 Y40.086 E0.44547

G1 X43.438 Y40.603 E0.44547

G1 X42.764 Y41.050 E0.44547

G1 X42.047 Y41.423 E0.44547

G1 X41.293 Y41.718 E0.44547

G1 X40.513 Y41.930 E0.44547

G1 X39.714 Y42.059 E0.44547

G1 X38.906 Y42.102 E0.44547

G1 X38.099 Y42.059 E0.44547

G1 X37.300 Y41.930 E0.44547

G1 X36.520 Y41.718 E0.44547

G1 X35.766 Y41.423 E0.44547

G1 X35.048 Y41.050 E0.44547

G1 X34.374 Y40.603 E0.44547

G1 X33.752 Y40.086 E0.44547

G1 X33.187 Y39.507 E0.44547

G1 X32.688 Y38.871 E0.44547

G1 X32.259 Y38.185 E0.44547

G1 X31.905 Y37.457 E0.44547

G1 X31.631 Y36.697 E0.44547

G1 X31.439 Y35.911 E0.44547

G1 X31.331 Y35.109 E0.44547

G1 X31.310 Y34.300 E0.44547

G1 X31.374 Y33.494 E0.44547

G1 X31.524 Y32.699 E0.44547

G1 X31.758 Y31.925 E0.44547

G1 X32.072 Y31.179 E0.44547

G1 X32.464 Y30.472 E0.44547

G1 X32.762 Y30.048 E0.28521

G1 X33.001 Y29.961 F3600.000

G1 X33.238 Y30.409

;TYPE:Gap fill

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G1 X33.891 Y29.619 E0.22030

G1 X34.509 Y29.059 E0.24675

G1 X35.213 Y28.561 E0.25479

G1 X35.682 Y28.297 E0.15920

G1 X36.360 Y27.989 E0.22015

G1 X37.066 Y27.755 E0.22016

G1 X37.633 Y27.623 E0.17217

G1 X38.451 Y27.520 E0.24365

G1 X38.797 Y27.508 E0.10237

G1 X39.335 Y27.517 E0.15910

G1 X40.204 Y27.628 E0.25929

G1 X40.747 Y27.755 E0.16468

G1 X41.453 Y27.989 E0.22016

G1 X42.131 Y28.297 E0.22015

G1 X42.773 Y28.673 E0.22018

G1 X43.372 Y29.116 E0.22023

G1 X43.923 Y29.621 E0.22082

G1 X44.410 Y30.182 E0.21979

G1 X44.836 Y30.792 E0.22022

G1 X45.196 Y31.444 E0.22017

G1 X45.485 Y32.130 E0.22015

G1 X45.701 Y32.843 E0.22016

G1 X45.818 Y33.417 E0.17331

G1 X45.903 Y34.300 E0.26234

G1 X45.882 Y35.061 E0.22514

G1 X45.737 Y36.012 E0.28436

G1 X45.603 Y36.522 E0.15605

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G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
G1 X41.103 Y41.143 E0.22015
G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
M73 P59 R12
M73 Q59 S12
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11601
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
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;HEIGHT:0.1
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;3.9

G1 Z3.900 F3600.000
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;TYPE:External perimeter
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G1 X33.798 Y30.645 E0.06627
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G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.790 Y28.106 E0.15613
G1 X39.304 Y28.114 E0.28314
G1 X40.083 Y28.211 E0.43220
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
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G1 X44.801 Y32.008 E0.43400
G1 X45.063 Y32.751 E0.43400
G1 X45.231 Y33.521 E0.43400
G1 X45.304 Y34.306 E0.43399
G1 X45.280 Y35.093 E0.43400
G1 X45.159 Y35.872 E0.43400
G1 X44.943 Y36.630 E0.43399
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G1 X44.242 Y38.038 E0.43400
G1 X43.767 Y38.667 E0.43400
G1 X43.219 Y39.233 E0.43400
G1 X42.605 Y39.727 E0.43400
G1 X41.935 Y40.142 E0.43400
G1 X41.219 Y40.471 E0.43400
G1 X40.468 Y40.710 E0.43399
G1 X39.693 Y40.855 E0.43400
G1 X38.906 Y40.903 E0.43400
G1 X38.120 Y40.855 E0.43400
G1 X37.345 Y40.710 E0.43399
G1 X36.594 Y40.471 E0.43400
G1 X35.878 Y40.142 E0.43400
G1 X35.208 Y39.727 E0.43400
G1 X34.594 Y39.233 E0.43399
G1 X34.046 Y38.667 E0.43400
G1 X33.571 Y38.038 E0.43399
G1 X33.177 Y37.356 E0.43400
G1 X32.869 Y36.630 E0.43400
G1 X32.654 Y35.872 E0.43399
G1 X32.533 Y35.093 E0.43400
G1 X32.509 Y34.306 E0.43400
G1 X32.581 Y33.521 E0.43400
G1 X32.750 Y32.751 E0.43400
G1 X33.012 Y32.008 E0.43399
G1 X33.363 Y31.302 E0.43400
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G1 X32.831 Y29.950
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G1 X33.462 Y29.201 E0.44547
G1 X34.056 Y28.652 E0.44547
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
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G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
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G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
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G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
G1 X37.300 Y41.930 E0.44547
G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
G1 X35.048 Y41.050 E0.44547
G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
G1 X32.688 Y38.871 E0.44547
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G1 X32.259 Y38.185 E0.44547
G1 X31.905 Y37.457 E0.44547
G1 X31.631 Y36.697 E0.44547
G1 X31.439 Y35.911 E0.44547
G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
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G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
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;WIDTH:0.439535
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G1 X33.891 Y29.619 E0.22030
G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.790 Y27.509 E0.10044
G1 X39.334 Y27.517 E0.16092
G1 X40.204 Y27.628 E0.25940
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
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G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
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G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
G1 X41.103 Y41.143 E0.22015
G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.468 Y31.768 E0.11484
G1 X32.842 Y31.016 E0.24842
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;Z:4
;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
G92 E0.0
;4


G1 Z4.000 F3600.000
;AFTER_LAYER_CHANGE
;4
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;TYPE:External perimeter
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G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.783 Y28.106 E0.15267
G1 X39.304 Y28.114 E0.28653
G1 X40.083 Y28.211 E0.43226
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
G1 X44.450 Y31.302 E0.43400
G1 X44.801 Y32.008 E0.43400
G1 X45.063 Y32.751 E0.43400
G1 X45.231 Y33.521 E0.43400
G1 X45.304 Y34.306 E0.43399
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G1 X43.219 Y39.233 E0.43400
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G1 X31.972 Y33.574 E0.21546
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G1 X33.891 Y29.619 E0.22030
G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.771 Y27.509 E0.09467
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G1 X39.333 Y27.517 E0.16637          ;LAYER_CHANGE                          G1 X36.594 Y40.471 E0.43400
G1 X40.204 Y27.628 E0.25970          ;Z:4.3                                 G1 X35.878 Y40.142 E0.43400
G1 X40.747 Y27.755 E0.16468          ;HEIGHT:0.1                            G1 X35.208 Y39.727 E0.43400
G1 X41.453 Y27.989 E0.22016          ;BEFORE_LAYER_CHANGE                   G1 X34.594 Y39.233 E0.43399
G1 X42.131 Y28.297 E0.22015          G92 E0.0                               G1 X34.046 Y38.667 E0.43400
G1 X42.773 Y28.673 E0.22018          ;4.3                                   G1 X33.571 Y38.038 E0.43400
G1 X43.372 Y29.116 E0.22023                                                 G1 X33.177 Y37.356 E0.43400
G1 X43.923 Y29.621 E0.22082                                                 G1 X32.869 Y36.630 E0.43400
G1 X44.410 Y30.182 E0.21979          G1 Z4.300 F3600.000                    G1 X32.654 Y35.872 E0.43399
G1 X44.836 Y30.792 E0.22022          ;AFTER_LAYER_CHANGE                    G1 X32.533 Y35.093 E0.43399
G1 X45.196 Y31.444 E0.22017          ;4.3                                   G1 X32.509 Y34.306 E0.43400
G1 X45.485 Y32.130 E0.22015          ; printing object Pieza4.STL id:0 copy 0   G1 X32.581 Y33.521 E0.43400
G1 X45.701 Y32.843 E0.22016          G1 X33.732 Y30.746                     G1 X32.750 Y32.751 E0.43400
G1 X45.818 Y33.417 E0.17331          ;TYPE:External perimeter               G1 X33.012 Y32.008 E0.43399
G1 X45.903 Y34.300 E0.26234          ;WIDTH:0.8                             G1 X33.363 Y31.302 E0.43400
G1 X45.882 Y35.061 E0.22514          G1 F450.000                            G1 X33.666 Y30.846 E0.30164
G1 X45.737 Y36.012 E0.28436          G1 X33.798 Y30.645 E0.06627            G1 X33.676 Y30.639 F3600.000
G1 X45.603 Y36.522 E0.15605          G1 X34.311 Y30.047 E0.43400            G1 X32.831 Y29.950
G1 X45.350 Y37.222 E0.22016          G1 X34.894 Y29.516 E0.43400            G1 F450.000
G1 X45.025 Y37.892 E0.22016          G1 X35.537 Y29.061 E0.43399            G1 X32.929 Y29.810 E0.09418
G1 X44.631 Y38.524 E0.22019          G1 X36.231 Y28.688 E0.43400            G1 X33.462 Y29.201 E0.44547
G1 X44.173 Y39.111 E0.22025          G1 X36.966 Y28.403 E0.43400            G1 X34.056 Y28.652 E0.44547
G1 X43.631 Y39.666 E0.22946          G1 X37.730 Y28.211 E0.43400            G1 X34.705 Y28.170 E0.44547
G1 X43.079 Y40.119 E0.21112          G1 X38.506 Y28.115 E0.43059            G1 X35.402 Y27.759 E0.44547
G1 X42.457 Y40.529 E0.22020          G1 X38.764 Y28.107 E0.14231            G1 X36.139 Y27.425 E0.44547
G1 X41.796 Y40.871 E0.22016          G1 X39.303 Y28.114 E0.29669            G1 X36.907 Y27.171 E0.44547
G1 X41.103 Y41.143 E0.22015          G1 X40.083 Y28.211 E0.43245            G1 X37.698 Y27.000 E0.44547
G1 X40.385 Y41.340 E0.22017          G1 X40.847 Y28.403 E0.43400            G1 X38.504 Y26.914 E0.44637
G1 X39.779 Y41.445 E0.18195          G1 X41.582 Y28.688 E0.43400            G1 X39.306 Y26.913 E0.44166
G1 X38.906 Y41.503 E0.25858          G1 X42.276 Y29.061 E0.43399            G1 X40.115 Y27.000 E0.44841
G1 X38.163 Y41.460 E0.22031          G1 X42.919 Y29.516 E0.43400            G1 X40.906 Y27.171 E0.44547
G1 X37.212 Y41.290 E0.28550          G1 X43.502 Y30.047 E0.43400            G1 X41.674 Y27.425 E0.44547
G1 X36.710 Y41.143 E0.15488          G1 X44.014 Y30.645 E0.43400            G1 X42.410 Y27.759 E0.44547
G1 X36.017 Y40.871 E0.22015          G1 X44.450 Y31.302 E0.43400            G1 X43.107 Y28.170 E0.44547
G1 X35.356 Y40.529 E0.22016          G1 X44.801 Y32.008 E0.43400            G1 X43.757 Y28.652 E0.44547
G1 X34.854 Y40.206 E0.17650          G1 X45.063 Y32.751 E0.43400            G1 X44.351 Y29.201 E0.44547
G1 X34.182 Y39.666 E0.25484          G1 X45.231 Y33.521 E0.43400            G1 X44.884 Y29.810 E0.44547
G1 X33.640 Y39.111 E0.22946          G1 X45.304 Y34.306 E0.43399            G1 X45.349 Y30.472 E0.44547
G1 X33.068 Y38.356 E0.28006          G1 X45.280 Y35.093 E0.43400            G1 X45.741 Y31.179 E0.44547
G1 X32.788 Y37.892 E0.16036          G1 X45.159 Y35.872 E0.43400            G1 X46.055 Y31.925 E0.44547
G1 X32.463 Y37.222 E0.22016          G1 X44.943 Y36.630 E0.43399            G1 X46.289 Y32.699 E0.44547
G1 X32.210 Y36.522 E0.22015          G1 X44.636 Y37.356 E0.43400            G1 X46.439 Y33.494 E0.44547
G1 X32.032 Y35.799 E0.22018          G1 X44.242 Y38.038 E0.43400            G1 X46.503 Y34.300 E0.44547
G1 X31.931 Y35.061 E0.22024          G1 X43.767 Y38.667 E0.43400            G1 X46.482 Y35.109 E0.44547
G1 X31.910 Y34.300 E0.22514          G1 X43.219 Y39.233 E0.43400            G1 X46.374 Y35.911 E0.44547
G1 X31.972 Y33.574 E0.21546          G1 X42.605 Y39.727 E0.43400            G1 X46.182 Y36.697 E0.44547
G1 X32.112 Y32.843 E0.22021          G1 X41.935 Y40.142 E0.43400            G1 X45.908 Y37.457 E0.44547
G1 X32.327 Y32.130 E0.22017          G1 X41.219 Y40.471 E0.43400            G1 X45.554 Y38.185 E0.44547
G1 X32.470 Y31.765 E0.11600          G1 X40.468 Y40.710 E0.43399            G1 X45.125 Y38.871 E0.44547
G1 X32.842 Y31.016 E0.24725          G1 X39.693 Y40.855 E0.43400            G1 X44.625 Y39.507 E0.44547
G1 X33.171 Y30.508 E0.17894          G1 X38.906 Y40.903 E0.43400            G1 X44.061 Y40.086 E0.44547
; stop printing object Pieza4.STL id:0   G1 X38.120 Y40.855 E0.43400        M73 Q64 S11
copy 0                               G1 X37.345 Y40.710 E0.43399            G1 X43.438 Y40.603 E0.44547
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M73 P64 R11

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G1 X40.513 Y41.930 E0.44547
G1 X40.140 Y41.990 E0.20808
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G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.764 Y27.509 E0.09275
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G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979

G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
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G1 X33.640 Y39.111 E0.22946
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G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11601
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G1 X33.171 Y30.508 E0.17894
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;BEFORE_LAYER_CHANGE
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;4.4

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G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
G1 X38.506 Y28.115 E0.43059
G1 X38.758 Y28.107 E0.13886
G1 X39.303 Y28.114 E0.30008
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G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
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G1 X45.159 Y35.872 E0.43400
G1 X44.943 Y36.630 E0.43399
G1 X44.636 Y37.356 E0.43400
G1 X44.242 Y38.038 E0.43400
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G1 X34.594 Y39.233 E0.43399
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G1 X33.571 Y38.038 E0.43400
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G1 X34.705 Y28.170 E0.44547
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G1 X36.907 Y27.171 E0.44547
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G1 X39.306 Y26.913 E0.44169
G1 X40.115 Y27.000 E0.44841
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M73 P65 R11
M73 Q65 S11
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G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
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G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
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G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.758 Y27.509 E0.09084
G1 X39.333 Y27.517 E0.17001
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G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
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G1 X43.923 Y29.621 E0.22082
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G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
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;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
G92 E0.0
;4.5


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;4.5
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;WIDTH:0.8
G1 F450.000
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G1 X34.311 Y30.047 E0.43400
G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
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G1 X37.730 Y28.211 E0.43400
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M73 Q68 S10
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G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.738 Y27.510 E0.08510
G1 X39.354 Y27.524 E0.18214
G1 X40.204 Y27.628 E0.25333
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G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
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G1 X44.836 Y30.792 E0.22022
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G1 X45.485 Y32.130 E0.22015
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G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
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G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
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G1 X31.931 Y35.061 E0.22024
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G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
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G1 X32.470 Y31.765 E0.11600
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G1 X33.171 Y30.508 E0.17894
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;BEFORE_LAYER_CHANGE
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;4.8


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G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
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G1 X38.733 Y28.108 E0.12507
G1 X39.303 Y28.114 E0.31364
G1 X40.083 Y28.211 E0.43273
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
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G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
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G1 X44.450 Y31.302 E0.43400
G1 X44.801 Y32.008 E0.43400
G1 X45.063 Y32.751 E0.43400
G1 X45.231 Y33.521 E0.43400
G1 X45.304 Y34.306 E0.43399
G1 X45.280 Y35.093 E0.43400
G1 X45.159 Y35.872 E0.43400
G1 X44.943 Y36.630 E0.43399
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G1 X39.693 Y40.855 E0.43400
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G1 X37.345 Y40.710 E0.43399
G1 X36.594 Y40.471 E0.43400
G1 X35.878 Y40.142 E0.43400
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G1 X32.869 Y36.630 E0.43400
G1 X32.654 Y35.872 E0.43399
G1 X32.533 Y35.093 E0.43399
G1 X32.509 Y34.306 E0.43400
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G1 X33.012 Y32.008 E0.43399
G1 X33.363 Y31.302 E0.43400
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G1 X33.676 Y30.639 F3600.000
G1 X32.831 Y29.950
G1 F450.000
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G1 X35.402 Y27.759 E0.44547
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G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.732 Y27.510 E0.08319
G1 X39.331 Y27.522 E0.17730
G1 X40.204 Y27.628 E0.26009

G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
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M73 Q69 S10
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G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
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G1 X45.025 Y37.892 E0.22016
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G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.730 Y28.211 E0.43400
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
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G1 X37.066 Y27.755 E0.22016
G1 X37.633 Y27.623 E0.17217
G1 X38.451 Y27.520 E0.24365
G1 X38.725 Y27.510 E0.08129
G1 X39.331 Y27.522 E0.17912
G1 X40.204 Y27.628 E0.26018
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
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G1 X43.923 Y29.621 E0.22082
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G1 X44.836 Y30.792 E0.22022
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G1 X45.701 Y32.843 E0.22016
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M73 Q70 S9
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G1 X40.385 Y41.340 E0.22017
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G1 X38.163 Y41.460 E0.22031
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G1 X36.231 Y28.688 E0.43400
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G1 X36.360 Y27.989 E0.22015
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G1 X35.682 Y28.297 E0.15920
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G1 X38.537 Y27.517 E0.26611
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G1 X40.204 Y27.628 E0.31336
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G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
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G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22017
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; stop printing object Pieza4.STL id:0
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G1 X33.238 Y30.409
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.641 Y27.621 E0.17437
G1 X38.536 Y27.515 E0.26659
G1 X39.186 Y27.512 E0.19237
G1 X40.204 Y27.628 E0.30302
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025

G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
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G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
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G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
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G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11600
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;6.3


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;AFTER_LAYER_CHANGE
;6.3
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G1 X34.894 Y29.516 E0.43400
G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
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G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
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G1 X44.801 Y32.008 E0.43400
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G1 X45.231 Y33.521 E0.30175
G1 X45.304 Y34.306 E0.43399
G1 X45.280 Y35.093 E0.43400
G1 X45.159 Y35.872 E0.43400
G1 X44.943 Y36.630 E0.43399
G1 X44.636 Y37.356 E0.43400
G1 X44.242 Y38.038 E0.43400
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G1 X32.533 Y35.093 E0.43400
G1 X32.509 Y34.306 E0.43400
G1 X32.581 Y33.521 E0.43400
G1 X32.750 Y32.751 E0.43400
G1 X33.012 Y32.008 E0.43399
G1 X33.363 Y31.302 E0.43400
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G1 F450.000
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G1 X34.056 Y28.652 E0.44547

G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
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G1 X39.220 Y26.912 E0.39505
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M73 Q83 S5
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.640 Y27.622 E0.17426
G1 X38.536 Y27.515 E0.26666
G1 X39.191 Y27.513 E0.19389
G1 X40.204 Y27.628 E0.30154
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
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G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
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G1 X32.463 Y37.222 E0.22016
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G1 X32.112 Y32.843 E0.22021
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G1 X35.537 Y29.061 E0.43400
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
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G1 X38.617 Y28.111 E0.49029
G1 X39.301 Y28.114 E0.37683
G1 X40.083 Y28.211 E0.43345
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
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G1 X43.502 Y30.047 E0.43400
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G1 X44.636 Y37.356 E0.43400
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G1 X36.594 Y40.471 E0.43400
G1 X35.878 Y40.142 E0.43400
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G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
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M73 P84 R5
M73 Q84 S5
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G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
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G1 X40.360 Y41.955 E0.08498
G1 X39.714 Y42.059 E0.36049
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
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G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
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G1 X33.238 Y30.409
;TYPE:Gap fill
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G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.640 Y27.622 E0.17416
G1 X38.535 Y27.515 E0.26674
G1 X39.196 Y27.513 E0.19541
G1 X40.204 Y27.628 E0.30006
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
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G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
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G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
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G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
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G1 X43.631 Y39.666 E0.22946
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G1 X42.457 Y40.529 E0.22020
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G1 X38.906 Y41.503 E0.25858
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G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
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G1 X34.854 Y40.206 E0.17650
G1 X34.182 Y39.666 E0.25484
G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
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G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11601
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G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;BEFORE_LAYER_CHANGE
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;6.5


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G1 X35.537 Y29.061 E0.43400
G1 X36.231 Y28.688 E0.43400
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G1 X37.732 Y28.210 E0.43516
G1 X38.611 Y28.111 E0.48688
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G1 X40.083 Y28.211 E0.43349
G1 X40.847 Y28.403 E0.43400
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G1 X43.502 Y30.047 E0.43400
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G1 X44.801 Y32.008 E0.43400
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G1 X32.327 Y32.130 E0.22017
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G1 X32.464 Y30.472 E0.44547
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G1 X33.001 Y29.961 F3600.000
G1 X33.238 Y30.409
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
G1 X37.066 Y27.755 E0.22016
G1 X37.639 Y27.622 E0.17383
G1 X38.535 Y27.514 E0.26699
G1 X39.211 Y27.513 E0.19996
G1 X40.204 Y27.628 E0.29563
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G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
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G1 X45.350 Y37.222 E0.22016
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G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
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G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
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G1 X35.356 Y40.529 E0.22016
G1 X34.854 Y40.206 E0.17650
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G1 X33.640 Y39.111 E0.22946
G1 X33.068 Y38.356 E0.28006
G1 X32.788 Y37.892 E0.16036
G1 X32.463 Y37.222 E0.22016
G1 X32.210 Y36.522 E0.22015
G1 X32.032 Y35.799 E0.22018
G1 X31.931 Y35.061 E0.22024
G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.112 Y32.843 E0.22021
G1 X32.327 Y32.130 E0.22016
G1 X32.470 Y31.765 E0.11600
G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;Z:6.8
;HEIGHT:0.1
;BEFORE_LAYER_CHANGE
G92 E0.0
;6.8


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;AFTER_LAYER_CHANGE
;6.8
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;TYPE:External perimeter
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G1 X34.311 Y30.047 E0.43400
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G1 X35.537 Y29.061 E0.43400
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.732 Y28.210 E0.43496
G1 X38.592 Y28.112 E0.47663
G1 X39.301 Y28.114 E0.39066
G1 X40.083 Y28.211 E0.43360
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399
G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
G1 X44.450 Y31.302 E0.43400
G1 X44.801 Y32.008 E0.43400
G1 X45.063 Y32.751 E0.43400
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G1 X45.231 Y33.521 E0.33565
G1 X45.304 Y34.306 E0.43399
G1 X45.280 Y35.093 E0.43400
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G1 X44.636 Y37.356 E0.43400
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G1 X43.219 Y39.233 E0.43400
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G1 X41.219 Y40.471 E0.43400
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G1 X39.693 Y40.855 E0.43400
G1 X38.906 Y40.903 E0.43400
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G1 X37.345 Y40.710 E0.43399
G1 X36.594 Y40.471 E0.43400
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G1 X34.594 Y39.233 E0.43399
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G1 X33.571 Y38.038 E0.43400
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G1 X32.533 Y35.093 E0.43400
G1 X32.509 Y34.306 E0.43400
G1 X32.581 Y33.521 E0.43399
G1 X32.750 Y32.751 E0.43400
G1 X33.012 Y32.008 E0.43399
G1 X33.363 Y31.302 E0.43400
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G1 X33.676 Y30.639 F3600.000
G1 X32.831 Y29.950
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G1 F450.000
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
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G1 X39.246 Y26.912 E0.40948
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M73 Q88 S4
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
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G1 X37.638 Y27.622 E0.17372
G1 X38.535 Y27.514 E0.26708
G1 X39.216 Y27.513 E0.20148
G1 X40.204 Y27.628 E0.29416
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
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G1 X45.025 Y37.892 E0.22016
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G1 X44.173 Y39.111 E0.22025
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G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.110 Y32.850 E0.21807
G1 X32.184 Y32.577 E0.08355
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;6.9


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G1 X35.537 Y29.061 E0.43399
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.732 Y28.210 E0.43489
G1 X38.585 Y28.112 E0.47321
G1 X39.301 Y28.114 E0.39412
G1 X40.083 Y28.211 E0.43363
G1 X40.847 Y28.403 E0.43400
G1 X41.582 Y28.688 E0.43400
G1 X42.276 Y29.061 E0.43399

G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
G1 X44.450 Y31.302 E0.43400
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G1 X45.280 Y35.093 E0.43400
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G1 X33.676 Y30.639 F3600.000
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G1 F450.000
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G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
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M73 Q88 S3
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
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G1 X46.439 Y33.494 E0.44547
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G1 X44.625 Y39.507 E0.44547
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G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.718 E0.44547
G1 X40.513 Y41.930 E0.44547
G1 X39.714 Y42.059 E0.44547
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
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G1 X35.048 Y41.050 E0.44547
G1 X34.374 Y40.603 E0.44547
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G1 X33.187 Y39.507 E0.44547
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G1 X31.374 Y33.494 E0.44547
G1 X31.524 Y32.702 E0.44400
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G1 X32.072 Y31.179 E0.37954
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G1 X34.509 Y29.059 E0.24675
G1 X35.213 Y28.561 E0.25479
G1 X35.682 Y28.297 E0.15920
G1 X36.360 Y27.989 E0.22015
M73 P89 R3
M73 Q89 S3
G1 X37.066 Y27.755 E0.22016
G1 X37.638 Y27.622 E0.17361
G1 X38.535 Y27.514 E0.26717
G1 X39.221 Y27.513 E0.20299
G1 X40.204 Y27.628 E0.29268
G1 X40.747 Y27.755 E0.16468
G1 X41.453 Y27.989 E0.22016
G1 X42.131 Y28.297 E0.22015
G1 X42.773 Y28.673 E0.22018
G1 X43.372 Y29.116 E0.22023
G1 X43.923 Y29.621 E0.22082
G1 X44.410 Y30.182 E0.21979
G1 X44.836 Y30.792 E0.22022
G1 X45.196 Y31.444 E0.22017
G1 X45.485 Y32.130 E0.22015
G1 X45.701 Y32.843 E0.22016
G1 X45.818 Y33.417 E0.17331
G1 X45.903 Y34.300 E0.26234
G1 X45.882 Y35.061 E0.22514
G1 X45.737 Y36.012 E0.28436
G1 X45.603 Y36.522 E0.15605
G1 X45.350 Y37.222 E0.22016
G1 X45.025 Y37.892 E0.22016
G1 X44.631 Y38.524 E0.22019
G1 X44.173 Y39.111 E0.22025
G1 X43.631 Y39.666 E0.22946
G1 X43.079 Y40.119 E0.21112
G1 X42.457 Y40.529 E0.22020
G1 X41.796 Y40.871 E0.22016
G1 X41.103 Y41.143 E0.22015
G1 X40.385 Y41.340 E0.22017
G1 X39.779 Y41.445 E0.18195
G1 X38.906 Y41.503 E0.25858
G1 X38.163 Y41.460 E0.22031
G1 X37.212 Y41.290 E0.28550
G1 X36.710 Y41.143 E0.15488
G1 X36.017 Y40.871 E0.22015
G1 X35.356 Y40.529 E0.22016
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G1 X31.910 Y34.300 E0.22514
G1 X31.972 Y33.574 E0.21546
G1 X32.110 Y32.849 E0.21822
G1 X32.184 Y32.577 E0.08341
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G1 X32.842 Y31.016 E0.24725
G1 X33.171 Y30.508 E0.17894
; stop printing object Pieza4.STL id:0
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;HEIGHT:0.0999999
;BEFORE_LAYER_CHANGE
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;7


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;AFTER_LAYER_CHANGE
;7
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;TYPE:External perimeter
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G1 X35.537 Y29.061 E0.43400
G1 X36.231 Y28.688 E0.43400
G1 X36.966 Y28.403 E0.43400
G1 X37.732 Y28.210 E0.43482
G1 X38.579 Y28.112 E0.46980
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G1 X42.919 Y29.516 E0.43400
G1 X43.502 Y30.047 E0.43400
G1 X44.014 Y30.645 E0.43400
G1 X44.450 Y31.302 E0.43400
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G1 X31.905 Y37.457 E0.44547          G1 X42.455 Y40.525 E0.17439          G1 X39.301 Y28.114 E0.40797
G1 X31.631 Y36.697 E0.44547          G1 X41.796 Y40.871 E0.21975          G1 X40.083 Y28.211 E0.43377
G1 X31.439 Y35.911 E0.44547          G1 X41.108 Y41.141 E0.21828          G1 X40.847 Y28.403 E0.43400
G1 X31.331 Y35.109 E0.44547          G1 X40.600 Y41.287 E0.15606          G1 X41.584 Y28.689 E0.43551
G1 X31.310 Y34.300 E0.44547          G1 X39.779 Y41.445 E0.24686          G1 X42.354 Y29.116 E0.48451
G1 X31.374 Y33.494 E0.44547          G1 X38.906 Y41.503 E0.25816          G1 X42.919 Y29.516 E0.38163
G1 X31.524 Y32.701 E0.44435          G1 X38.163 Y41.460 E0.21995          G1 X43.502 Y30.047 E0.43400
G1 X31.792 Y31.843 E0.49504          G1 X37.212 Y41.290 E0.28505          G1 X44.014 Y30.645 E0.43400
G1 X32.072 Y31.179 E0.39678          G1 X36.710 Y41.143 E0.15463          G1 X44.450 Y31.302 E0.43400
G1 X32.464 Y30.472 E0.44547          G1 X36.017 Y40.871 E0.21980          G1 X44.802 Y32.010 E0.43551
G1 X32.762 Y30.048 E0.28521          G1 X35.356 Y40.529 E0.21981          G1 X45.083 Y32.844 E0.48451
G1 X33.001 Y29.961 F3600.000         G1 X34.854 Y40.206 E0.17622          G1 X45.231 Y33.521 E0.38163
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G1 X33.403 Y30.182 E0.08277          G1 X32.463 Y37.222 E0.21980          G1 X44.636 Y37.356 E0.43400
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G1 X35.213 Y28.561 E0.22081          G1 X31.931 Y35.061 E0.21989          G1 X43.144 Y39.292 E0.48451
G1 X35.682 Y28.297 E0.15895          G1 X31.910 Y34.294 E0.22656          G1 X42.605 Y39.727 E0.38163
G1 X36.360 Y27.989 E0.21980          G1 X31.977 Y33.575 E0.21326          G1 X41.935 Y40.142 E0.43400
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G1 X37.637 Y27.622 E0.17298          G1 X32.183 Y32.577 E0.08282          G1 X40.468 Y40.710 E0.43399
G1 X38.535 Y27.513 E0.26701          G1 X32.473 Y31.756 E0.25698          G1 X39.693 Y40.855 E0.43400
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G1 X40.204 Y27.628 E0.28780          G1 X33.171 Y30.508 E0.14518          G1 X38.120 Y40.855 E0.43400
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G1 X44.836 Y30.792 E0.21979          ;7.3                                 G1 X33.177 Y37.356 E0.43400
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M73 Q91 S2                                                                G1 X32.639 Y35.778 E0.48451
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G1 X45.483 Y32.131 E0.21976          ;AFTER_LAYER_CHANGE                  G1 X32.509 Y34.303 E0.43551
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G1 X45.818 Y33.417 E0.21418          ; printing object Pieza4.STL id:0 copy 0  G1 X32.750 Y32.751 E0.38163
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G1 X45.603 Y36.522 E0.15580          G1 F450.000                          G1 X33.676 Y30.639 F3600.000
G1 X45.350 Y37.222 E0.21980          G1 X33.798 Y30.645 E0.06627          G1 X32.831 Y29.950
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G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
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G1 X36.907 Y27.171 E0.44547
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G1 X35.682 Y28.297 E0.15897
G1 X36.360 Y27.989 E0.21984
G1 X37.066 Y27.755 E0.21984
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G1 X38.535 Y27.513 E0.26715
G1 X39.241 Y27.513 E0.20873
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G1 X41.107 Y41.141 E0.21848
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M73 Q93 S2
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G1 X32.327 Y32.130 E0.21985
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G1 X36.907 Y27.171 E0.44547
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G1 X39.277 Y26.913 E0.42677
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G1 X36.360 Y27.989 E0.21988
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G1 X37.636 Y27.622 E0.17280
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M73 P94 R2
M73 Q94 S2
G1 X32.463 Y37.222 E0.21988
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G1 X32.212 Y36.521 E0.21985
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G1 X45.280 Y35.093 E0.43400
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G1 X35.682 Y28.297 E0.15903
G1 X36.360 Y27.989 E0.21991
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G1 X37.636 Y27.622 E0.17271
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G1 X32.111 Y32.846 E0.21890
G1 X32.347 Y32.079 E0.23716
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M73 Q95 S2
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copy 0
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G1 X35.537 Y29.061 E0.40254
G1 X36.231 Y28.688 E0.43400
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G1 X38.541 Y28.113 E0.44933
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G1 X44.450 Y31.302 E0.40254
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G1 X44.636 Y37.356 E0.43400
G1 X44.242 Y38.038 E0.43400
G1 X43.766 Y38.668 E0.43494
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M73 Q95 S1
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G1 X41.935 Y40.142 E0.43400
G1 X41.219 Y40.471 E0.43400
G1 X40.468 Y40.710 E0.43399
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G1 X32.509 Y34.304 E0.43494
G1 X32.594 Y33.465 E0.46429
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G1 X37.635 Y27.623 E0.17261
G1 X38.518 Y27.514 E0.26280
G1 X39.256 Y27.514 E0.21814
G1 X40.204 Y27.628 E0.28212
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G1 X41.453 Y27.989 E0.21996
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M73 Q96 S1
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G1 X41.219 Y40.471 E0.43400
M73 P99 R0
M73 Q99 S0
G1 X40.468 Y40.710 E0.43399
G1 X39.693 Y40.855 E0.43400
G1 X38.906 Y40.903 E0.43400
G1 X38.120 Y40.855 E0.43400
G1 X37.345 Y40.710 E0.43399
G1 X36.594 Y40.471 E0.43400
G1 X35.878 Y40.142 E0.43411
G1 X35.203 Y39.723 E0.43736
G1 X34.594 Y39.233 E0.43049
G1 X34.046 Y38.667 E0.43400
G1 X33.571 Y38.038 E0.43400
G1 X33.177 Y37.356 E0.43400
G1 X32.869 Y36.630 E0.43411
G1 X32.653 Y35.866 E0.43736
G1 X32.533 Y35.093 E0.43049
G1 X32.509 Y34.305 E0.43411
G1 X32.583 Y33.515 E0.43736
G1 X32.750 Y32.751 E0.43049
G1 X33.012 Y32.008 E0.43399
G1 X33.363 Y31.302 E0.43400
G1 X33.666 Y30.846 E0.30164
G1 X33.676 Y30.639 F3600.000
G1 X32.831 Y29.950
G1 F450.000
G1 X32.929 Y29.810 E0.09418
G1 X33.462 Y29.201 E0.44547
G1 X34.056 Y28.652 E0.44547
G1 X34.705 Y28.170 E0.44547
G1 X35.402 Y27.759 E0.44547
G1 X36.139 Y27.425 E0.44547
G1 X36.907 Y27.171 E0.44547
G1 X37.698 Y27.000 E0.44547
G1 X38.502 Y26.914 E0.44548
G1 X39.308 Y26.914 E0.44404
G1 X40.115 Y27.000 E0.44693
G1 X40.906 Y27.171 E0.44545
G1 X41.674 Y27.425 E0.44547
G1 X42.410 Y27.759 E0.44547
G1 X43.107 Y28.170 E0.44547
G1 X43.757 Y28.652 E0.44547
G1 X44.351 Y29.201 E0.44547
G1 X44.884 Y29.810 E0.44547
G1 X45.349 Y30.472 E0.44547
G1 X45.741 Y31.179 E0.44547
G1 X46.055 Y31.925 E0.44547
G1 X46.289 Y32.699 E0.44547
G1 X46.439 Y33.494 E0.44547
G1 X46.503 Y34.300 E0.44547
G1 X46.482 Y35.109 E0.44547
G1 X46.374 Y35.911 E0.44547
```

```
G1 X46.182 Y36.697 E0.44547
G1 X45.908 Y37.457 E0.44547
G1 X45.554 Y38.185 E0.44547
G1 X45.125 Y38.871 E0.44547
G1 X44.625 Y39.507 E0.44547
G1 X44.061 Y40.086 E0.44547
G1 X43.438 Y40.603 E0.44547
G1 X42.764 Y41.050 E0.44547
G1 X42.047 Y41.423 E0.44547
G1 X41.293 Y41.717 E0.44540
G1 X40.508 Y41.931 E0.44839
G1 X39.714 Y42.059 E0.44262
G1 X38.906 Y42.102 E0.44547
G1 X38.099 Y42.059 E0.44547
G1 X37.300 Y41.930 E0.44547
G1 X36.520 Y41.718 E0.44547
G1 X35.766 Y41.423 E0.44547
G1 X35.048 Y41.050 E0.44547
G1 X34.374 Y40.603 E0.44547
G1 X33.752 Y40.086 E0.44547
G1 X33.187 Y39.507 E0.44547
G1 X32.688 Y38.871 E0.44547
G1 X32.259 Y38.185 E0.44547
G1 X31.905 Y37.457 E0.44547
G1 X31.631 Y36.697 E0.44547
G1 X31.439 Y35.911 E0.44547
G1 X31.331 Y35.109 E0.44547
G1 X31.310 Y34.300 E0.44547
G1 X31.374 Y33.494 E0.44547
G1 X31.524 Y32.699 E0.44547
G1 X31.758 Y31.925 E0.44547
G1 X32.072 Y31.179 E0.44547
G1 X32.464 Y30.472 E0.44547
G1 X32.762 Y30.048 E0.28521
G1 X33.001 Y29.961 F3600.000
G1 X33.238 Y30.409
;TYPE:Gap fill
;WIDTH:0.439492
G1 F450.000
G1 X33.403 Y30.182 E0.08289
G1 X33.891 Y29.619 E0.22028
G1 X34.515 Y29.055 E0.24871
G1 X35.213 Y28.561 E0.25277
G1 X35.682 Y28.297 E0.15919
G1 X36.360 Y27.989 E0.22013
G1 X37.066 Y27.755 E0.22014
G1 X37.633 Y27.623 E0.17222
G1 X38.492 Y27.516 E0.25571
G1 X39.276 Y27.514 E0.23204
G1 X40.204 Y27.628 E0.27647
G1 X40.747 Y27.755 E0.16466
G1 X41.453 Y27.989 E0.22014
G1 X42.131 Y28.297 E0.22013
```

```
G1 X42.773 Y28.673 E0.22016
G1 X43.372 Y29.116 E0.22021
G1 X43.923 Y29.621 E0.22091
G1 X44.409 Y30.182 E0.21964
G1 X44.836 Y30.792 E0.22019
G1 X45.196 Y31.444 E0.22015
G1 X45.485 Y32.130 E0.22013
G1 X45.701 Y32.843 E0.22014
G1 X45.818 Y33.417 E0.17330
G1 X45.903 Y34.300 E0.26232
G1 X45.882 Y35.061 E0.22512
G1 X45.737 Y36.012 E0.28433
G1 X45.603 Y36.522 E0.15603
G1 X45.350 Y37.222 E0.22013
G1 X45.025 Y37.892 E0.22013
G1 X44.631 Y38.524 E0.22017
G1 X44.173 Y39.111 E0.22023
G1 X43.631 Y39.666 E0.22944
G1 X43.079 Y40.119 E0.21110
G1 X42.457 Y40.529 E0.22018
G1 X41.796 Y40.871 E0.22014
G1 X41.103 Y41.142 E0.22003
G1 X40.380 Y41.340 E0.22172
G1 X39.779 Y41.445 E0.18045
G1 X38.906 Y41.503 E0.25855
G1 X38.163 Y41.460 E0.22028
G1 X37.212 Y41.290 E0.28547
G1 X36.710 Y41.143 E0.15486
G1 X36.017 Y40.871 E0.22013
G1 X35.356 Y40.529 E0.22014
G1 X34.848 Y40.202 E0.17842
G1 X34.182 Y39.666 E0.25287
G1 X33.640 Y39.111 E0.22944
G1 X33.068 Y38.356 E0.28003
G1 X32.788 Y37.892 E0.16035
G1 X32.463 Y37.222 E0.22013
G1 X32.210 Y36.522 E0.22013
G1 X32.032 Y35.799 E0.22016
G1 X31.931 Y35.061 E0.22022
G1 X31.910 Y34.300 E0.22523
G1 X31.972 Y33.574 E0.21531
G1 X32.112 Y32.843 E0.22018
G1 X32.327 Y32.130 E0.22014
G1 X32.470 Y31.765 E0.11599
G1 X32.842 Y31.016 E0.24723
G1 X33.171 Y30.508 E0.17892
; stop printing object Pieza4.STL id:0
copy 0
M107
;TYPE:Custom
; Filament-specific end gcode
G4 ; wait
M221 S100 ; reset flow
```

```
M900 K0 ; reset LA

M107 ; turn off fan
G1 Z38 ; Move print head up

M84 ; disable motors
M73 P100 R0
M73 Q100 S0
; filament used [mm] = 6979.81
; filament used [cm3] = 49.34
; filament used [g] = 61.18
; filament cost = 1.55
; total filament used [g] = 61.18
; total filament cost = 1.55
; estimated printing time (normal
mode) = 30m 59s
; estimated printing time (silent mode)
= 30m 59s

; avoid_crossing_perimeters = 0
;
avoid_crossing_perimeters_max_det
our = 0
; bed_custom_model =
; bed_custom_texture =
;           bed_shape          =
0x0,250x0,250x210,0x210
; bed_temperature = 90
;        before_layer_gcode        =
;BEFORE_LAYER_CHANGE\nG92
E0.0\n;[layer_z]\n\n
; between_objects_gcode =
; bottom_fill_pattern = rectilinear
; bottom_solid_layers = 0
; bottom_solid_min_thickness = 0.8
; bridge_acceleration = 1000
; bridge_angle = 0
; bridge_fan_speed = 100
; bridge_flow_ratio = 0.95
; bridge_speed = 7.5
; brim_width = 0
; clip_multipart_objects = 1
; color_change_gcode = M600
;
compatible_printers_condition_cum
mulative                        =
"printer_model=~/(MK3|MK2.5).*/
and  nozzle_diameter[0]==0.8  and
num_extruders==1";"nozzle_diamete
r[0]==0.8        and        !
(printer_notes=~/.*PRINTER_VENDO
R_PRUSA3D.*/              and
printer_notes=~/.*PRINTER_MODEL_
```

MK(2.5|3).*/ and single_extruder_multi_material)"
; complete_objects = 0
; cooling = 1
; cooling_tube_length = 5
; cooling_tube_retraction = 91.5
; default_acceleration = 0
; default_filament_profile = "Prusament PLA"
; default_print_profile = 0.15mm QUALITY @MK3
; deretract_speed = 0
; disable_fan_first_layers = 1
; dont_support_bridges = 1
; draft_shield = 0
; duplicate_distance = 6
; elefant_foot_compensation = 0.2
; end_filament_gcode = "; Filament-specific end gcode"
; end_gcode = G4 ; wait\nM221 S100 ; reset flow\nM900 K0 ; reset LA\n{if print_settings_id=~/.*(DETAIL @MK3|QUALITY @MK3|@0.25 nozzle MK3).*/}M907 E538 ; reset extruder motor current{endif}\nM107 ; turn off fan\n{if max_layer_z < max_print_height}G1 Z{z_offset+min(max_layer_z+30, max_print_height)}{endif} ; Move print head up\n\nM84 ; disable motors
; ensure_vertical_shell_thickness = 1
; external_perimeter_extrusion_width = 0.8
; external_perimeter_speed = 7.5
; external_perimeters_first = 0
; extra_loading_move = -2
; extra_perimeters = 0
; extruder_clearance_height = 20
; extruder_clearance_radius = 45
; extruder_colour = ""
; extruder_offset = 0x0
; extrusion_axis = E
; extrusion_multiplier = 50
; extrusion_width = 0.8
; fan_always_on = 1
; fan_below_layer_time = 100
; filament_colour = #FF8000
; filament_cooling_final_speed = 3.4
; filament_cooling_initial_speed = 2.2
; filament_cooling_moves = 4

; filament_cost = 25.4
; filament_density = 1.24
; filament_diameter = 3
; filament_load_time = 0
; filament_loading_speed = 28
; filament_loading_speed_start = 3
; filament_max_volumetric_speed = 15
; filament_minimal_purge_on_wipe_tower = 15
; filament_notes = ""
; filament_ramming_parameters = "120 100 6.6 6.8 7.2 7.6 7.9 8.2 8.7 9.4 9.9 10.0| 0.05 6.6 0.45 6.8 0.95 7.8 1.45 8.3 1.95 9.7 2.45 10 2.95 7.6 3.45 7.6 3.95 7.6 4.45 7.6 4.95 7.6"
; filament_settings_id = "Generic PLA @0.8 nozzle - Copiar"
; filament_soluble = 0
; filament_spool_weight = 0
; filament_toolchange_delay = 0
; filament_type = PLA
; filament_unload_time = 0
; filament_unloading_speed = 90
; filament_unloading_speed_start = 100
; filament_vendor = Generic
; fill_angle = 45
; fill_density = 100%
; fill_pattern = rectilinear
; first_layer_acceleration = 1000
; first_layer_bed_temperature = 90
; first_layer_extrusion_width = 0.8
; first_layer_height = 0.2
; first_layer_speed = 5
; first_layer_temperature = 210
; full_fan_speed_layer = 4
; gap_fill_speed = 7.5
; gcode_comments = 0
; gcode_flavor = marlin
; gcode_label_objects = 1
; high_current_on_filament_swap = 0
; host_type = octoprint
; infill_acceleration = 1000
; infill_anchor = 1
; infill_anchor_max = 1
; infill_every_layers = 1
; infill_extruder = 1
; infill_extrusion_width = 0.8
; infill_first = 0
; infill_only_where_needed = 0
; infill_overlap = 80%

; infill_speed = 7.5
; inherits_cummulative = "0.30mm DETAIL @0.8 nozzle";"Generic PLA @0.8 nozzle";"Original Prusa i3 MK3S & MK3S+"
; interface_shells = 0
; ironing = 0
; ironing_flowrate = 15%
; ironing_spacing = 0.1
; ironing_speed = 15
; ironing_type = top
; layer_gcode = ;AFTER_LAYER_CHANGE\n;[layer_z]
; layer_height = 0.1
; machine_limits_usage = emit_to_gcode
; machine_max_acceleration_e = 5000,5000
; machine_max_acceleration_extruding = 1250,1250
; machine_max_acceleration_retracting = 1250,1250
; machine_max_acceleration_x = 1000,960
; machine_max_acceleration_y = 1000,960
; machine_max_acceleration_z = 1000,1000
; machine_max_feedrate_e = 120,120
; machine_max_feedrate_x = 200,100
; machine_max_feedrate_y = 200,100
; machine_max_feedrate_z = 12,12
; machine_max_jerk_e = 1.5,1.5
; machine_max_jerk_x = 8,8
; machine_max_jerk_y = 8,8
; machine_max_jerk_z = 0.4,0.4
; machine_min_extruding_rate = 0,0
; machine_min_travel_rate = 0,0
; max_fan_speed = 100
; max_layer_height = 0.25
; max_print_height = 210
; max_print_speed = 60
; max_volumetric_speed = 0
; min_fan_speed = 100
; min_layer_height = 0.07
; min_print_speed = 15
; min_skirt_length = 4
; notes =
; nozzle_diameter = 0.8

```
;
only_retract_when_crossing_perimet
ers = 0
; ooze_prevention = 0
; output_filename_format =
{input_filename_base}_{nozzle_diam
eter[0]}n_{layer_height}mm_{filamen
t_type[0]}_{printer_model}_{print_ti
me}.gcode
; overhangs = 0
; parking_pos_retraction = 92
; pause_print_gcode = M601
; perimeter_acceleration = 800
; perimeter_extruder = 1
; perimeter_extrusion_width = 0.8
; perimeter_speed = 7.5
; perimeters = 2
; physical_printer_settings_id =
; post_process =
; print_settings_id = 0.30mm DETAIL
@0.8 nozzle - Copiar
; printer_model = MK3S
; printer_notes = Don't remove the
following keywords! These keywords
are used in the "compatible printer"
condition of the print and filament
profiles to link the particular print and
filament profiles to this printer
profile.\nPRINTER_VENDOR_PRUSA3
D\nPRINTER_MODEL_MK3\n
; printer_settings_id = Original Prusa
i3 MK3S & MK3S+ - Copiar
; printer_technology = FFF
; printer_variant = 0.4
; printer_vendor =
; raft_layers = 0
; remaining_times = 1
; resolution = 0
; retract_before_travel = 1
; retract_before_wipe = 0%
; retract_layer_change = 1
; retract_length = 0
; retract_length_toolchange = 4
; retract_lift = 0.4
; retract_lift_above = 0
; retract_lift_below = 209
; retract_restart_extra = 0
; retract_restart_extra_toolchange = 0
; retract_speed = 35
; seam_position = aligned
; silent_mode = 1
; single_extruder_multi_material = 0
```

```
;
single_extruder_multi_material_prim
ing = 0
; skirt_distance = 3
; skirt_height = 2
; skirts = 1
; slice_closing_radius = 0.049
; slowdown_below_layer_time = 20
; small_perimeter_speed = 7.5
; solid_infill_below_area = 0
; solid_infill_every_layers = 0
; solid_infill_extruder = 1
; solid_infill_extrusion_width = 0.9
; solid_infill_speed = 50
; spiral_vase = 0
; standby_temperature_delta = -5
; start_filament_gcode = "M900 K{if
printer_notes=~/.*PRINTER_MODEL_
MINI.*/ and
nozzle_diameter[0]==0.6}0.12{elsif
printer_notes=~/.*PRINTER_MODEL_
MINI.*/ and
nozzle_diameter[0]==0.8}0.06{elsif
printer_notes=~/.*PRINTER_MODEL_
MINI.*/}0.2{elsif
nozzle_diameter[0]==0.8}0.01{elsif
nozzle_diameter[0]==0.6}0.04{else}0.
05{endif} ; Filament gcode LA 1.5\n{if
printer_notes=~/.*PRINTER_MODEL_
MINI.*/};{elsif
printer_notes=~/.*PRINTER_HAS_BO
WDEN.*/}M900 K200{elsif
nozzle_diameter[0]==0.6}M900
K18{elsif
nozzle_diameter[0]==0.8};{else}M900
K30{endif} ; Filament gcode LA 1.0"
; start_gcode = M221 S{if
layer_height<0.075}100{else}95{endif
}\nM862.3 P "[printer_model]" ;
printer model check\nM862.1
P[nozzle_diameter] ; nozzle diameter
check\nM115 U3.9.1 ; tell printer
latest fw version\nG90 ; use absolute
coordinates\nM83 ; extruder relative
mode\nM104
S[first_layer_temperature] ; set
extruder temp\nM140
S[first_layer_bed_temperature] ; set
bed temp\nM190
S[first_layer_bed_temperature] ; wait
for bed temp\nM109
S[first_layer_temperature] ; wait for
extruder temp\n\nM73 Q1
```

```
S5\n\nM73 P1 R5\n\nG92 E0.0\n\n;
Don't change E values below.
Excessive value can damage the
printer.\n\n{if
print_settings_id=~/.*(DETAIL
@MK3|QUALITY @MK3).*/}M907
E430 ; set extruder motor
current{endif}\n{if
print_settings_id=~/.*(SPEED
@MK3|DRAFT @MK3).*/}M907 E538
; set extruder motor current{endif}
; support_material = 0
; support_material_angle = 0
; support_material_auto = 1
; support_material_buildplate_only =
0
; support_material_contact_distance
= 0.25
; support_material_enforce_layers = 0
; support_material_extruder = 0
; support_material_extrusion_width =
0.7
;
support_material_interface_contact_
loops = 0
;
support_material_interface_extruder
= 0
; support_material_interface_layers =
2
; support_material_interface_spacing
= 0.4
; support_material_interface_speed =
100%
; support_material_pattern =
rectilinear
; support_material_spacing = 2
; support_material_speed = 7.5
;
support_material_synchronize_layers
= 0
; support_material_threshold = 50
; support_material_with_sheath = 0
; support_material_xy_spacing = 80%
; temperature = 210
; template_custom_gcode =
; thin_walls = 0
; threads = 16
; thumbnails =
; toolchange_gcode =
; top_fill_pattern = rectilinear
; top_infill_extrusion_width = 0.8
; top_solid_infill_speed = 35
```

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; top_solid_layers = 0

; top_solid_min_thickness = 1.2

; travel_speed = 60

; use_firmware_retraction = 0

; use_relative_e_distances = 1

; use_volumetric_e = 0

; variable_layer_height = 1

; wipe = 1

; wipe_into_infill = 0

; wipe_into_objects = 0

; wipe_tower = 1

; wipe_tower_bridging = 10

; wipe_tower_no_sparse_layers = 0

; wipe_tower_rotation_angle = 0

; wipe_tower_width = 60

; wipe_tower_x = 170

; wipe_tower_y = 140

; wiping_volumes_extruders = 70,70

; wiping_volumes_matrix = 0

; xy_size_compensation = 0

; z_offset = 0

A2. Resultados de las pruebas de durezas HV de cada modelo

PIEZA 1A									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
144,5	144,5	36,125	36,125	0,036125	0,036125	0,036125	284	2,7845	
148,5	144	37,125	36	0,037125	0,036	0,0365625	277	2,7183	
149	152	37,25	38	0,03725	0,038	0,037625	262	2,5669	
124	130,5	31	32,625	0,031	0,032625	0,0318125	366	3,5906	
132	138	33	34,5	0,033	0,0345	0,03375	326	3,1902	
137	135	34,25	33,75	0,03425	0,03375	0,034	321	3,1435	
133	133	33,25	33,25	0,03325	0,03325	0,03325	335	3,2869	
148	147	37	36,75	0,037	0,03675	0,036875	273	2,6724	
137	136,5	34,25	34,125	0,03425	0,034125	0,0341875	317	3,1091	
146	144	36,5	36	0,0365	0,036	0,03625	282	2,7653	
144	145	36	36,25	0,036	0,03625	0,036125	284	2,7845	
140	135	35	33,75	0,035	0,03375	0,034375	314	3,0752	
144	139	36	34,75	0,036	0,03475	0,035375	296	2,9038	
131	134	32,75	33,5	0,03275	0,0335	0,033125	338	3,3117	
138	143	34,5	35,75	0,0345	0,03575	0,035125	301	2,9453	
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	CENTRO
133,5	132	33,375	33	0,033375	0,033	0,0331875	337	3,2993	CENTRO
134	133,5	33,5	33,375	0,0335	0,033375	0,0334375	332	3,2501	CENTRO
138	136,5	34,5	34,125	0,0345	0,034125	0,0343125	315	3,0865	CENTRO
144	153	36	38,25	0,036	0,03825	0,037125	269	2,6365	CENTRO
145	146	36,25	36,5	0,03625	0,0365	0,036375	280	2,7464	CENTRO
141	149	35,25	37,25	0,03525	0,03725	0,03625	282	2,7653	CENTRO
144	159	36	39,75	0,036	0,03975	0,037875	258	2,5331	CENTRO
133	143	33,25	35,75	0,03325	0,03575	0,0345	312	3,0530	CENTRO
153	148,5	38,25	37,125	0,03825	0,037125	0,0376875	261	2,5584	PICO IZQUI
126	128	31,5	32	0,0315	0,032	0,03175	368	3,6048	PICO IZQUI
144	138	36	34,5	0,036	0,0345	0,03525	298	2,9245	PICO IZQUI
143	140	35,75	35	0,03575	0,035	0,035375	296	2,9038	PICO IZQUI
138	139	34,5	34,75	0,0345	0,03475	0,034625	309	3,0310	PICO IZQUI
139	137	34,75	34,25	0,03475	0,03425	0,0345	312	3,0530	PICO IZQUI
130	136	32,5	34	0,0325	0,034	0,03325	335	3,2869	PICO IZQUI
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	PICO IZQUI
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	PICO IZQUI
132	132	33	33	0,033	0,033	0,033	340	3,3369	PICO DERE
132	130	33	32,5	0,033	0,0325	0,03275	346	3,3880	PICO DERE
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	PICO DERE
148	147	37	36,75	0,037	0,03675	0,036875	273	2,6724	PICO DERE
146	149	36,5	37,25	0,0365	0,03725	0,036875	273	2,6724	PICO DERE
147	152	36,75	38	0,03675	0,038	0,037375	265	2,6014	PICO DERE
146	147	36,5	36,75	0,0365	0,03675	0,036625	276	2,7090	PICO DERE
140	144	35	36	0,035	0,036	0,0355	294	2,8834	PICO DERE
136	141	34	35,25	0,034	0,03525	0,034625	309	3,0310	PICO DERE

Figura A2.1. Dureza HV pieza 1A

PIEZA 2A									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
132	132	33	33	0,033	0,033	0,033	340	3,3369	
132	131	33	32,75	0,033	0,03275	0,032875	343	3,3623	
135	132	33,75	33	0,03375	0,033	0,033375	333	3,2623	
130	135,5	32,5	33,875	0,0325	0,033875	0,0331875	337	3,2993	
132	137	33	34,25	0,033	0,03425	0,033625	328	3,2140	
137,5	136	34,375	34	0,034375	0,034	0,0341875	317	3,1091	
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	
138,5	135	34,625	33,75	0,034625	0,03375	0,0341875	317	3,1091	
154	153,5	38,5	38,375	0,0385	0,038375	0,0384375	251	2,4595	
138,5	139	34,625	34,75	0,034625	0,03475	0,0346875	308	3,0201	
128	134	32	33,5	0,032	0,0335	0,03275	346	3,3880	
129	140	32,25	35	0,03225	0,035	0,033625	328	3,2140	
131	135	32,75	33,75	0,03275	0,03375	0,03325	335	3,2869	
132	136	33	34	0,033	0,034	0,0335	330	3,2380	
139	139	34,75	34,75	0,03475	0,03475	0,03475	307	3,0092	
141	136	35,25	34	0,03525	0,034	0,034625	309	3,0310	CENTRO
150	156	37,5	39	0,0375	0,039	0,03825	253	2,4837	CENTRO
138,5	137	34,625	34,25	0,034625	0,03425	0,0344375	313	3,0641	CENTRO
144	139	36	34,75	0,036	0,03475	0,035375	296	2,9038	CENTRO
133	127	33,25	31,75	0,03325	0,03175	0,0325	351	3,4403	CENTRO
132	132	33	33	0,033	0,033	0,033	340	3,3369	CENTRO
138	143	34,5	35,75	0,0345	0,03575	0,035125	301	2,9453	CENTRO
132	140	33	35	0,033	0,035	0,034	321	3,1435	CENTRO
129	133	32,25	33,25	0,03225	0,03325	0,03275	346	3,3880	CENTRO
129	130	32,25	32,5	0,03225	0,0325	0,032375	354	3,4669	PICO IZQUI
128	133,5	32	33,375	0,032	0,033375	0,0326875	347	3,4010	PICO IZQUI
141	137,5	35,25	34,375	0,03525	0,034375	0,0348125	306	2,9984	PICO IZQUI
131	136	32,75	34	0,03275	0,034	0,033375	333	3,2623	PICO IZQUI
132	136	33	34	0,033	0,034	0,0335	330	3,2380	PICO IZQUI
131	135	32,75	33,75	0,03275	0,03375	0,03325	335	3,2869	PICO IZQUI
143	141	35,75	35,25	0,03575	0,03525	0,0355	294	2,8834	PICO IZQUI
140	138	35	34,5	0,035	0,0345	0,03475	307	3,0092	PICO IZQUI
134	138	33,5	34,5	0,0335	0,0345	0,034	321	3,1435	PICO IZQUI
137	141	34,25	35,25	0,03425	0,03525	0,03475	307	3,0092	PICO DERE
130	133	32,5	33,25	0,0325	0,03325	0,032875	343	3,3623	PICO DERE
135	134,5	33,75	33,625	0,03375	0,033625	0,0336875	327	3,2021	PICO DERE
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	PICO DERE
132,5	133	33,125	33,25	0,033125	0,03325	0,0331875	337	3,2993	PICO DERE
138,5	142	34,625	35,5	0,034625	0,0355	0,0350625	302	2,9558	PICO DERE
132	132	33	33	0,033	0,033	0,033	340	3,3369	PICO DERE
138	141	34,5	35,25	0,0345	0,03525	0,034875	305	2,9877	PICO DERE
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	PICO DERE

Figura A2.2. Dureza HV pieza 2A

PIEZA 3A									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
139	132	34,75	33	0,03475	0,033	0,033875	323	3,1667	
143	146,7	35,75	36,675	0,03575	0,036675	0,0362125	283	2,7711	
146,7	141,2	36,675	35,3	0,036675	0,0353	0,0359875	286	2,8058	
141	145,7	35,25	36,425	0,03525	0,036425	0,0358375	289	2,8294	
148	141	37	35,25	0,037	0,03525	0,036125	284	2,7845	
140,5	137,5	35,125	34,375	0,035125	0,034375	0,03475	307	3,0092	
131	134	32,75	33,5	0,03275	0,0335	0,033125	338	3,3117	
137,5	137	34,375	34,25	0,034375	0,03425	0,0343125	315	3,0865	
142,5	138	35,625	34,5	0,035625	0,0345	0,0350625	302	2,9558	
130	138,5	32,5	34,625	0,0325	0,034625	0,0335625	329	3,2259	
133,5	137	33,375	34,25	0,033375	0,03425	0,0338125	324	3,1784	
133	143	33,25	35,75	0,03325	0,03575	0,0345	312	3,0530	
135	135	33,75	33,75	0,03375	0,03375	0,03375	326	3,1902	
137	136	34,25	34	0,03425	0,034	0,034125	318	3,1205	
138	137	34,5	34,25	0,0345	0,03425	0,034375	314	3,0752	
149	151,5	37,25	37,875	0,03725	0,037875	0,0375625	263	2,5755	CENTRO
133	134	33,25	33,5	0,03325	0,0335	0,033375	333	3,2623	CENTRO
132	137,5	33	34,375	0,033	0,034375	0,0336875	327	3,2021	CENTRO
140	136	35	34	0,035	0,034	0,0345	312	3,0530	CENTRO
146	144	36,5	36	0,0365	0,036	0,03625	282	2,7653	CENTRO
148	142	37	35,5	0,037	0,0355	0,03625	282	2,7653	CENTRO
138	132	34,5	33	0,0345	0,033	0,03375	326	3,1902	CENTRO
137	137	34,25	34,25	0,03425	0,03425	0,03425	316	3,0977	CENTRO
178	178	44,5	44,5	0,0445	0,0445	0,0445	187	1,8350	CENTRO
163	163,5	40,75	40,875	0,04075	0,040875	0,0408125	223	2,1816	CENTRO

Figura A2.3. Dureza HV pieza 3A

PIEZA 1B									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
155	148	38,75	37	0,03875	0,037	0,037875	258	2,5331	
148	151	37	37,75	0,037	0,03775	0,037375	265	2,6014	
148	140	37	35	0,037	0,035	0,036	286	2,8039	
147	147	36,75	36,75	0,03675	0,03675	0,03675	275	2,6906	
152	152	38	38	0,038	0,038	0,038	257	2,5165	
149,5	151,5	37,375	37,875	0,037375	0,037875	0,037625	262	2,5669	
280	302	70	75,5	0,07	0,0755	0,07275	70	0,6866	
152	150	38	37,5	0,038	0,0375	0,03775	260	2,5500	
156	162	39	40,5	0,039	0,0405	0,03975	235	2,2998	
147	150	36,75	37,5	0,03675	0,0375	0,037125	269	2,6365	
144,5	149	36,125	37,25	0,036125	0,03725	0,0366875	275	2,6998	CENTRO
153	162	38,25	40,5	0,03825	0,0405	0,039375	239	2,3438	CENTRO
146	148,5	36,5	37,125	0,0365	0,037125	0,0368125	274	2,6815	CENTRO
148	151	37	37,75	0,037	0,03775	0,037375	265	2,6014	CENTRO
152	151	38	37,75	0,038	0,03775	0,037875	258	2,5331	PICO IZQUI
149	152	37,25	38	0,03725	0,038	0,037625	262	2,5669	PICO IZQUI
159	155	39,75	38,75	0,03975	0,03875	0,03925	241	2,3588	PICO IZQUI
149	147	37,25	36,75	0,03725	0,03675	0,037	271	2,6544	PICO DERE
151	151,5	37,75	37,875	0,03775	0,037875	0,0378125	259	2,5415	PICO DERE
151	154	37,75	38,5	0,03775	0,0385	0,038125	255	2,5000	PICO DERE

Figura A2.4. Dureza HV pieza 1B

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PIEZA 2B										
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa		
157	155,5	39,25	38,875	0,03925	0,038875	0,0390625	243	2,3815		
163	165	40,75	41,25	0,04075	0,04125	0,041	221	2,1617		
151,5	155	37,875	38,75	0,037875	0,03875	0,0383125	253	2,4756		
154,5	157	38,625	39,25	0,038625	0,03925	0,0389375	245	2,3968		
150	162	37,5	40,5	0,0375	0,0405	0,039	244	2,3891		
158	157	39,5	39,25	0,0395	0,03925	0,039375	239	2,3438		
149	149	37,25	37,25	0,03725	0,03725	0,03725	267	2,6189		
153	158	38,25	39,5	0,03825	0,0395	0,038875	245	2,4045		
167	171	41,75	42,75	0,04175	0,04275	0,04225	208	2,0357		
153	152,5	38,25	38,125	0,03825	0,038125	0,0381875	254	2,4919		
153,5	155	38,375	38,75	0,038375	0,03875	0,0385625	249	2,4436	CENTRO	
151,5	150	37,875	37,5	0,037875	0,0375	0,0376875	261	2,5584	CENTRO	
180	174,5	45	43,625	0,045	0,043625	0,0443125	189	1,8506	CENTRO	
147,5	153	36,875	38,25	0,036875	0,03825	0,0375625	263	2,5755	CENTRO	
150	149,5	37,5	37,375	0,0375	0,037375	0,0374375	265	2,5927	PICO IZQUI	
152	150	38	37,5	0,038	0,0375	0,03775	260	2,5500	PICO IZQUI	
153	153	38,25	38,25	0,03825	0,03825	0,03825	253	2,4837	PICO IZQUI	
155	161,5	38,75	40,375	0,03875	0,040375	0,0395625	237	2,3217	PICO DERE	
163	167,5	40,75	41,875	0,04075	0,041875	0,0413125	217	2,1291	PICO DERE	
153	160	38,25	40	0,03825	0,04	0,039125	242	2,3739	PICO DERE	

Figura A2.5. Dureza HV pieza 2B

PIEZA 3B									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
164	161	41	40,25	0,041	0,04025	0,040625	225	2,2018	
153,5	150	38,375	37,5	0,038375	0,0375	0,0379375	258	2,5248	
182	180	45,5	45	0,0455	0,045	0,04525	181	1,7747	
159	158	39,75	39,5	0,03975	0,0395	0,039625	236	2,3143	
154,5	158	38,625	39,5	0,038625	0,0395	0,0390625	243	2,3815	
152	156	38	39	0,038	0,039	0,0385	250	2,4516	
164,5	161	41,125	40,25	0,041125	0,04025	0,0406875	224	2,1950	
152	160	38	40	0,038	0,04	0,039	244	2,3891	
158	157	39,5	39,25	0,0395	0,03925	0,039375	239	2,3438	
158	155	39,5	38,75	0,0395	0,03875	0,039125	242	2,3739	
157	162	39,25	40,5	0,03925	0,0405	0,039875	233	2,2854	CENTRO
170	167	42,5	41,75	0,0425	0,04175	0,042125	209	2,0478	CENTRO
159	158	39,75	39,5	0,03975	0,0395	0,039625	236	2,3143	CENTRO
162	168	40,5	42	0,0405	0,042	0,04125	218	2,1356	CENTRO
152,5	149	38,125	37,25	0,038125	0,03725	0,0376875	261	2,5584	CENTRO
148	150	37	37,5	0,037	0,0375	0,03725	267	2,6189	CENTRO
155	160	38,75	40	0,03875	0,04	0,039375	239	2,3438	CENTRO
167	164	41,75	41	0,04175	0,041	0,041375	217	2,1227	CENTRO
188	186	47	46,5	0,047	0,0465	0,04675	170	1,6627	CENTRO
153	155	38,25	38,75	0,03825	0,03875	0,0385	250	2,4516	CENTRO

Figura A2.6. Dureza HV pieza 3B

PIEZA 1C									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
134	136,5	33,5	34,125	0,0335	0,034125	0,0338125	324	3,1784	
149	152	37,25	38	0,03725	0,038	0,037625	262	2,5669	
148	150	37	37,5	0,037	0,0375	0,03725	267	2,6189	
139	137	34,75	34,25	0,03475	0,03425	0,0345	312	3,0530	
141	142,5	35,25	35,625	0,03525	0,035625	0,0354375	295	2,8936	
148	149	37	37,25	0,037	0,03725	0,037125	269	2,6365	
135	137	33,75	34,25	0,03375	0,03425	0,034	321	3,1435	
152	159	38	39,75	0,038	0,03975	0,038875	245	2,4045	
139	139	34,75	34,75	0,03475	0,03475	0,03475	307	3,0092	
135	141	33,75	35,25	0,03375	0,03525	0,0345	312	3,0530	
138	140	34,5	35	0,0345	0,035	0,03475	307	3,0092	CENTRO
135,5	140	33,875	35	0,033875	0,035	0,0344375	313	3,0641	CENTRO
145	148,5	36,25	37,125	0,03625	0,037125	0,0366875	275	2,6998	CENTRO
137	141,5	34,25	35,375	0,03425	0,035375	0,0348125	306	2,9984	CENTRO
140	147	35	36,75	0,035	0,03675	0,035875	288	2,8235	PICO IZQUI
140	142,5	35	35,625	0,035	0,035625	0,0353125	297	2,9141	PICO IZQUI
141	142	35,25	35,5	0,03525	0,0355	0,035375	296	2,9038	PICO IZQUI
141,5	143	35,375	35,75	0,035375	0,03575	0,0355625	293	2,8733	PICO DERE
143	142,5	35,75	35,625	0,03575	0,035625	0,0356875	291	2,8532	PICO DERE
151	147	37,75	36,75	0,03775	0,03675	0,03725	267	2,6189	PICO DERE

Figura A2.7. Dureza HV pieza 1C

PIEZA 2C									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
148	149	37	37,25	0,037	0,03725	0,037125	269	2,6365	
154	152	38,5	38	0,0385	0,038	0,03825	253	2,4837	
160	165	40	41,25	0,04	0,04125	0,040625	225	2,2018	
152,5	157,5	38,125	39,375	0,038125	0,039375	0,03875	247	2,4200	
151	154	37,75	38,5	0,03775	0,0385	0,038125	255	2,5000	
145	151	36,25	37,75	0,03625	0,03775	0,037	271	2,6544	
148	148,5	37	37,125	0,037	0,037125	0,0370625	270	2,6454	
145	147	36,25	36,75	0,03625	0,03675	0,0365	278	2,7276	
147,5	151	36,875	37,75	0,036875	0,03775	0,0373125	266	2,6101	
152	150	38	37,5	0,038	0,0375	0,03775	260	2,5500	
146	146	36,5	36,5	0,0365	0,0365	0,0365	278	2,7276	CENTRO
145,5	143,5	36,375	35,875	0,036375	0,035875	0,036125	284	2,7845	CENTRO
147	149	36,75	37,25	0,03675	0,03725	0,037	271	2,6544	CENTRO
153	147,5	38,25	36,875	0,03825	0,036875	0,0375625	263	2,5755	CENTRO
152	167	38	41,75	0,038	0,04175	0,039875	233	2,2854	PICO IZQUI
151	163,5	37,75	40,875	0,03775	0,040875	0,0393125	240	2,3513	PICO IZQUI
150	164	37,5	41	0,0375	0,041	0,03925	241	2,3588	PICO IZQUI
146,5	161	36,625	40,25	0,036625	0,04025	0,0384375	251	2,4595	PICO DERE
152	155	38	38,75	0,038	0,03875	0,038375	252	2,4676	PICO DERE
158,5	155	39,625	38,75	0,039625	0,03875	0,0391875	241	2,3663	PICO DERE

Figura A2.8. Dureza HV pieza 2C

PIEZA 3C									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
145	151	36,25	37,75	0,03625	0,03775	0,037	271	2,6544	
141,5	145	35,375	36,25	0,035375	0,03625	0,0358125	289	2,8333	
165	168	41,25	42	0,04125	0,042	0,041625	214	2,0973	
176	173	44	43,25	0,044	0,04325	0,043625	195	1,9094	
148	147	37	36,75	0,037	0,03675	0,036875	273	2,6724	
145	145	36,25	36,25	0,03625	0,03625	0,03625	282	2,7653	
143	145	35,75	36,25	0,03575	0,03625	0,036	286	2,8039	
157	149	39,25	37,25	0,03925	0,03725	0,03825	253	2,4837	
149	151	37,25	37,75	0,03725	0,03775	0,0375	264	2,5841	
149	147	37,25	36,75	0,03725	0,03675	0,037	271	2,6544	
150	151,5	37,5	37,875	0,0375	0,037875	0,0376875	261	2,5584	CENTRO
148	146	37	36,5	0,037	0,0365	0,03675	275	2,6906	CENTRO
147	148	36,75	37	0,03675	0,037	0,036875	273	2,6724	CENTRO
153	147	38,25	36,75	0,03825	0,03675	0,0375	264	2,5841	CENTRO
143	146	35,75	36,5	0,03575	0,0365	0,036125	284	2,7845	CENTRO
145	147	36,25	36,75	0,03625	0,03675	0,0365	278	2,7276	CENTRO
140	145	35	36,25	0,035	0,03625	0,035625	292	2,8632	CENTRO
150	148	37,5	37	0,0375	0,037	0,03725	267	2,6189	CENTRO
144	149	36	37,25	0,036	0,03725	0,036625	276	2,7090	CENTRO
142,5	149	35,625	37,25	0,035625	0,03725	0,0364375	279	2,7370	CENTRO

Figura A2.9. Dureza HV pieza 3C

PIEZA 1D									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
135,5	134,5	33,875	33,625	0,033875	0,033625	0,03375	326	3,1902	
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	
138	138	34,5	34,5	0,0345	0,0345	0,0345	312	3,0530	
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	
136	139	34	34,75	0,034	0,03475	0,034375	314	3,0752	
132	138,5	33	34,625	0,033	0,034625	0,0338125	324	3,1784	
136	136,5	34	34,125	0,034	0,034125	0,0340625	320	3,1319	
133	136	33,25	34	0,03325	0,034	0,033625	328	3,2140	
134	134	33,5	33,5	0,0335	0,0335	0,0335	330	3,2380	
136	135	34	33,75	0,034	0,03375	0,033875	323	3,1667	
135	137	33,75	34,25	0,03375	0,03425	0,034	321	3,1435	
135,5	139	33,875	34,75	0,033875	0,03475	0,0343125	315	3,0865	
130	129	32,5	32,25	0,0325	0,03225	0,032375	354	3,4669	
132,5	132	33,125	33	0,033125	0,033	0,0330625	339	3,3243	
134	146	33,5	36,5	0,0335	0,0365	0,035	303	2,9664	CENTRO
133	139	33,25	34,75	0,03325	0,03475	0,034	321	3,1435	CENTRO
128	134	32	33,5	0,032	0,0335	0,03275	346	3,3880	CENTRO
132	135	33	33,75	0,033	0,03375	0,033375	333	3,2623	CENTRO
140	144	35	36	0,035	0,036	0,0355	294	2,8834	CENTRO
127	135	31,75	33,75	0,03175	0,03375	0,03275	346	3,3880	CENTRO
126	134	31,5	33,5	0,0315	0,0335	0,0325	351	3,4403	CENTRO
138	139	34,5	34,75	0,0345	0,03475	0,034625	309	3,0310	CENTRO
127	134	31,75	33,5	0,03175	0,0335	0,032625	348	3,4140	CENTRO
128	137	32	34,25	0,032	0,03425	0,033125	338	3,3117	PICO IZQUI
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	PICO IZQUI
129	133	32,25	33,25	0,03225	0,03325	0,03275	346	3,3880	PICO IZQUI
131	135	32,75	33,75	0,03275	0,03375	0,03325	335	3,2869	PICO IZQUI
126	137	31,5	34,25	0,0315	0,03425	0,032875	343	3,3623	PICO IZQUI
127	126	31,75	31,5	0,03175	0,0315	0,031625	371	3,6333	PICO IZQUI
131	136	32,75	34	0,03275	0,034	0,033375	333	3,2623	PICO IZQUI
129	133	32,25	33,25	0,03225	0,03325	0,03275	346	3,3880	PICO IZQUI
134	140	33,5	35	0,0335	0,035	0,03425	316	3,0977	PICO IZQUI
137	136	34,25	34	0,03425	0,034	0,034125	318	3,1205	PICO DERE
141	142	35,25	35,5	0,03525	0,0355	0,035375	296	2,9038	PICO DERE
146	145	36,5	36,25	0,0365	0,03625	0,036375	280	2,7464	PICO DERE
138	143	34,5	35,75	0,0345	0,03575	0,035125	301	2,9453	PICO DERE
144	141	36	35,25	0,036	0,03525	0,035625	292	2,8632	PICO DERE
135	135	33,75	33,75	0,03375	0,03375	0,03375	326	3,1902	PICO DERE
134	140	33,5	35	0,0335	0,035	0,03425	316	3,0977	PICO DERE
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	PICO DERE
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	PICO DERE

Figura A2.10. Dureza HV pieza 1D

PIEZA 2D									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
130,5	130	32,625	32,5	0,032625	0,0325	0,0325625	350	3,4271	
129	132	32,25	33	0,03225	0,033	0,032625	348	3,4140	
132	130	33	32,5	0,033	0,0325	0,03275	346	3,3880	
126	126	31,5	31,5	0,0315	0,0315	0,0315	374	3,6622	
125	124	31,25	31	0,03125	0,031	0,031125	383	3,7510	
128	129	32	32,25	0,032	0,03225	0,032125	359	3,5211	
129	129	32,25	32,25	0,03225	0,03225	0,03225	357	3,4939	
125,5	122	31,375	30,5	0,031375	0,0305	0,0309375	387	3,7966	
128	131	32	32,75	0,032	0,03275	0,032375	354	3,4669	
121	126	30,25	31,5	0,03025	0,0315	0,030875	389	3,8120	
130	131	32,5	32,75	0,0325	0,03275	0,032625	348	3,4140	
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	
130	133	32,5	33,25	0,0325	0,03325	0,032875	343	3,3623	
125	130	31,25	32,5	0,03125	0,0325	0,031875	365	3,5766	
125	124	31,25	31	0,03125	0,031	0,031125	383	3,7510	
128	130	32	32,5	0,032	0,0325	0,03225	357	3,4939	CENTRO
153	158	38,25	39,5	0,03825	0,0395	0,038875	245	2,4045	CENTRO
133	132	33,25	33	0,03325	0,033	0,033125	338	3,3117	CENTRO
134	134	33,5	33,5	0,0335	0,0335	0,0335	330	3,2380	CENTRO
132	136	33	34	0,033	0,034	0,0335	330	3,2380	CENTRO
129	132	32,25	33	0,03225	0,033	0,032625	348	3,4140	CENTRO
131	136	32,75	34	0,03275	0,034	0,033375	333	3,2623	CENTRO
128	139	32	34,75	0,032	0,03475	0,033375	333	3,2623	CENTRO
127	129	31,75	32,25	0,03175	0,03225	0,032	362	3,5487	CENTRO
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	PICO IZQUI
147	149	36,75	37,25	0,03675	0,03725	0,037	271	2,6544	PICO IZQUI
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	PICO IZQUI
136	136	34	34	0,034	0,034	0,034	321	3,1435	PICO IZQUI
130	132	32,5	33	0,0325	0,033	0,03275	346	3,3880	PICO IZQUI
151	153	37,75	38,25	0,03775	0,03825	0,038	257	2,5165	PICO IZQUI
124	129	31	32,25	0,031	0,03225	0,031625	371	3,6333	PICO IZQUI
143	138	35,75	34,5	0,03575	0,0345	0,035125	301	2,9453	PICO IZQUI
132	132	33	33	0,033	0,033	0,033	340	3,3369	PICO IZQUI
136	132	34	33	0,034	0,033	0,0335	330	3,2380	PICO DERE
134	133	33,5	33,25	0,0335	0,03325	0,033375	333	3,2623	PICO DERE
127	132	31,75	33	0,03175	0,033	0,032375	354	3,4669	PICO DERE
144	147	36	36,75	0,036	0,03675	0,036375	280	2,7464	PICO DERE
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	PICO DERE
133	134	33,25	33,5	0,03325	0,0335	0,033375	333	3,2623	PICO DERE
134	132	33,5	33	0,0335	0,033	0,03325	335	3,2869	PICO DERE
132	133	33	33,25	0,033	0,03325	0,033125	338	3,3117	PICO DERE
133	132	33,25	33	0,03325	0,033	0,033125	338	3,3117	PICO DERE

Figura A2.11. Dureza HV pieza 2D

PIEZA 3D									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
130	129	32,5	32,25	0,0325	0,03225	0,032375	354	3,4669	
125	129	31,25	32,25	0,03125	0,03225	0,03175	368	3,6048	
128	131	32	32,75	0,032	0,03275	0,032375	354	3,4669	
136,5	138	34,125	34,5	0,034125	0,0345	0,0343125	315	3,0865	
135	133	33,75	33,25	0,03375	0,03325	0,0335	330	3,2380	
138	137	34,5	34,25	0,0345	0,03425	0,034375	314	3,0752	
132,5	132	33,125	33	0,033125	0,033	0,0330625	339	3,3243	
131	132,5	32,75	33,125	0,03275	0,033125	0,0329375	342	3,3495	
126	128	31,5	32	0,0315	0,032	0,03175	368	3,6048	
135	139	33,75	34,75	0,03375	0,03475	0,03425	316	3,0977	
133	133	33,25	33,25	0,03325	0,03325	0,03325	335	3,2869	
131	135	32,75	33,75	0,03275	0,03375	0,03325	335	3,2869	
131	129	32,75	32,25	0,03275	0,03225	0,0325	351	3,4403	
130	128,5	32,5	32,125	0,0325	0,032125	0,0323125	355	3,4804	
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	
154	154	38,5	38,5	0,0385	0,0385	0,0385	250	2,4516	CENTRO
147	148	36,75	37	0,03675	0,037	0,036875	273	2,6724	CENTRO
131	134	32,75	33,5	0,03275	0,0335	0,033125	338	3,3117	CENTRO
136	135	34	33,75	0,034	0,03375	0,033875	323	3,1667	CENTRO
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	CENTRO
136	138	34	34,5	0,034	0,0345	0,03425	316	3,0977	CENTRO
138	136	34,5	34	0,0345	0,034	0,03425	316	3,0977	CENTRO
134	136	33,5	34	0,0335	0,034	0,03375	326	3,1902	CENTRO
141	140	35,25	35	0,03525	0,035	0,035125	301	2,9453	CENTRO
136	137	34	34,25	0,034	0,03425	0,034125	318	3,1205	CENTRO

Figura A2.12. Dureza HV pieza 3D

PIEZA 1F									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
142	141	35,5	35,25	0,0355	0,03525	0,035375	296	2,9038	
147	141	36,75	35,25	0,03675	0,03525	0,036	286	2,8039	
128	129	32	32,25	0,032	0,03225	0,032125	359	3,5211	
136	131	34	32,75	0,034	0,03275	0,033375	333	3,2623	
130	130	32,5	32,5	0,0325	0,0325	0,0325	351	3,4403	
130	130	32,5	32,5	0,0325	0,0325	0,0325	351	3,4403	
132	133	33	33,25	0,033	0,03325	0,033125	338	3,3117	
132	132	33	33	0,033	0,033	0,033	340	3,3369	
129	132	32,25	33	0,03225	0,033	0,032625	348	3,4140	
131	135	32,75	33,75	0,03275	0,03375	0,03325	335	3,2869	
140	141	35	35,25	0,035	0,03525	0,035125	301	2,9453	
132	132	33	33	0,033	0,033	0,033	340	3,3369	
132	136	33	34	0,033	0,034	0,0335	330	3,2380	
134	135	33,5	33,75	0,0335	0,03375	0,033625	328	3,2140	
124	127	31	31,75	0,031	0,03175	0,031375	377	3,6915	
131	131	32,75	32,75	0,03275	0,03275	0,03275	346	3,3880	CENTRO
135	133	33,75	33,25	0,03375	0,03325	0,0335	330	3,2380	CENTRO
128	129	32	32,25	0,032	0,03225	0,032125	359	3,5211	CENTRO
130	125	32,5	31,25	0,0325	0,03125	0,031875	365	3,5766	CENTRO
128	131	32	32,75	0,032	0,03275	0,032375	354	3,4669	CENTRO
127	127	31,75	31,75	0,03175	0,03175	0,03175	368	3,6048	CENTRO
130	131	32,5	32,75	0,0325	0,03275	0,032625	348	3,4140	CENTRO
127	130	31,75	32,5	0,03175	0,0325	0,032125	359	3,5211	CENTRO
135	135	33,75	33,75	0,03375	0,03375	0,03375	326	3,1902	CENTRO
123	126	30,75	31,5	0,03075	0,0315	0,031125	383	3,7510	PICO IZQUI
129	134	32,25	33,5	0,03225	0,0335	0,032875	343	3,3623	PICO IZQUI
128	136	32	34	0,032	0,034	0,033	340	3,3369	PICO IZQUI
145	145	36,25	36,25	0,03625	0,03625	0,03625	282	2,7653	PICO IZQUI
128	127	32	31,75	0,032	0,03175	0,031875	365	3,5766	PICO IZQUI
127	125	31,75	31,25	0,03175	0,03125	0,0315	374	3,6622	PICO IZQUI
130	124	32,5	31	0,0325	0,031	0,03175	368	3,6048	PICO IZQUI
148	144	37	36	0,037	0,036	0,0365	278	2,7276	PICO IZQUI
127	129	31,75	32,25	0,03175	0,03225	0,032	362	3,5487	PICO IZQUI
134	140	33,5	35	0,0335	0,035	0,03425	316	3,0977	PICO DERE
134	132	33,5	33	0,0335	0,033	0,03325	335	3,2869	PICO DERE
123	128	30,75	32	0,03075	0,032	0,031375	377	3,6915	PICO DERE
130	135	32,5	33,75	0,0325	0,03375	0,033125	338	3,3117	PICO DERE
125	126	31,25	31,5	0,03125	0,0315	0,031375	377	3,6915	PICO DERE
135	134	33,75	33,5	0,03375	0,0335	0,033625	328	3,2140	PICO DERE
127	130	31,75	32,5	0,03175	0,0325	0,032125	359	3,5211	PICO DERE
134	134	33,5	33,5	0,0335	0,0335	0,0335	330	3,2380	PICO DERE
127	130	31,75	32,5	0,03175	0,0325	0,032125	359	3,5211	PICO DERE

Figura A2.13. Dureza HV pieza 1F

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola d'Enginyeria de Barcelona Est

PIEZA 2F									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
131	129	32,75	32,25	0,03275	0,03225	0,0325	351	3,4403	
133	132	33,25	33	0,03325	0,033	0,033125	338	3,3117	
128	127	32	31,75	0,032	0,03175	0,031875	365	3,5766	
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	
132	134	33	33,5	0,033	0,0335	0,03325	335	3,2869	
129	133	32,25	33,25	0,03225	0,03325	0,03275	346	3,3880	
141	140	35,25	35	0,03525	0,035	0,035125	301	2,9453	
126	131	31,5	32,75	0,0315	0,03275	0,032125	359	3,5211	
150	161	37,5	40,25	0,0375	0,04025	0,038875	245	2,4045	
132	131	33	32,75	0,033	0,03275	0,032875	343	3,3623	
136	137	34	34,25	0,034	0,03425	0,034125	318	3,1205	
134	139	33,5	34,75	0,0335	0,03475	0,034125	318	3,1205	
130	130	32,5	32,5	0,0325	0,0325	0,0325	351	3,4403	
138	137	34,5	34,25	0,0345	0,03425	0,034375	314	3,0752	
128	128	32	32	0,032	0,032	0,032	362	3,5487	
147	149	36,75	37,25	0,03675	0,03725	0,037	271	2,6544	CENTRO
133	132	33,25	33	0,03325	0,033	0,033125	338	3,3117	CENTRO
125	126	31,25	31,5	0,03125	0,0315	0,031375	377	3,6915	CENTRO
123	126	30,75	31,5	0,03075	0,0315	0,031125	383	3,7510	CENTRO
137	135	34,25	33,75	0,03425	0,03375	0,034	321	3,1435	CENTRO
124	128	31	32	0,031	0,032	0,0315	374	3,6622	CENTRO
138	139	34,5	34,75	0,0345	0,03475	0,034625	309	3,0310	CENTRO
132	130	33	32,5	0,033	0,0325	0,03275	346	3,3880	CENTRO
126	129	31,5	32,25	0,0315	0,03225	0,031875	365	3,5766	CENTRO
129	134	32,25	33,5	0,03225	0,0335	0,032875	343	3,3623	PICO IZQUI
142	144	35,5	36	0,0355	0,036	0,03575	290	2,8432	PICO IZQUI
136	138	34	34,5	0,034	0,0345	0,03425	316	3,0977	PICO IZQUI
133	134	33,25	33,5	0,03325	0,0335	0,033375	333	3,2623	PICO IZQUI
130	130	32,5	32,5	0,0325	0,0325	0,0325	351	3,4403	PICO IZQUI
140	140	35	35	0,035	0,035	0,035	303	2,9664	PICO IZQUI
133	139	33,25	34,75	0,03325	0,03475	0,034	321	3,1435	PICO IZQUI
128	130	32	32,5	0,032	0,0325	0,03225	357	3,4939	PICO IZQUI
134	139	33,5	34,75	0,0335	0,03475	0,034125	318	3,1205	PICO IZQUI
141	142	35,25	35,5	0,03525	0,0355	0,035375	296	2,9038	PICO DERE
136	138	34	34,5	0,034	0,0345	0,03425	316	3,0977	PICO DERE
140	142	35	35,5	0,035	0,0355	0,03525	298	2,9245	PICO DERE
127	126	31,75	31,5	0,03175	0,0315	0,031625	371	3,6333	PICO DERE
135	137	33,75	34,25	0,03375	0,03425	0,034	321	3,1435	PICO DERE
132	131	33	32,75	0,033	0,03275	0,032875	343	3,3623	PICO DERE
126	128	31,5	32	0,0315	0,032	0,03175	368	3,6048	PICO DERE
132	131	33	32,75	0,033	0,03275	0,032875	343	3,3623	PICO DERE
136	136	34	34	0,034	0,034	0,034	321	3,1435	PICO DERE

Figura A2.14. Dureza HV pieza 2F

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PIEZA 3F									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
128	127	32	31,75	0,032	0,03175	0,031875	365	3,5766	
127	130	31,75	32,5	0,03175	0,0325	0,032125	359	3,5211	
133	129	33,25	32,25	0,03325	0,03225	0,03275	346	3,3880	
129	126	32,25	31,5	0,03225	0,0315	0,031875	365	3,5766	
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	
126	129	31,5	32,25	0,0315	0,03225	0,031875	365	3,5766	
146	147	36,5	36,75	0,0365	0,03675	0,036625	276	2,7090	
136	140	34	35	0,034	0,035	0,0345	312	3,0530	
139	146	34,75	36,5	0,03475	0,0365	0,035625	292	2,8632	
130	135	32,5	33,75	0,0325	0,03375	0,033125	338	3,3117	
131	129	32,75	32,25	0,03275	0,03225	0,0325	351	3,4403	
129	127	32,25	31,75	0,03225	0,03175	0,032	362	3,5487	
132	138	33	34,5	0,033	0,0345	0,03375	326	3,1902	
146	145	36,5	36,25	0,0365	0,03625	0,036375	280	2,7464	
129	131	32,25	32,75	0,03225	0,03275	0,0325	351	3,4403	
123	127	30,75	31,75	0,03075	0,03175	0,03125	380	3,7211	CENTRO
126	130	31,5	32,5	0,0315	0,0325	0,032	362	3,5487	CENTRO
128	127	32	31,75	0,032	0,03175	0,031875	365	3,5766	CENTRO
130	129	32,5	32,25	0,0325	0,03225	0,032375	354	3,4669	CENTRO
128	130	32	32,5	0,032	0,0325	0,03225	357	3,4939	CENTRO
128	131	32	32,75	0,032	0,03275	0,032375	354	3,4669	CENTRO
131	133	32,75	33,25	0,03275	0,03325	0,033	340	3,3369	CENTRO
129	132	32,25	33	0,03225	0,033	0,032625	348	3,4140	CENTRO
130	133	32,5	33,25	0,0325	0,03325	0,032875	343	3,3623	CENTRO
135	136	33,75	34	0,03375	0,034	0,033875	323	3,1667	CENTRO

Figura A2.15. Dureza HV pieza 3F

Pieza compleja									
d1	d2	d1 [um]	d2 [um]	d1 [mm]	d2 [mm]	D [mm]	HV	Gpa	
143	139	35,75	34,75	0,03575	0,03475	0,03525	298	2,9245	
128	126	32	31,5	0,032	0,0315	0,03175	368	3,6048	
130	132	32,5	33	0,0325	0,033	0,03275	346	3,3880	
130	135	32,5	33,75	0,0325	0,03375	0,033125	338	3,3117	
129	131	32,25	32,75	0,03225	0,03275	0,0325	351	3,4403	
133	130	33,25	32,5	0,03325	0,0325	0,032875	343	3,3623	
131	132	32,75	33	0,03275	0,033	0,032875	343	3,3623	
139	141	34,75	35,25	0,03475	0,03525	0,035	303	2,9664	
141	139	35,25	34,75	0,03525	0,03475	0,035	303	2,9664	
127	128	31,75	32	0,03175	0,032	0,031875	365	3,5766	
131	132	32,75	33	0,03275	0,033	0,032875	343	3,3623	CENTRO
134	137	33,5	34,25	0,0335	0,03425	0,033875	323	3,1667	CENTRO
133	138	33,25	34,5	0,03325	0,0345	0,033875	323	3,1667	CENTRO
134	137	33,5	34,25	0,0335	0,03425	0,033875	323	3,1667	CENTRO
140	135	35	33,75	0,035	0,03375	0,034375	314	3,0752	CENTRO
132	135	33	33,75	0,033	0,03375	0,033375	333	3,2623	CENTRO
135	135	33,75	33,75	0,03375	0,03375	0,03375	326	3,1902	CENTRO
129	128	32,25	32	0,03225	0,032	0,032125	359	3,5211	CENTRO
132	133	33	33,25	0,033	0,03325	0,033125	338	3,3117	CENTRO
131	133	32,75	33,25	0,03275	0,03325	0,033	340	3,3369	CENTRO

Figura A2.16. Dureza HV pieza compleja

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