【Phrozen Resin User Guide】

Phrozen Onyx Impact Plus

Outline

Before printing the perfect object, it is important to first understand the material limitations we are handling and how it can be successfully printed under various conditions. With this in mind, Phrozen provides the following design suggestions to help you better understand the properties of each material and how you can best utilize them to bring your wildest creation to life.

Table of Contents

Section 1

TDS

Mechanical Properties*	Unit	Results	Method
Tensile Stress at Break	MPa	37 ± 2	ASTM D638
Young's Modulus	MPa	1175 ± 47	ASTM D638
Elongation at Break	%	98 ± 4	ASTM D638
Izod Impact Strength (Notched)	J/m	145 ± 10	ASTM D256
Shore D Hardness (5s)	-	72	ASTM 2240
Solid Density	g/cm³	1.15	ASTM D1475
Liquid Properties			
Viscosity at 25°C (77°F)	cP	1800 - 2200	ASTM D1475
Liquid Density	g/cm³	1.05	ASTM D7867

** All testing specimens are printed using Phrozen Sonic Mega 8K or Sonic Mini 8K, and post-cured using Phrozen Cure Mega.*

Section 2

Printing

Printing Parameters

Test Printer	All Printers	
Objects	**Solid Objects / Objects with Low Details**	**Objects with High Details**
Layer Height	50 μm	50 μm
Exposure Time	14–16 s	23–25 s
Bottom Exposure time	30–35 s	30–35 s
Transition Layer Count	18	18
Rest Time	8–10 s	8–10 s
Lift Distance	8 mm	8 mm
Lifting Speed	45–60 mm/min	45–60 mm/min
Retract Speed	150 mm/min	150 mm/min

※Due to the long curing time of each layer, it's not compatible with RGB LCD※

Printing Suggestions

Z-Axis Calibration

· Sonic Mini 4k、Sonic Mighty 4K、Sonic Mega 8K：
Use 3 sheets of A4 paper during Z-axis calibration to ensure smooth printing.

· Sonic Mini 8k、Sonic Mighty 8K：
Calibrate as usual, then use the manual adjustment system to increase Z-offset to 0.4 ~ 0.8 mm before printing.

Resting Time

Due to the high viscosity of the resin, it is recommended to increase the resting time.

Supports

Supports Parameters:

Upper diameter: ≥ 0.8 mm

Middle diameter: ≥ 1 mm

※Strong support ensures smoother printing and reduces shaking during the peeling process.※

Cleaning

1. After removing the printed object from the building stage, use an ultrasonic cleaner and 95% alcohol for 60 seconds to remove uncured resin from the surface.
2. Make sure that the object has been thoroughly cleaned, then leave it in a cool, well-ventilated place for at least 30 minutes without exposure to light. Alternatively, you may gently apply compressed air to dry the printed object.
3. This resin is highly viscous, please take extra care to make sure that you have cleaned every detail thoroughly.

Post-Curing

For best precision and mechanical properties, use Phrozen Post-Curing Lamps (Cure V2, Cure Luna or Cure Mega) to cure the parts for at least 30 minutes per side.

Section 3

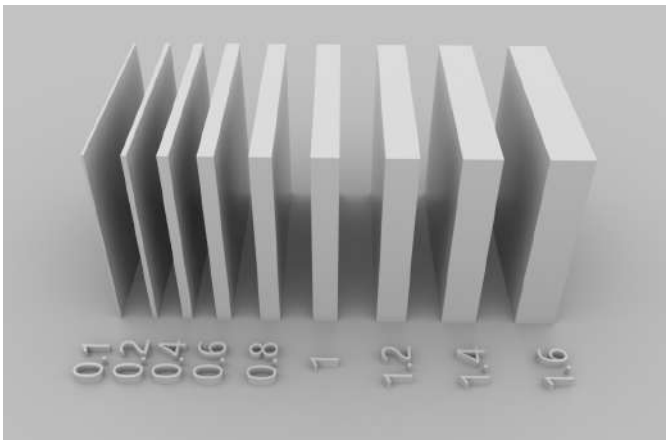
Design Specifications

※Note: All indicators are limited to each resin; the value will vary with different machines and environmental conditions.※

Minimum Unsupported Wall Thickness

This indicator shows the minimum wall thickness that can be printed independently with no support without causing any bending or breaking.

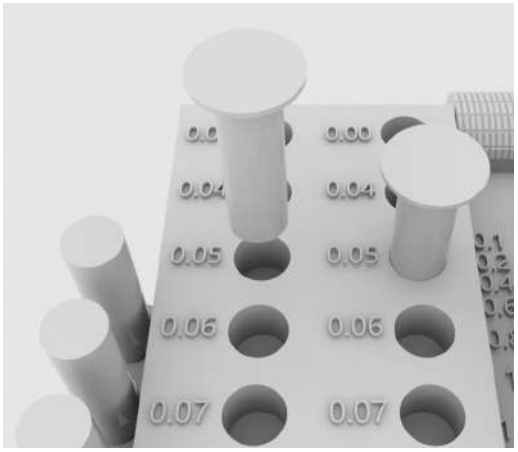
Recommended thickness：≥ 0.6 mm



Size Tolerance, X-Y plane

This indicator shows the minimum dimensional tolerance between the hole and the column parallel to the XY plane.

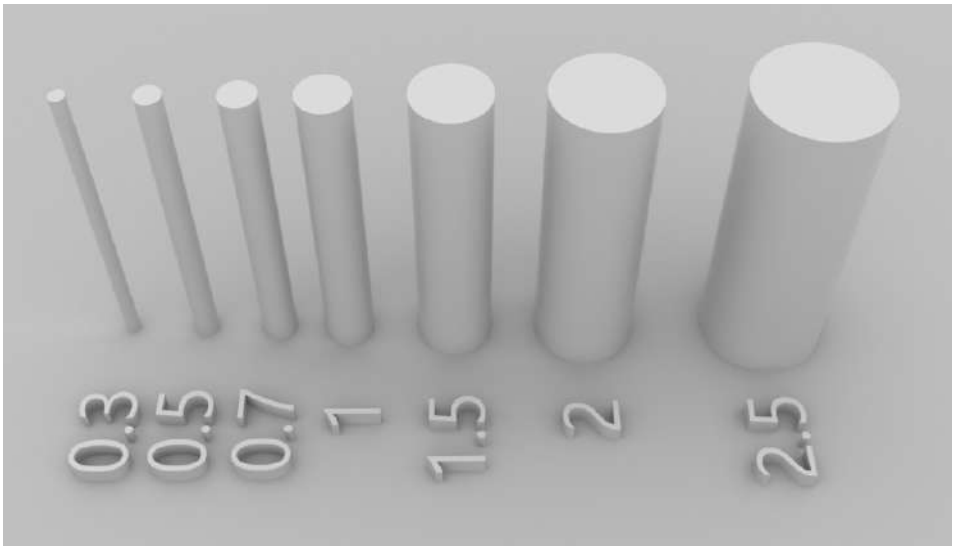
Recommended tolerance：≥ 0.06 mm



Minimum Pin Diameter

This indicator shows the minimum column diameter of pillars and supports that can be printed independently without bending or breaking.

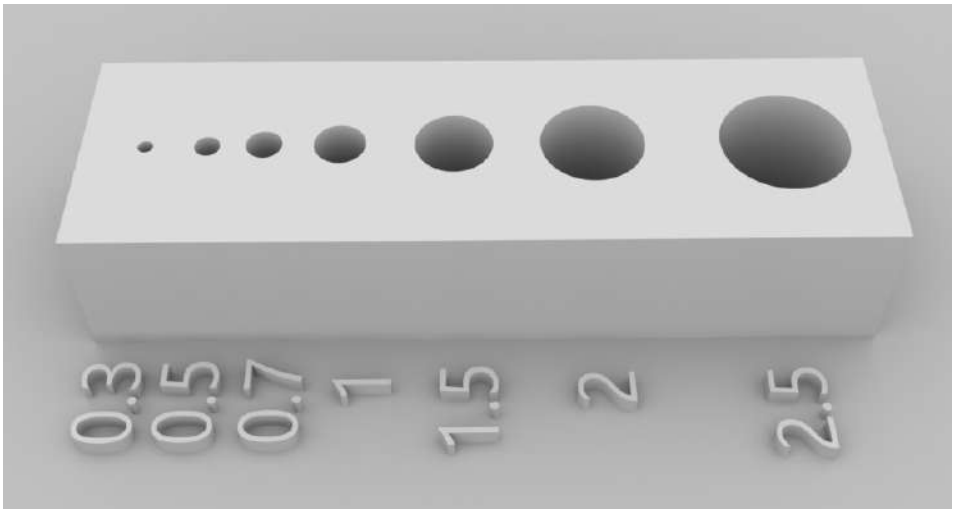
Recommended diameter: ≥ 0.5 mm



Minimum Hole Diameter, X-Y plane

This indicator shows the minimum hole diameter that can be successfully printed parallel to the XY plane.

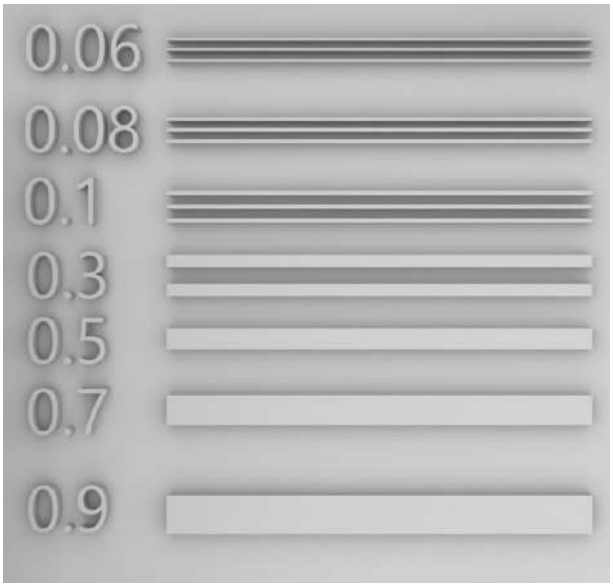
Recommended diameter: ≥ 1 mm



Minimum Embossed Detail Width, X-Y plane

This indicator shows the minimum line width that can successfully be printed with embossed details.

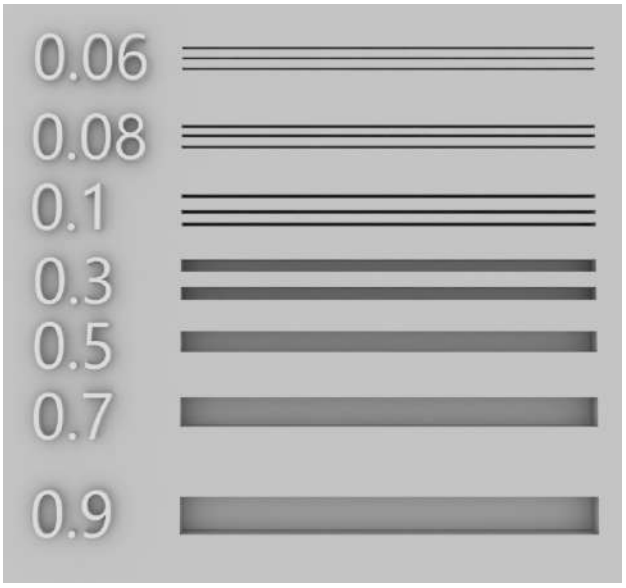
Recommended width： ≥ 0.08 mm



Minimum Engraved Detail Width, X-Y plane

This indicator shows the minimum line width that can successfully be printed with engraved details.

Recommended width： ≥ 0.06 mm



Maximum Horizontal Bridge Span

This indicator shows the maximum width between the supporting walls that can be printed without deforming the bridge.

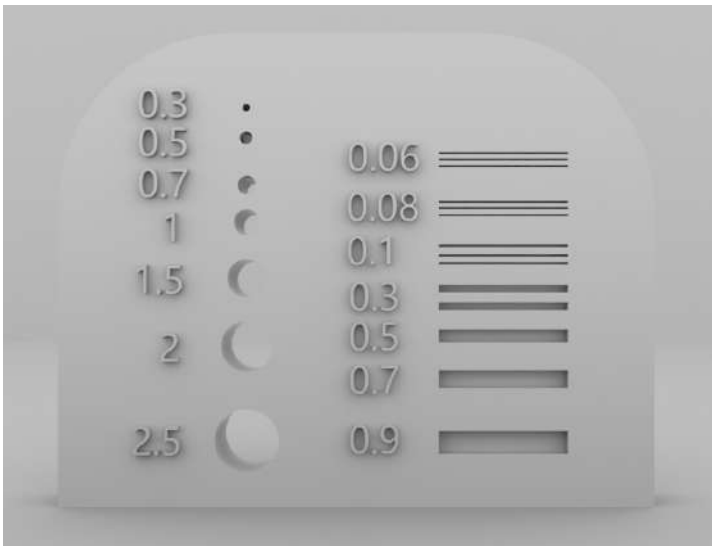
Recommended width: ≤ 4 mm

Minimum Hole Diameter and Engraved Detail Width, Z-axis, at 0.05mm Layer Height

This indicator shows the minimum hole diameter and engraving groove width that can be successfully printed on the Z axis with a layer thickness of 0.05 mm.

Recommended diameter: ≥ 1.5 mm

Recommended width: ≥ 0.06 mm



Section 4

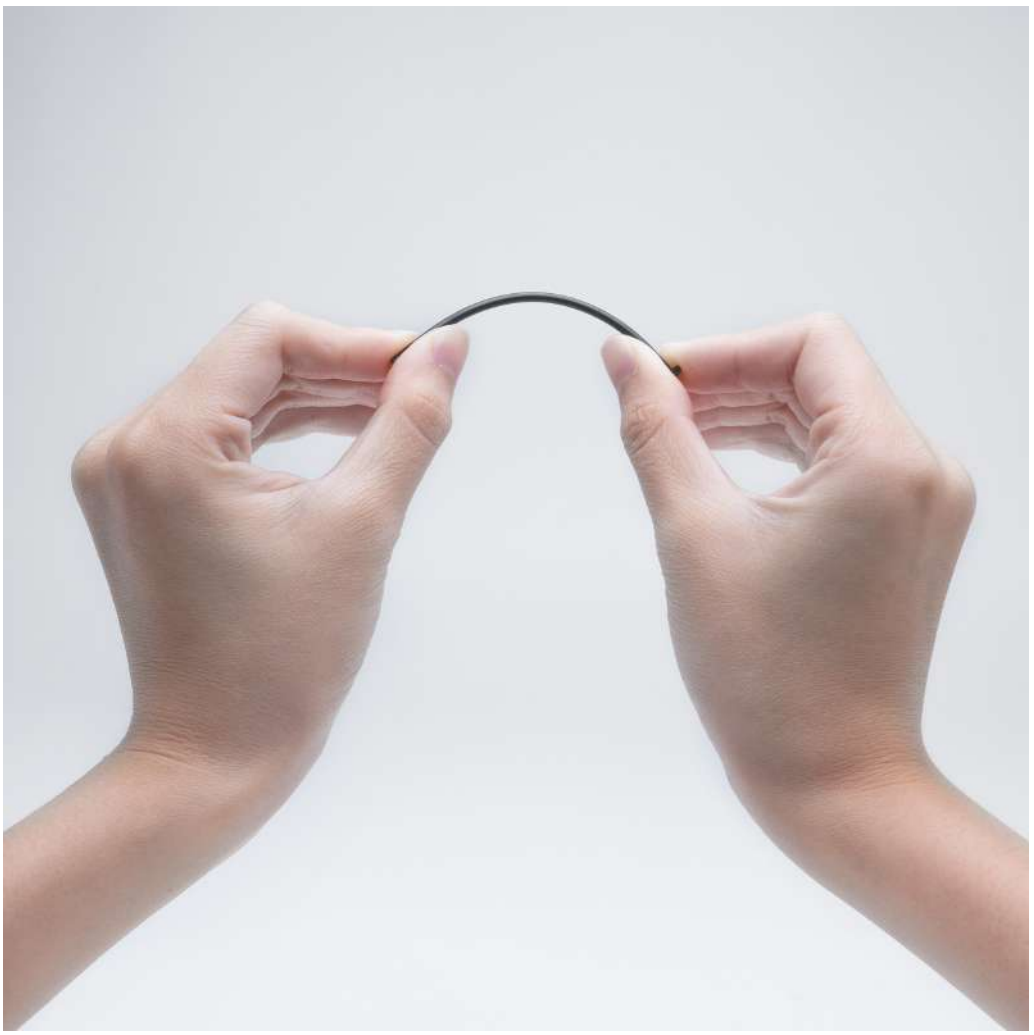
Applications

Hollowed Ball

Hammer

Mechanical Parts

Bendable Objects



Phone Stand

Assemblable Parts

phrozen

【Phrozen樹脂 使用者指南】

Phrozen Onyx Impact Plus

大綱

在列印一個理想的物件前，我們可以先了解材料在各條件下能完整列印出物件的極限在哪；因此**Phrozen**提供以下設計建議，幫助您列印物件時大幅提升成功率，並印製出更符合您心目中的物件。

目錄

Section 1

TDS

Mechanical Properties*	Unit	Results	Method
Tensile Stress at Break	MPa	37 ± 2	ASTM D638
Young's Modulus	MPa	1175 ± 47	ASTM D638
Elongation at Break	%	98 ± 4	ASTM D638
Izod Impact Strength (Notched)	J/m	145 ± 10	ASTM D256
Shore D Hardness (5s)	-	72	ASTM 2240
Solid Density	g/cm³	1.15	ASTM D1475
Liquid Properties			
Viscosity at 25°C (77°F)	cP	1800 - 2200	ASTM D1475
Liquid Density	g/cm³	1.05	ASTM D7867

** All testing specimens are printed using Phrozen Sonic Mega 8K or Sonic Mini 8K, and post-cured using Phrozen Cure Mega.*

Section 2

列印

列印參數

測試機台	所有機台	
適合物件	實心 / 低精細度物件	高精細度物件
Layer Height	50 μm	50 μm
Exposure Time	14~16 s	23~25 s
Bottom Exposure Time	30~35 s	30~35 s
Transition Layer Count	18	18
Rest Time	8~10 s	8~10 s
Lift Distance	8 mm	8 mm
Lifting Speed	45-60 mm/min	45-60 mm/min
Retract Speed	150 mm/min	150 mm/min

※由於每層固化時間長，不適合在彩屏上使用※

列印建議

校正

・樹脂黏稠度高，列印時可能會有樹脂無法被推開的情況，無法順利進行列印。

・Sonic Mini 4k、Sonic Mighty 4K、Sonic Mega 8K:
建議在校正時使用 3 張A4紙校正，讓列印可以順利進行。

・Sonic Mini 8k、Sonic Mighty 8K:
正常校正後，使用自定原點系統把原點往上移0.4 ~ 0.8mm後進行列印。

靜止時間

樹脂黏稠度高，建議增加靜止時間做列印。

支撐

支撐參數:
上端直徑0.8mm以上，中間直徑1mm以上

※強壯的支撐可以讓列印更順利進行，減少拉拔時產生的晃動※

清洗步驟

1. 超音波機+95%酒精清洗60秒
2. 清洗後靜置30分鐘
3. 樹脂較濃稠，容易堆積，請仔細清理
4. 空心薄件請務必洗淨內部

二固

至少30分鐘。

Section 3

設計規格

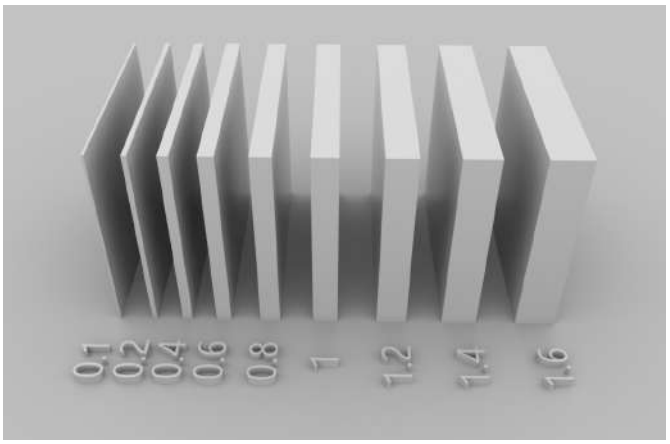
※註:所有指標均為樹脂之極限值，會依照使用機台不同有所差距※

Minimum Unsupported Wall Thickness

最小無支撐壁厚

此項指標為在無支撐前提下能獨立印出且無彎曲、斷裂現象之最薄厚度。

建議厚度:≥ 0.6 mm

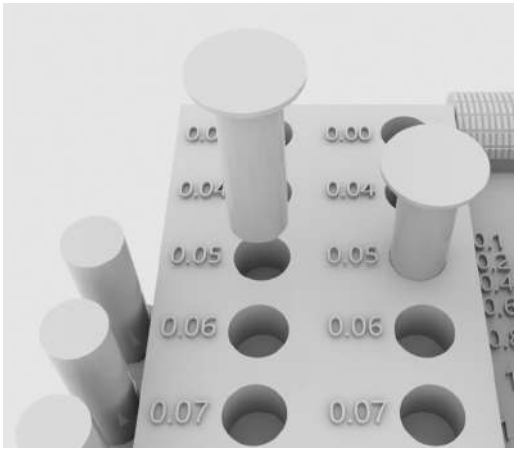


Size Tolerance, X-Y plane

最小尺寸公差

此項指標為平行於XY平面上的孔洞與立柱接合之最小尺寸公差。

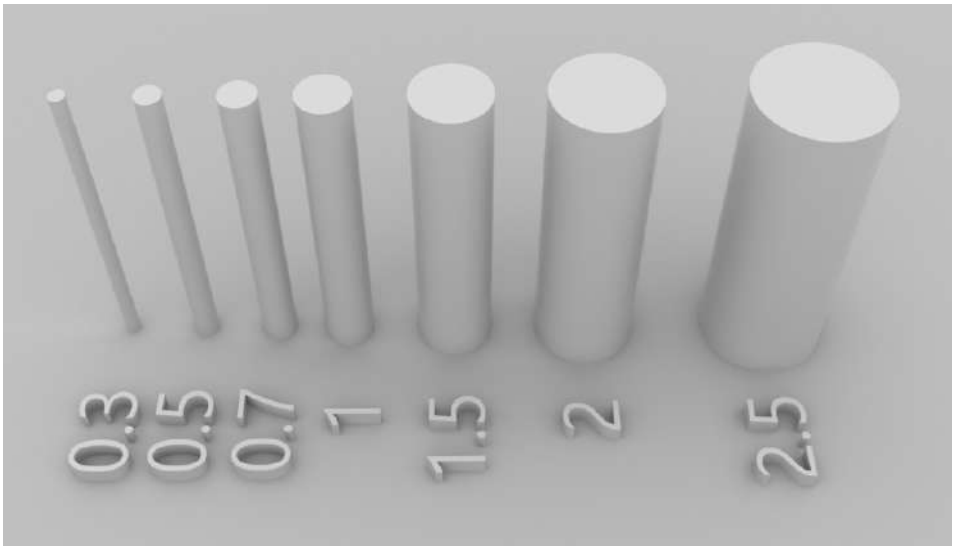
建議公差:≥ 0.06 mm



Minimum Pin Diameter

最小立柱直徑

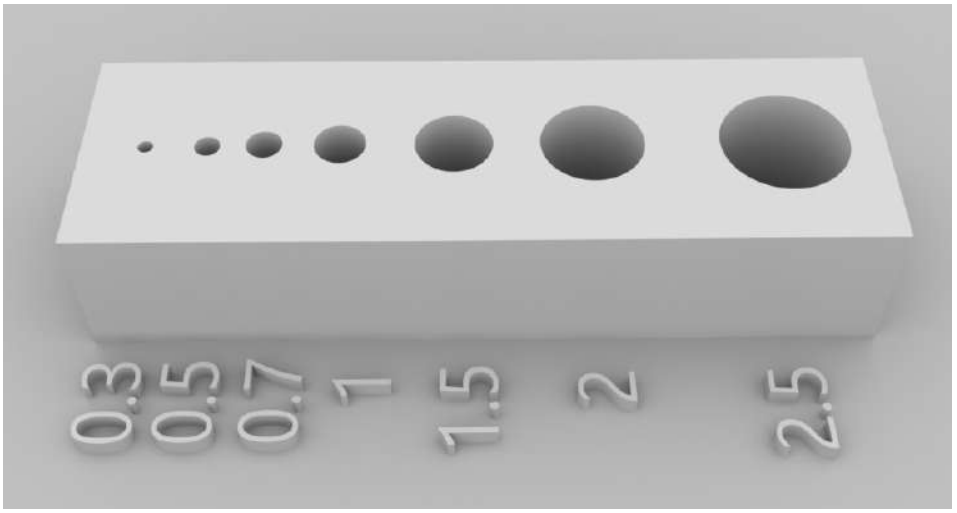
此項指標為細根及支撐能獨立印出且無彎曲、斷裂現象之最小立柱直徑。
建議直徑:≥ 0.5 mm



Minimum Hole Diameter, X-Y plane

最小孔洞直徑

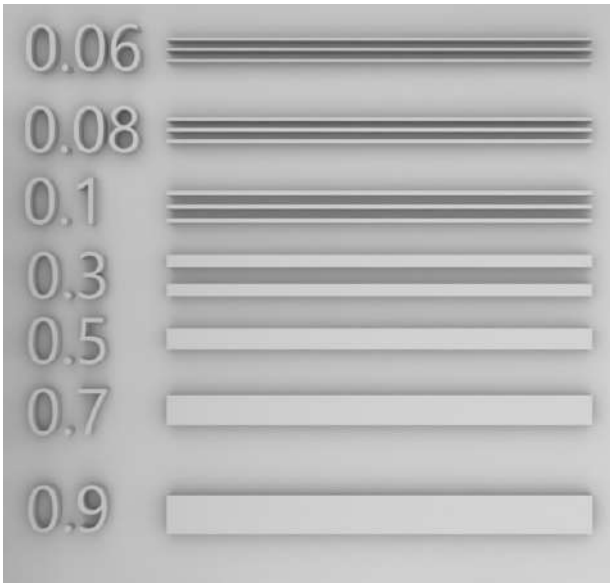
此項指標為平行於XY平面列印前提下能完整印出之最小孔洞直徑。
建議直徑:≥ 1 mm



Minimum Embossed Detail Width, X-Y plane

最小浮雕細節寬度

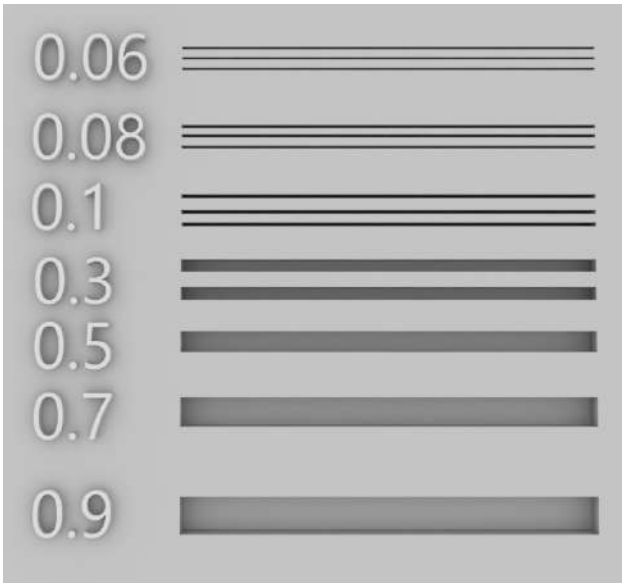
此項指標為可完整列印浮雕細節之最低線條寬度
建議寬度： ≥ 0.08 mm



Minimum Engraved Detail Width, X-Y plane

最小雕刻細節寬度

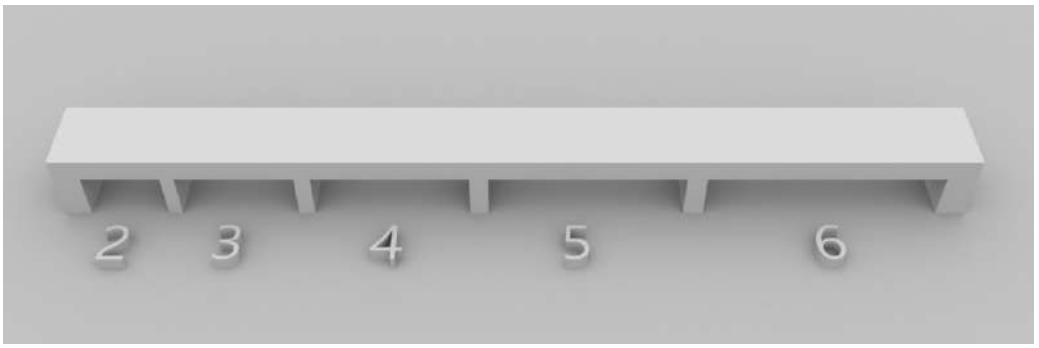
此項指標為可完整列印雕刻細節之最低線條寬度
建議寬度： ≥ 0.06 mm



Maximum Horizontal Bridge Span

最大水平跨橋寬度

此項指標為在兩側有支撐壁前提下能印出不變形懸空模型之支撐壁間最大寬度。
建議寬度: ≤ 6 mm

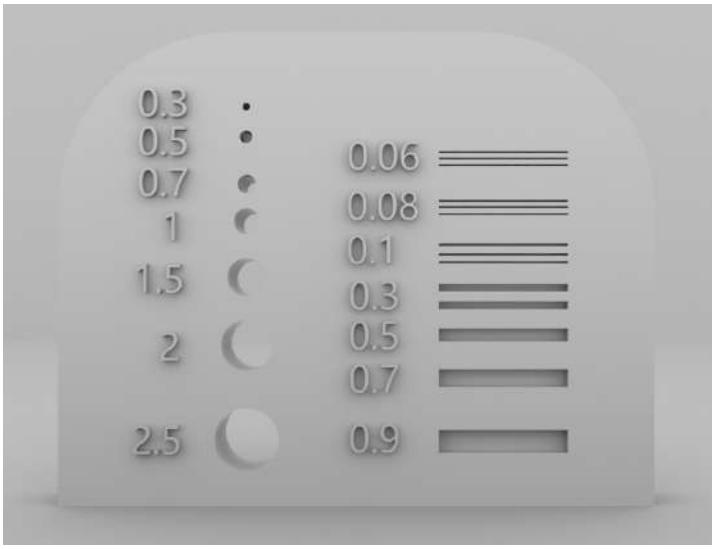


Minimum Hole Diameter and Engraved Detail Width, Z-axis, at 0.05mm layer height

Z軸最小孔洞直徑及最小雕刻凹槽寬度 (0.05mm層高)

此項指標為再層厚為0.05mm時Z軸上可完整印出之最小孔洞直徑及最小雕刻凹槽寬度

建議直徑:≥ 1.5 mm
建議寬度:≥ 0.06 mm



Section 4

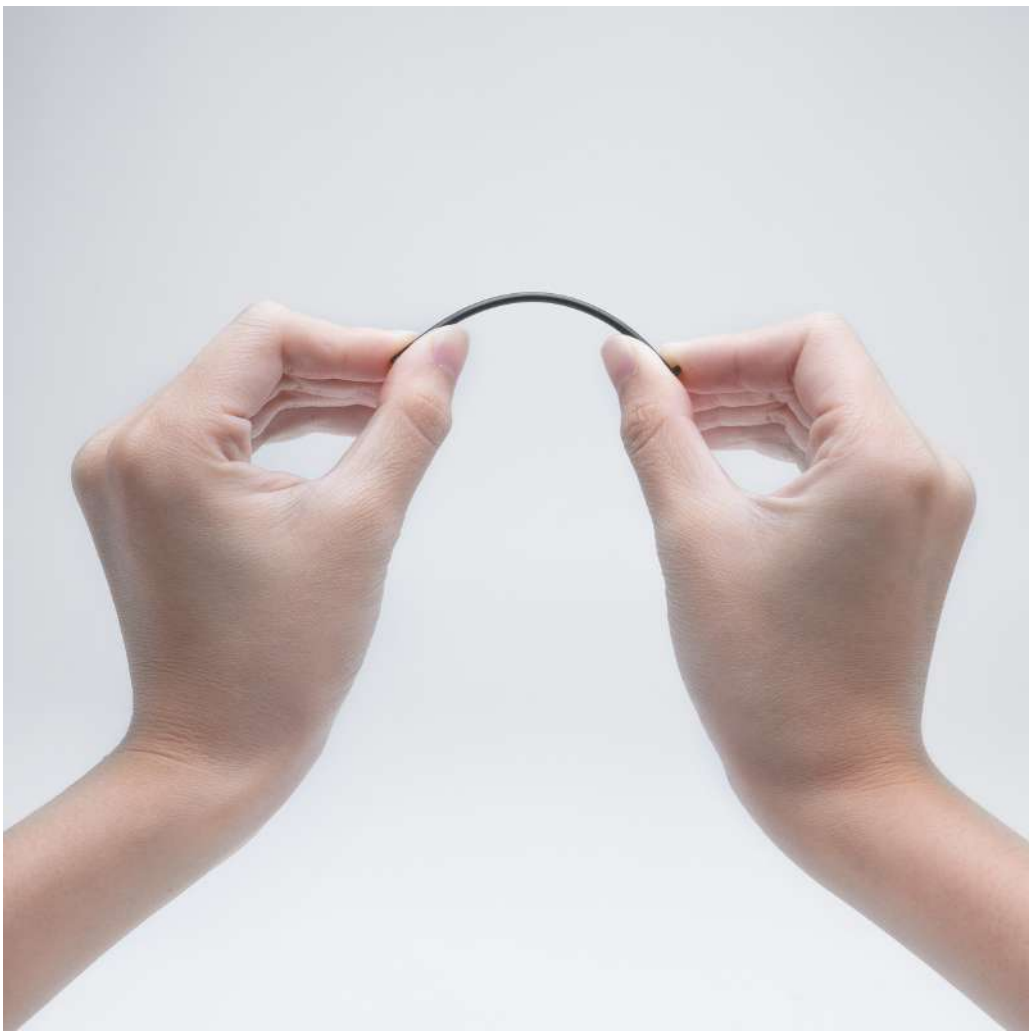
應用範例

【空心球】

【槌子】

【攻牙】

【對折】



【手機架】

【造型組合件】