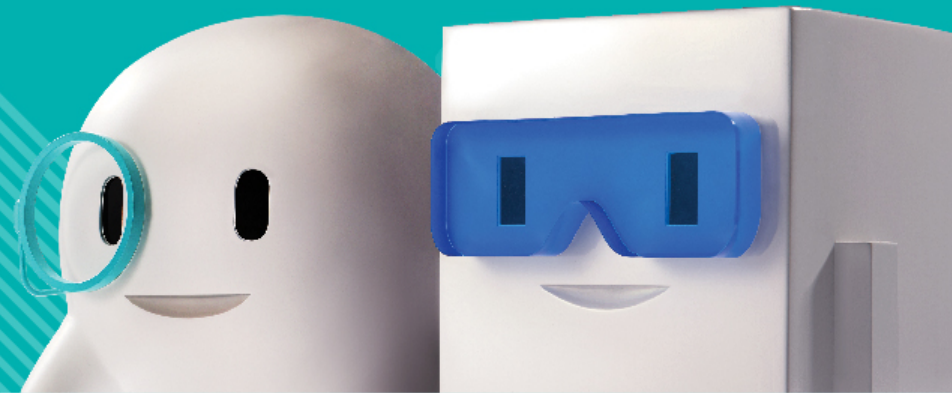




粉末注射成型技術及其最新應用

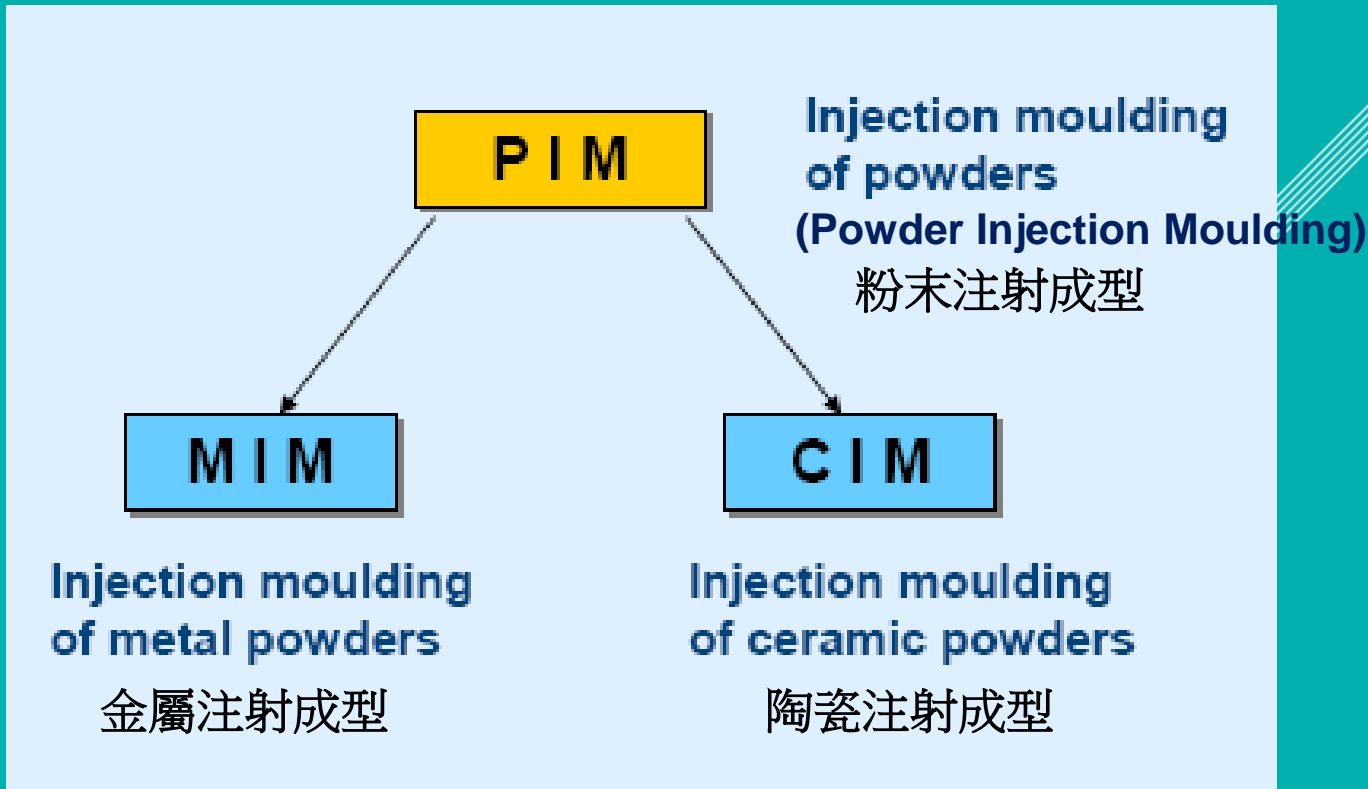
Powder Injection Moulding & Its Latest Application

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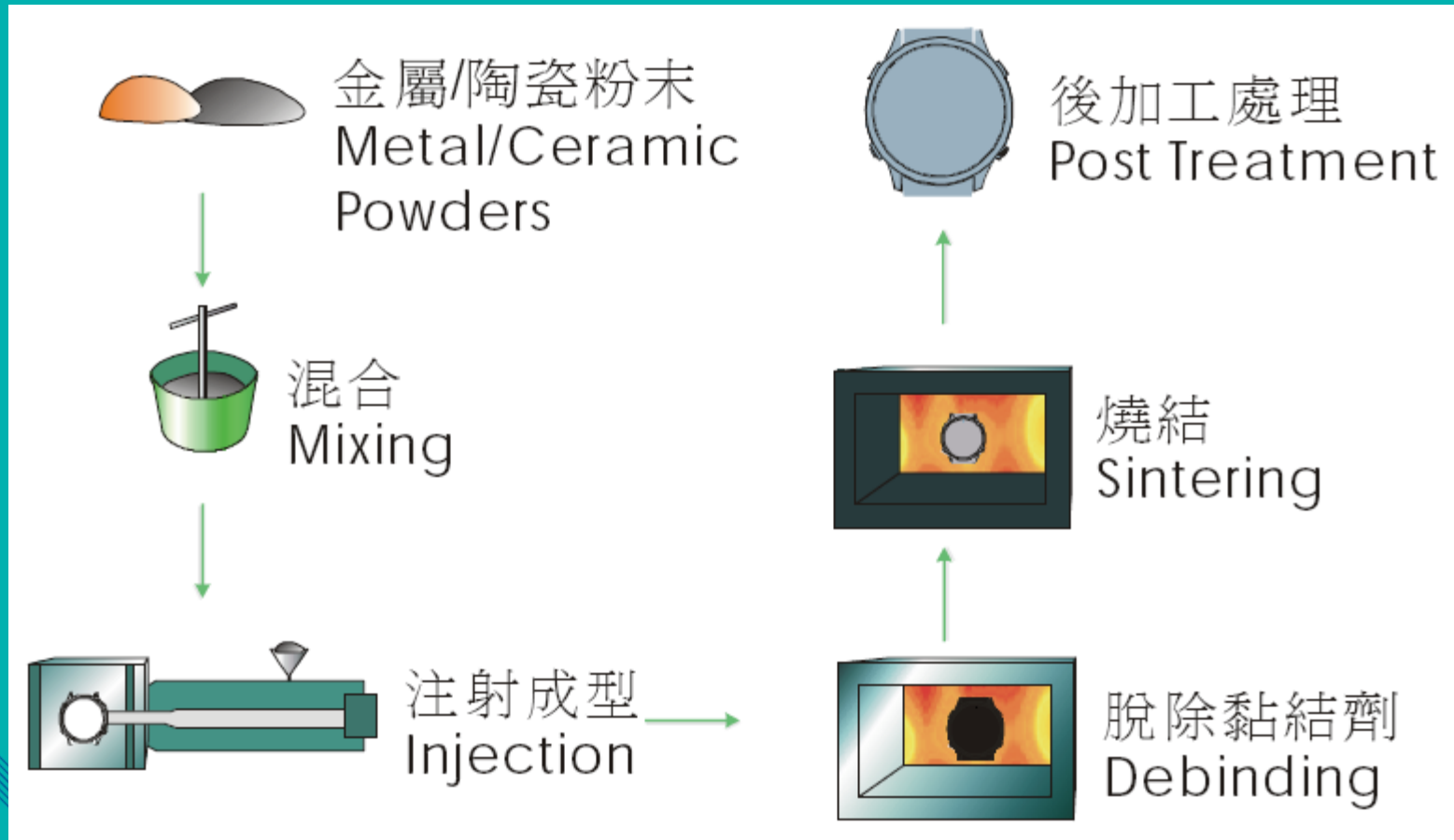
粉末注射成型技術及其最新應用

Powder Injection Moulding & Its Latest Application



粉末注射成型的基本原理

The Principle of PIM



粉末注射成型的基本步驟

The Basic Steps of PIM

Step 1

Mixing
混合



Step 2

Moulding
成型



Step 3

Debinding
脫脂



Step 4

Sintering
燒結



**Compounding
Machine**
材料混合機



**Injection
Moulding
Machine**
注射成型機



**Debinding
Furnace**
黏結劑脫除爐

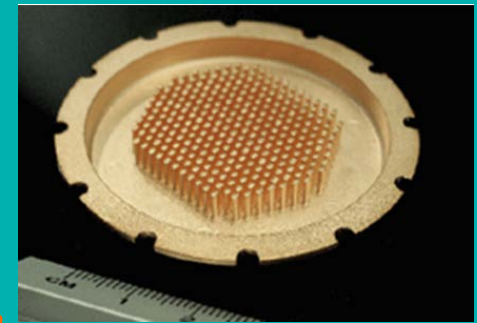
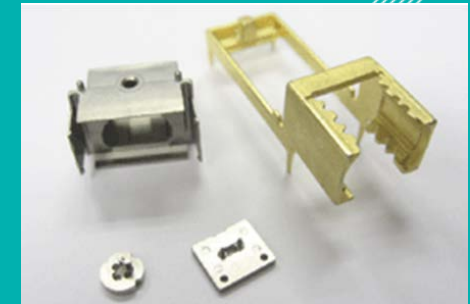


**Sintering
Furnace**
燒結爐

PIM 的材料選用

Applied Materials for PIM

- 304, 316L, 17-4PH不鏽鋼
304, 316L, 17-4PH Stainless steel
- 銅及銅合金
Copper & copper alloy
- 鈦及鈦合金
Titanium & titanium alloy
- 氧化鋁及氧化鋯陶瓷
Alumina & zirconia ceramic



For other materials, we can tailor-made for you.

粉末注射成型的產品特色

Production Features of PIM

Precision
精度

Up to 0.02 mm
可達至0.02 mm

Typical
Dimensions
一般尺寸

3 to 50 mm
3至50毫米

Shape
Complexity
設計複雜性

More than 10 features
多過 10 項的設計特點

Materials
材料

Ceramic or metal
陶瓷或金屬

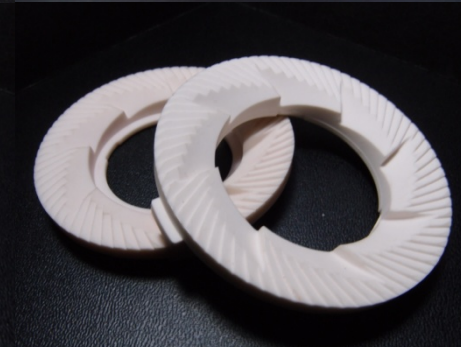
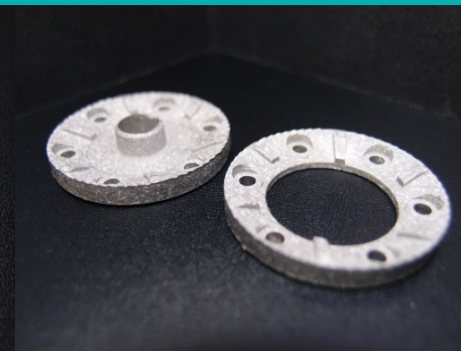


PIM 的應用行業

Applied Industries of PIM



- 電氣消費產品
- 電腦通訊
- 工業機械
- 汽車部件
- 鐘錶及裝飾品
- 軍事及防衛
- 醫療
- 牙科護理



HKPC®

PIM產品

PIM Products



傳統工藝難以用較低成本，快速而大量地生產出三維形狀的複雜零件。注射成形是一種可行的選擇以發達至低成本高效益。



Examples of microcomponents made of zirconium oxide, smallest total diameters are in the range of about 670 μm .



剪刀刀具



斯沃琪 (Swatch) 目前也利用注射成形生產不銹鋼面板。



316L stainless steel staples



注射成形可以一次成型製造出高爾夫球的推杆。反之，傳統工藝需分開鑄造推杆的各部份，然後才可焊接在一起。



生產力局的 PIM 核心技術

The core competence of PIM technology in HKPC



汽車製造業的應用

The Automotive Applications

汽車柴油渦輪增壓器的渦輪增壓器葉片
Turbocharger vane for automotive diesel turbochargers



此部件符合嚴格的尺寸公差要求，配合加工，翼形能接近至 ± 0.015 毫米
The part meets strict dimensional tolerance requirements, as close as $\pm 0.015\text{mm}$ on the wing profile, which was achieved with machining



汽車製造業的應用

The Automotive Applications

汽車的手動變速杆

Shift lever of a passenger car's manual transmission



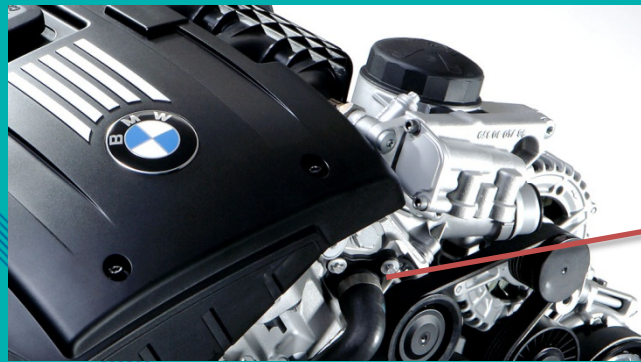
- 材料為 **Fe-2% Ni** 。
- 這組件由多個製作階段而製成，包括成型、燒結、硬化，以及裝配軸。
- 燒結後，這組件能夠加強硬度。
- The material is Fe-2% Ni.
- The component was shown various manufacturing stages: moulded, sintered, hardened, and assembled with a shaft.
- The part is case hardened after sintering.

汽車製造業的應用

The Automotive Applications

寶馬發動機的搖臂

Rocker Arms for BMW engines



- 其中空結構的特點可減輕重量，這特色較難利用其他技術來達到
- 此部件可提升發動機之性能，同時減少消耗燃料
- 需求：大約每年4.5萬件
- 材料：鋼合金粉末 50NiCrMo2.2
- It features a hollow configuration, saving weight, which is difficult to achieve by other processes.
- The variable valve lift enhances the engine performance and reduces fuel consumption.
- Demand: Around 4.5 millions parts / year
- Materials: 50NiCrMo2.2 steel powder alloy.

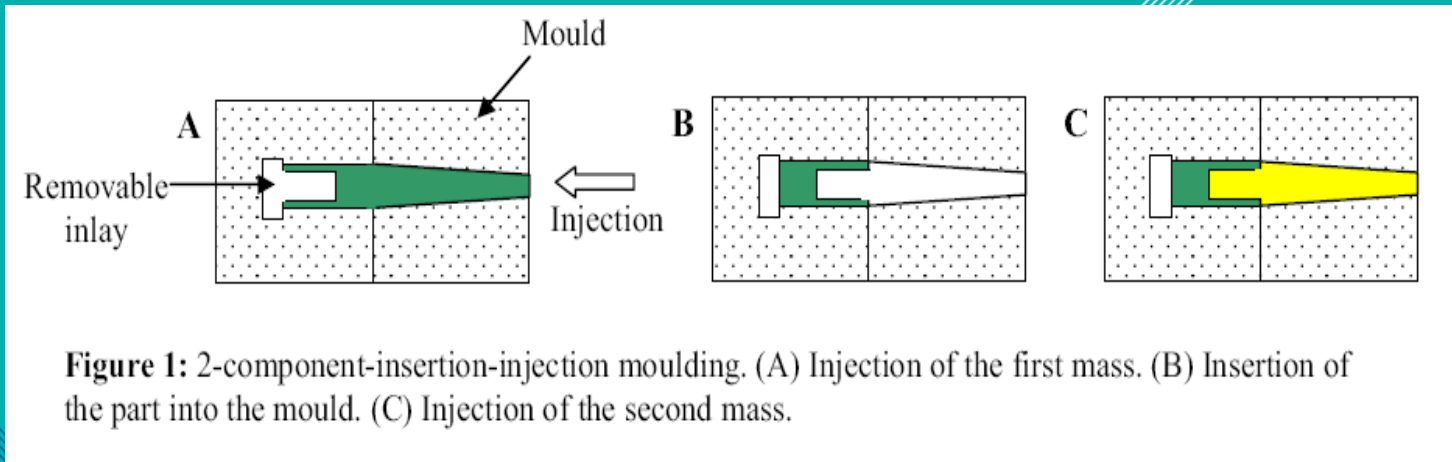
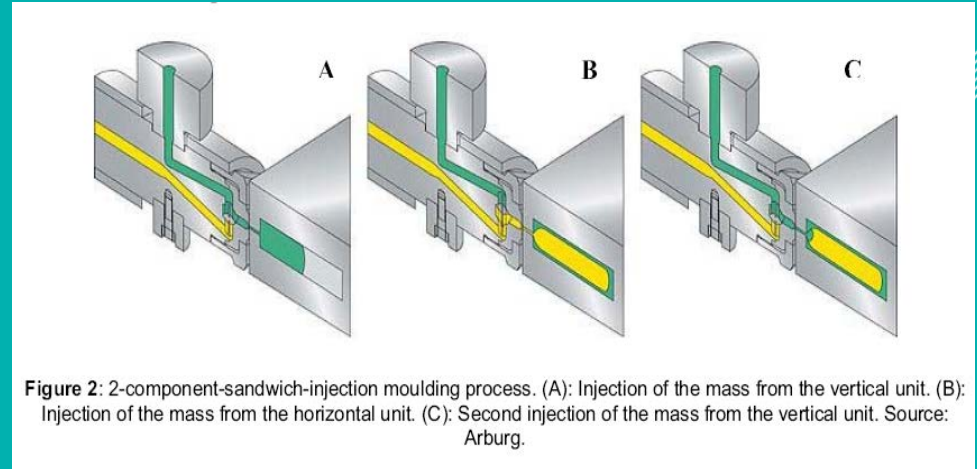
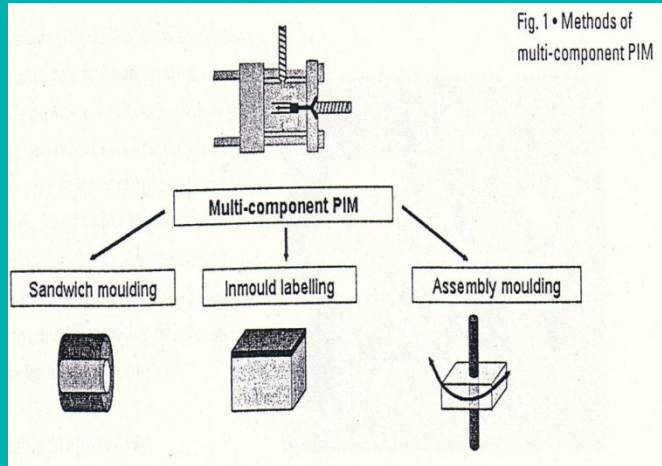
精密零部件的製作

The Application on Micro Parts



金屬-陶瓷復合注射成型

The Multiple Injection on MIM/CIM



金屬-陶瓷 復合注射成型

The Multiple Injection on MIM/CIM



ZIRCONIA – STAINLESS STEEL

謝謝！
Thanks !