

## Diffusion Bonding Technology 擴散焊接技術

Diffusion bonding technology is a solid-state joining technique that utilizes high temperature and pressure to join solid blocks of metal and/or ceramic under a vacuum condition. In the bonding process, the atoms of solid blocks can diffuse through the contact interface. This technology provides stronger joint and less distortion. The bonded part can be further machined and heat treated. The typical industrial application area is to fabricate plastic injection mould insert with complicated conformal cooling channel that closely follows the contour of mould core and cavity.

擴散焊接是一種固態接合技術，在真空環境下利用高溫及壓力使金屬及／或陶瓷工件的接觸面之間的距離達到原子間距，令原子間相互嵌入擴散結合。相對於傳統的焊接技術，擴散焊接能令接合面更堅固及減少變形情況。經焊接後的工作可以進一步進行加工和熱處理。製造異型水路的塑膠注塑模具鑲件是擴散焊接的典型工業應用，這些異型水路可以貼近模芯和模腔的輪廓。

The benefit of applying diffusion bonding technology for making mould insert with conformal cooling channel includes:-

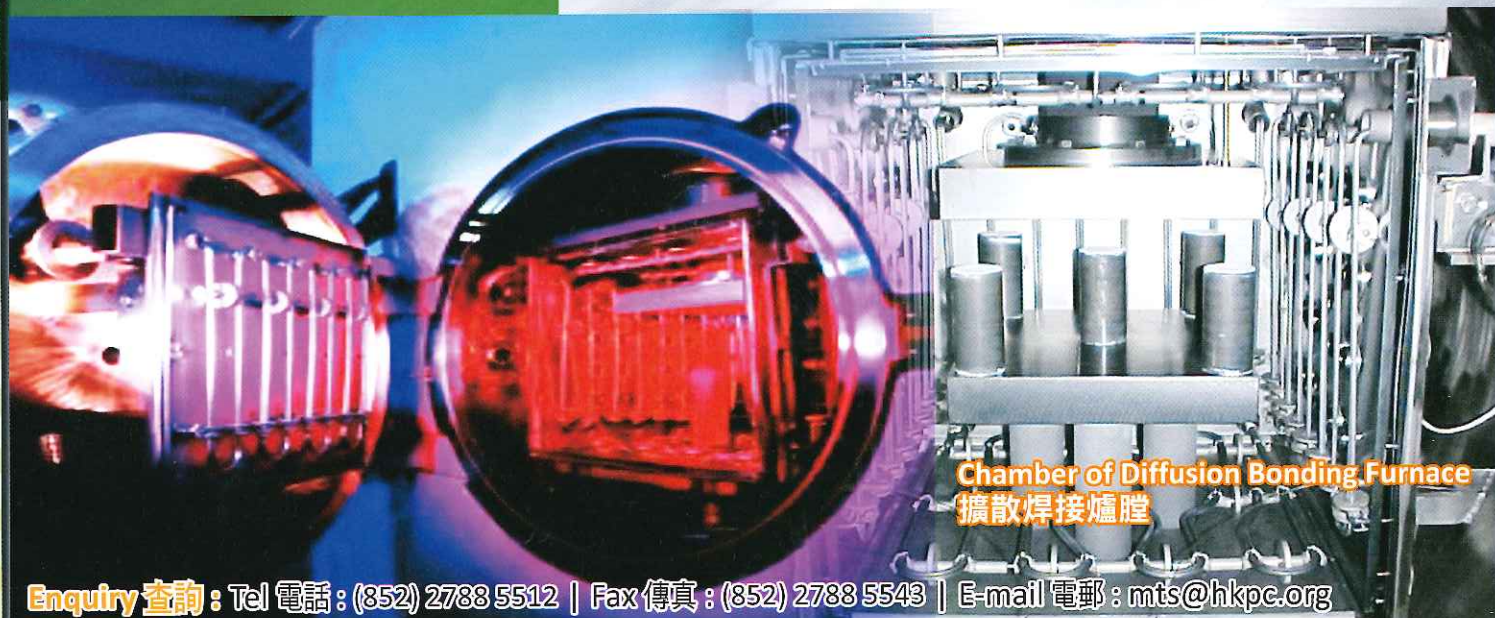
- To enhance dimensional accuracy and quality of plastic injection parts
- To shorten the overall injection moulding cycle, hence increase the overall workshop capacity and productivity
- To reduce the overall investment in duplicating plastic injection moulds and hence, reduce the required total number of injection moulding machines due to shortening of moulding cycle
- To produce a part that could not be manufactured by traditional machining method

Other industrial application areas include heat exchanger, automotive part, aerospace part, medical implantable part and precious metal jewellery.

以下是應用擴散焊接技術製造異型水路鑲件的好處:-

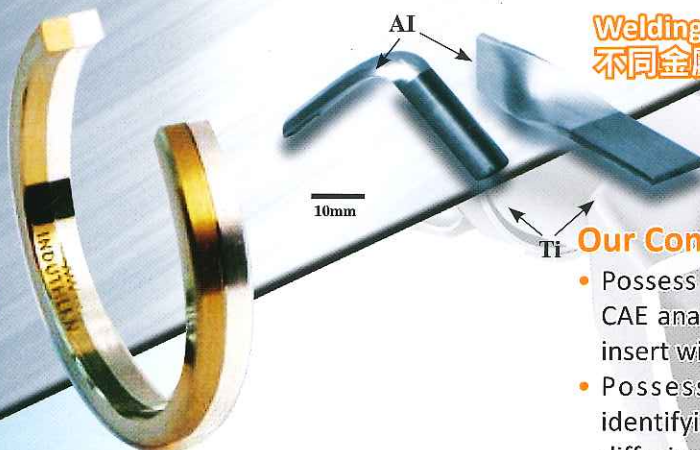
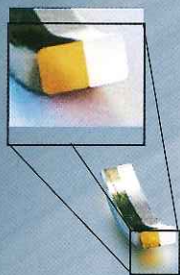
- 提升注塑件的尺寸精度和質量
- 縮短整體注塑週期，從而提高整體的車間能力及生產力
- 透過縮短成形週期，減少整體注塑機的數量，以及對複模的投資
- 可製造一些不能用傳統加工方法來製造的零部件

其他工業應用範圍包括熱交換器、汽車零部件、航空零部件、醫療植入零件及貴金屬手飾。



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## Welding of Different Metals 不同金屬的焊接

### Our Competency

- Possess an unique diffusion bonding facility and CAE analysis for assisting industry to realize mould insert with complicated conformal cooling channel
- Possess extensive technical knowledge for identifying and evaluating the application areas of diffusion bonding
- Possess extensive technical knowledge and hands on experience on mould insert design and fabrication with complicated conformal cooling channel
- Possess extensive technical knowledge and hands on experience on plastic injection moulding process parameter setting and optimization

### Our Scope of Services

- To provide technical evaluation on mould design for identifying the application areas of diffusion bonding
- To provide technical design input for mould insert with conformal cooling channel
- To provide CAE analysis for conformal cooling channel design in mould insert
- To provide diffusion bonding service for fabrication of mould insert with conformal cooling channel
- To provide technical support for plastic injection moulding process parameter setting and optimization for the fabricated mould insert with conformal cooling channel
- To join solid blocks of metal and/or ceramic for fabrication of part for different industrial applications

### 顧問服務範圍

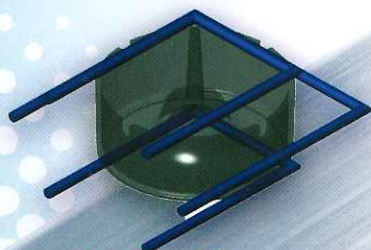
- 提供模具設計的技術評估，以確定擴散焊接的應用範圍
- 提供異型水路模具鑲件的技術設計
- 提供電腦輔助工程 (CAE)，分析模具鑲件內的異型水路設計
- 提供擴散焊接服務來製造異型水路的模具鑲件
- 為異型水路的模具鑲件，提供塑膠注射成形工藝參數設定和優化的技術支援
- 焊接金屬及 / 或陶瓷實塊以製造各種工業用途的製品

### 我們的優勢

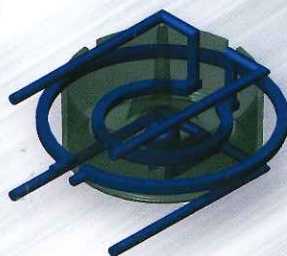
- 擁有獨特的擴散焊接設備和電腦輔助工程 (CAE) 分析工具，以協助業界實現複雜異型水路設計的模具鑲件
- 擁有豐富的技術知識，以確認及評估擴散焊接的應用範圍
- 擁有豐富的技術知識和實踐經驗，以協助複雜異型水路的模具鑲件設計和製造
- 擁有豐富的技術知識和實踐經驗，以設定及優化塑膠注射成形工藝參數



Tooling Surfaces Before  
Diffusion Bonding  
焊接前的截面



Conventional Cooling  
Channel Design  
傳統流道設計



Conformal Cooling Channel Design  
can be Realized by Diffusion Bonding  
擴散焊接可實現的異型流道設計



Sectioned Tooling Surface  
After Diffusion Bonding  
焊接後的截面

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