

高強度 ZA 鋅合金熱室壓鑄機械特質之探討

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摘要

高強度ZA 鋅鋁合金之優異特性為擁有高負載、高抗磨耗和極佳的苛刻運轉性能，因此使得極適合應用於高承載、低速度和潤滑軸承的場合。在價格低廉的ZA-8、ZA-12 和ZA-27 鋅鋁合金使用更是頻繁，普遍應用於生產高負載軸承之鋅壓鑄件，例如變速箱傳動裝置、氣動零件、軸傳動元件和採礦設備的大型軸承等。因此本研究利用電腦輔助模擬分析CAE，設計ZA 鋅鋁合金之最佳流路系統，將ZA 鋅鋁合金在低設備成本及生產快速的熱室壓鑄法上，利用比較不同的性質探討最佳之熱室壓鑄製程參數，並比較與重力鑄造之差異。研究結果顯示ZA-27 鋅鋁合金鑄件較ZA-12 或ZA-8 鋅鋁合金鑄件具有更佳的硬度及抗拉強度，且硬度值隨澆鑄溫度提高而增加，而在高鑄造壓力或低的澆鑄溫度之條件下，三種ZA 鋅鋁合金壓鑄件之硬度值則會隨之提升。在澆鑄溫度(過熱度)+20 時，三種ZA 鋅合金具有最佳的抗拉強度，在較高之鑄造壓力下其合金抗拉強度亦會提升，ZA 合金的充模能力隨著澆鑄溫度、模具溫度和鑄造壓力之增加而提升。主要影響晶粒大小為澆鑄溫度，而在孔洞率方面，澆鑄溫度越高所生成之孔洞也越多，而鑄造壓力之提升則會降低孔洞率。

關鍵詞：ZA-8，ZA-12，ZA-27鋅鋁合金，熱室壓鑄，硬度，抗拉強度，充模能力，晶粒，孔洞率

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