

# Effect of Cavity Thickness on Copper Alloy Corrosion Resistance



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**Abstract** This investigation inspects on the effect of cavity's thickness during metal casting process on the corrosion resistance of copper alloy product. As the thickness increases, the cooling rate becomes higher due to higher latent heat available in the thicker and larger cavity volume. As such the quantity of Dendritic Arm Spacing, DAS and its Secondary, SDAS per unit area becomes higher. This eventually results in better properties such as the higher hardness and good corrosion resistance because its correlation with DAS and SDAS distribution in the microstructure. The copper alloy used in this project is Nickel Aluminium Bronze (NAB) alloy which consists of elements such as the copper, aluminium, iron, nickel and manganese. Sand casting process has been used and the NAB alloys have been fabricated according to the ASTM B148 UNS 95,800 standards with the usage of 1.1% degassing agent. A range of product cavity's thickness have been fabricated for gating system and proper machining processes have been carried out to prepare the specimens for the immersion test. The specimens were immersed in sea water for a period of 17 weeks and changes in the specimen mass and pH and TDS values of the sea water used was measured. The data analysis revealed that the specimens were not corroded yet for the period of 17 weeks as there are not much changes in the specimen mass. The pH and TDS values are showing changes but these changes are very small comparatively.

**Keywords** Nickel Aluminum Bronze · Metal casting · Corrosion · Dendritic Arm Spacing

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