# Investigations of microstructure and mechanical properties of brass alloys produced by sand casting method at different temperatures

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Brass, alloy of copper and zinc, of historical and enduring importance because of its hardness and workability such that ancient metalworkers around the Mediterranean Sea were able to melt copper with zinc to make this metal alloy as early as 3000 B.C. Brass is stronger and harder than copper. The amount of copper varies between 55% and 95% by weight depending on the type of brass and its intended use. It is easy to form into various shapes, a good conductor of heat, and generally resistant to corrosion from salt water. It can be used to make pipes and tubes, weather-stripping and other architectural trim pieces, screws, radiators, musical instruments, and cartridge casings for firearms.

The manufacturing process involves combining the appropriate raw materials into a molten metal, which is allowed to solidify. The shape and properties of the solidified metal are then altered through a series of carefully controlled operations to produce the desired brass alloy. Temperature used in the process is one of the parameter to affect the product properties. In this study, the brass alloys were produced by sand casting method at different temperatures. Structural and mechanical properties were observed. Optical microscope, XRD and SEM-EDS tests were performed for microstructure and phase analysis of the material. Charpy impact test and tensile test applied to consider the mechanical properties of the samples. As a main purpose of this study, the results were evaluated and then the optimum temperature for the brass material production was determined.