

Additive manufacturing (AM), commonly referred to as 3D Printing, has gained a lot of popularity in recent times. New technologies and materials are being developed very quickly using the various AM technologies. Before these materials can be used in any application, it is necessary to find out how the process parameters affect the properties and performance of the parts. The technology is still in its nascent stage, so there is little understanding of how the process parameters affect the manufactured materials. The aim of this research is to find this process-property relationship for a unique AM process called binder jet printing. From this experimentation we will find unique uses of the AM technology, the materials themselves, and products being produced. The scope of this research is to determine the effect of process parameters of additive manufacturing based stainless steel 420 with bronze parts on the mechanical properties such as tensile strength, yield strength and elastic modulus. A full factorial design of experiments matrix was made by varying layer thicknesses and orientation angles. ASTM E8 standard was used for tensile testing of the specimen and the results were compared. Layer thickness was very important to the mechanical properties, while the part orientation had negligible effect. Based on various applications, different process parameters can be chosen to achieve the strength of a required component made by binder jetting of this material.