# AlSi10Mg ALLOY FABRICATED BY SELECTIVE LASER MELTING: IMPACT PROPERTIES AND FRACTOGRAPHY

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## ABSTRACT

*Selective Laser Melting is one of the main methods of building metallic engineering components through Additive Manufacturing technology. Popular among materials for this method is the AlSi10Mg alloy which is thoroughly investigated by many researchers. Expanding the databases regarding the properties and behavior of this material will allow for more efficient and optimized implementation for this technology in various applications and industries. This work focuses on a systematic investigation of the impact properties of the AlSi10Mg alloy via Charpy V-notched tests and the impact energy that is absorbed while considering the effects of the high strain rates that are typical to the test. The properties are discussed for two building orientations (vertical and horizontal) under different conditions including the as-built condition, the typical T5 treatment and an additional modified T5 treatment. Residual stresses for the horizontal build direction are also discussed and the fracture mode dependency on the building direction is also shown. It was found that horizontally built specimens can absorb more impact energy compared to vertically built specimens, which conforms to the material properties of this alloy, favoring elongation for the X direction and separation within layers in contrast to the separation between weakly bonded layers of the Z specimens.*

**KEYWORDS:** Selective Laser Melting, AlSi10Mg, Charpy V-notch, Fractography.

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