

ABSTRACT

This study influences the effect of various process parameters on Cold Metal Transfer (CMT) of stainless steel 316L using mild steel as substrate. CMT has a benefits of a minimal heat input, high deposition rate, low cost and increased efficiency. Typically, single pass weld beads are utilized for repair and remanufacturing. The geometry of the beads determines the cladding performance of additively produced components. Therefore, the optimal range of bead characteristics is necessary to ensure superior mechanical characteristics and qualities. The various parameters include as: Welding current, Wire travel speed and Wire feed speed were tuned to produce the weld joints with complete penetration depth and zero defects. The weld bead with lower Wire travel speed of (2.9 m/min) and higher wire feed speed of (4.9 m/min) at weld current value of (141A) shows the optimum value of (bead width: 3.56 mm, bead height:1.72mm, weld penetration: 3.83 mm and Dilution: 1.5%). This was attributed to the decreases of Wire travel speed and increases of wire feed speed ensures thew better weld penetration and larger flow of molten metal. While a higher Weld current value causes the convexity area of the bead to rise, it displays a stronger penetration and minimal dilution.

Keywords: CMT, Stainless steel 316L, Weld bead Geometry & Macrograph analysis.