

# **Influence of Shielding Gas Composition on the Properties of Flux-Cored Arc Welds of Plain Carbon Steel**

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## **Abstract**

In this study, the influence of variation in the shielding gas composition on the weld properties of steel ST 37-3 was investigated. Six different shielding gas compositions in addition to pure argon (Ar) and pure CO<sub>2</sub> were studied in this work using flux cored arc welding (FCAW) process. For bead-on-plate (B.O.P) specimens pure Ar shielding gas has excellent arc stability; however, with increase of the CO<sub>2</sub> percent in the shielding gas compositions, the arc stability becomes noisy (unstable arc) especially for pure CO<sub>2</sub>. 75% Ar – 25% CO<sub>2</sub> shielding gas composition has the optimum deposition rate among other shielding gases for B.O.P. Furthermore, for complete real welded joints, the absorbed energy in the Charpy impact toughness test of weld metal (W.M) decreases with increase of the CO<sub>2</sub> percent in the shielding gas composition. Additionally, the hardness of W.M decreases with the increase of the CO<sub>2</sub> percent in the shielding gas composition.

**Keywords:** flux cored arc welding, shielding gas compositions, bead on plate, arc stability & efficiency, deposition rate

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