

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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" Narrow-Gap CO₂-Welding in the Vertical Position "

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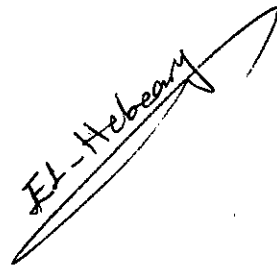
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Abstract

MIG welding using Narrow-Gap Welding technique (NGW) is a well known process in which the gap width, depending on plate thickness, varies between 7 to 30 mm and is mostly applied in the flat position.

In this work, a narrow-gap technique has been developed for welding mild steel plates in which reduced gap width between 3 to 5 mm has been used. Such narrow width was made possible by keeping the contact tube outside the gap and making use of a long stick-out. Welded plate thickness had been limited up to 12 mm, which is the most widely used in the welded structures. Moreover, carbon dioxide was used as a shielding gas, which is the most economic compared to other gases normally used. Welding has been performed in the vertical-up position in one single pass. Welding experiments had been conducted using either direct or pulsed current under different frequencies and off-time ratios of pulse. The filling wire was either solid or flux cored.

The results show that the above described process could be used successfully to weld steel plates in the vertical position without weaving motion. With respect to the mechanical properties, the narrower gap of 3 mm achieved a better toughness and strength. On the other hand, welding with 5 mm gap gave more stable process. Metallographic studies showed that the narrower the gap width the finer is the weld metal microstructure.

The proposed combination is recommended as a most economical process for fabricating welded structures such as tanks in which the plate thickness rarely exceeds 16 mm.