Image Cover Sheet

CLASSIFICATION	SYSTEM NUMBER
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TITLE

LASER ASSISTED GAS METAL ARC WELDING OF THICK STEEL PLATE

System Number:

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Laser Assisted Gas Metal Arc Welding of Thick Steel Plate

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ABSTRACT

High power lasers can be used to produce high quality, distortion free, single pass welds in thick steel plate. However, lasers with sufficient power to produce deep penetrating welds can be expensive. The capital cost can be reduced by employing laser assisted arc welding; a hybrid process which combines inexpensive arc welding energy with more costly, but highly controllable laser energy.

The process parameters have been investigated using bead on plate welding trials, and by producing welds in a variety of V-groove designs. The investigation has resulted in the development of a four pass welding procedure that can successfully weld 25 mm thick steel plate using approximately 5 kW of continuous wave carbon dioxide laser energy combined with sufficient GMAW arc energy to produce a LAGMAW heat input of 1.6 kJ/mm for each pass. The process has been applied to HY80 plate typically used in submarine hull construction.