

## Accepted Manuscript

Title: Influence of Rotation Speed and Axial Force on the Friction Stir Welding of AISI 410S Ferritic Stainless Steel

Authors: Gerbson de Queiroz Caetano, Cleiton Carvalho Silva, Marcelo Ferreira Motta, Hélio Cordeiro Miranda, Jesualdo Pereira Farias, Luciano Andrei Bergmann, Jorge F. dos Santos



PII: S0924-0136(18)30314-5  
DOI: <https://doi.org/10.1016/j.jmatprotec.2018.07.018>  
Reference: PROTEC 15845

To appear in: *Journal of Materials Processing Technology*

Received date: 2-2-2018  
Revised date: 13-7-2018  
Accepted date: 14-7-2018

Please cite this article as: de Queiroz Caetano G, Silva CC, Motta MF, Miranda HC, Farias JP, Bergmann LA, dos Santos JF, Influence of Rotation Speed and Axial Force on the Friction Stir Welding of AISI 410S Ferritic Stainless Steel, *Journal of Materials Processing Tech.* (2018), <https://doi.org/10.1016/j.jmatprotec.2018.07.018>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Influence of Rotation Speed and Axial Force on the Friction Stir Welding of AISI 410S Ferritic Stainless Steel

### Author names and affiliations:

Gerbson de Queiroz Caetano<sup>1\*</sup>, Cleiton Carvalho Silva<sup>1</sup>, Marcelo Ferreira Motta<sup>1</sup>, Hélio Cordeiro Miranda<sup>1</sup>, Jesualdo Pereira Farias<sup>1</sup>, Luciano Andrei Bergmann<sup>2</sup>, Jorge F. dos Santos<sup>2</sup>

<sup>1</sup> Universidade Federal do Ceará, “Department of Materials and Metallurgical Engineering”, Campus do Pici, Building 1080, 60440-554 Fortaleza, Ceará, Brazil.

<sup>2</sup>Helmholtz-Zentrum Geesthacht, Institute of Material Research, Material Mechanics, Solid State Joining Processes, Max Planck Strasse 1, 21502 Geesthacht, Schleswig-Holstein, Germany

\*Corresponding author.

Phone: +55 85 33669358

E-mail: gerbsonqueiroz@gmail.com

**Abstract.** The Friction Stir Welding process parameters were varied to provide a combination of an acceptable surface finish, absence of cracks, and full tool penetration. Two levels of rotation speed and axial forces from 10 to 30 kN were applied, whilst keeping the welding speed constant at 1 mm/s. One of the defects analyzed was the production of flashes. This can occur due to an increase in axial force and because of the instability in its applications, which implies directly on the formation of volumetric defects along the stir zone. FSW joints without root flaws can be achieved through a correct balance between the axial force and rotation speed, which also allows a greater immersion of the tool probe in the joint. Both rotation speeds using an axial force of around 20 kN proved to be good welding parameters for the FSW process. The welding of the AISI 410S steel (under these conditions) resulted in joints without internal defects and with a good surface finish.

Download English Version:

<https://daneshyari.com/en/article/7176205>

Download Persian Version:

<https://daneshyari.com/article/7176205>

[Daneshyari.com](https://daneshyari.com)