Corrosion Behaviour of 304 Austenitic, 15-5PH and 17-4PH Passive Stainless Steels in acid solutions

M. Lara Banda¹, C. Gaona Tiburcio^{1,*}, P. Zambrano-Robledo¹, J. A. Cabral M¹,
F. Estupinán L¹, M. A. Baltazar-Zamora², R. Croche B², E. Vera V³, F. Almeraya-Calderón¹.

¹ Universidad Autónoma de Nuevo León, Facultad de Ingeniería Mecánica y Eléctrica, Centro de Investigación e Innovación en Ingeniería Aeronáutica (CIIIA),
Av. Universidad s/n, Ciudad Universitaria, San Nicolás de los Garza, Nuevo León 66455, México

² Universidad Veracruzana, Facultad de Ingeniería Civil – Xalapa.

Circ. G. Aguirre Beltrán S/N, Lomas del Estadio, Xalapa, Veracruz, México, CP 91000

³ Universidad Pedagógica y Tecnológica de Colombia, Sede Central Tunja–Boyacá–Colombia.

*E-mail: citlalli.gaona@gmail.com

doi: 10.20964/2018.11.12

Received: 13 July 2018 / Accepted: 29 August 2018 / Published: 1 October 2018

The objective of this work was to study is use electrochemical techniques to determinate the growth conditions, characteristics and resistance of passive layers of stainless steel (SS): 304 austenitic, 17-4PH (precipitation hardening) and 15-5PH. Passivation of the SS was performed in 15% citric acid at temperatures of 25 and 49 °C. The corrosion kinetics was obtained using the electrochemical technique as potentiodynamic polarization (PP), in a three-electrode system. The electrolytes used were sodium chloride (5 wt. % NaCl) and sulfuric acid (1 wt. % H₂SO₄). Passivation in citric acid allows obtain passive layers at temperatures of 49°C with immersion times of 30 minutes. In precipitation hardening steels, passive layers up to 360 mV in sodium chloride. Can be obtained. In sulfuric acid, there is a mechanism of passivation – transpassivation - secondary passivation, this due to the high electropositive values of potential.

Keywords: Stainless Steels, Precipitation Hardening, Corrosion, Passivation

[FULL TEXT](#)

© 2018 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).