

Proceedings of the 2nd Annual World Conference
of the Society for Industrial And Systems Engineering
Las Vegas, NV, USA
November 5-7, 2013

Taguchi Application to Improve a Laser Welding Process

**CM Guerrero-Zacarías, V Torres-Argüelles, SA Noriega-Morales,
AM Guaderrama, and T Escobedo-Portillo**

Departamento de Ingeniería Industrial y Manufactura,
Instituto de Ingeniería y Tecnología,
Universidad Autónoma de Ciudad Juárez,
Cd. Juárez, Chihuahua, México

Corresponding author e-mail: vianey.torres@uacj.mx

Abstract. This Project was done in a production line dedicated to the production of sensors used in automotive fuel systems. The sensor measures the quality of the fuel, varying from 100% of gasoline to 85% gasoline and up to 15% of ethanol. The sensor is assembled between a top and a casing, couple that encloses-protects the sensor, then, they are laser weld. There are two laser welding machines. The customer wanted precise figures of the variation in each laser machines and between the two of them to make sure there were airtight seals. This sealing was measured and subject to several levels in a test of resistance to blowup, during the test, compressed air was injected under different pressure levels and the pressure of blowup was registered. The pressure has to be higher than 65 psi. A DOE Taguchi method with four variables was designed, the casing cavity, the rupture in mm, the welding time and the trigger force. The values were for the casing cavity in the range [1,4], for the rupture, the levels, 0.16 and 0.18; 2 and 2.5 seconds for the welding time and two levels, 900 and 920 Nw for the trigger force. The mean blowup test obtained were 110 and 122 psi for the confirmation run. Results indicate that the best set of parameters is, 0.18 for the rupture, 2 seconds for welding, 920 Nw for the trigger force. The casing cavity with higher effect was 2, with an average of 116.7 psi and the one with the lower average was 3, giving 102.4 psi, both higher than the minimum required. We conclude that the initial objectives were accomplished.

Keywords: DOE Taguchi method, Sensors Testing, Laser Welding, Rupture Resistance