

Thesis Title	A Reduction of Burn Defect in Hard Anodizing Process
Thesis Credits	12
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Program	Master of Engineering
Field of Study	Industrial and Manufacturing Systems Engineering
Department	Production Engineering
Faculty	Engineering
Academic Year	2014

Abstract

Hard anodizing process is a widely used coating process on aluminum surface through an electrochemical process where an anodic film of Aluminum oxide (Al_2O_3) builds up on the surface of an aluminum part. The sulfuric acid of 15-20% concentration is normally utilized as an electrolyte while the rectified direct current is applied to catalyst the chemical reaction. It is due to the fact that a myriad of heat accumulates and burn the part at the position where ununiformed anodic films are created. Therefore, a good agitation system in order to dissipate the mentioned heat is a must. In addition, such parameters as ramp time and suitable amount of sulfuric acid must also be correctly set and constantly monitored. The objective of this thesis is to explore a systematic approach to successfully reduce burn defects on an aluminum 3003 work-part. First, different designs of the agitation system via bubble are explored. It is found that 5-pipe design in order to increase agitation efficacy offers the most favorable result. Then, an experimental design is conducted to investigate an effect of ramp time and acid concentration to burn defect. It is convinced that with an increasing of both ramp time and acid concentration can substantially reduce burn defect from 1.21 to 0.32 percent which is equivalent to 73.55 percent improvement.

Keywords: Hard anodizing process / Burn defect / Agitation / Ramp time / Acid concentration