

The Suitable Factors Study for Polyester powder coating on Lap Seam welding of a Can Production

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Abstract

Nowadays Thailand had many kind of industry which changes from the agriculture industry that is former occupation of people in the past until the present it had change to work in industry. There are many kind of industry for produce the good for export and for supporting to some industry. There are many kind of agriculture was done in many province in Thailand as fruit, vegetable and rice had grown in Thailand and export to foreign country and some sent to produce to finish product as canning fruit. In the middle region of Thailand had much kind of fruit as the pineapple had grown at this area and there are the factory by produce it to finish product with containing it in the can for keep and export to oversea for serve and ready for eat. So, the can factory was established at near the area of growing the pineapple for support the food factory who makes the finish product for export and for keep it for some season that no fresh fruit. According to the cans production had many steps on production process such as slitting the steel plate, body making, polyester coating, lacquer coating, flanged body, bending, widening and dent vacuum. The most defaults were found in the step of polyester coating on the welding seam with some leak of seam and some too thin coating of polyester. The problem was found that had uncertainty on thickness of the polyester powder coating on the welding seam. This problem due to the unsuitable parameters on the process of powder coating on lap weld seam. This is the big problem and effect to quality of can production because the seam coating was defect with too thin or too thick of coating and it effect to easily on corrosion and effect to food that contain in the can may be hazard to consumer. The information of defect by average from the past are too thin of coating at 47% too much of coating 31% and not smooth on coating surface 22% respectively. The basic factors control for polyester coating of can production is pressure, current, squirt and suck by setting the machine to automatic production control. The improving processes by experiment with using these four factors on factorial design (34) technique on can production and test the thickness of polyester coating. The experiment was found that pressure, current, squirt and suck affected to the thickness of powder coating on lap weld at significant level ($\alpha = 0.05$). The regression equation of this parameter relating with the major factors influence with thickness of the polyester powder for coating on lap weld seam is: $Y = 90.97 + 18.25A - 0.37B - 5.93C - 1.13D - 10.74A^2 - 3.06B^2 - 3.32C^2 + 1.58D^2 + 3.96AB - 1.05AC - 1.78AD$. After that the researcher using the response surface graph for selecting the optimum parameter by set the objective on coating thickness of polyester powder. The optimum result of the suitable factors for polyester powder coating thickness on lap weld seam for coating thickness at 95 μm can be done by adjusting the pressure (A) 0.95 bar, the current (B) at 91 % (81.9 Volt), the squirt (C) at 5 bar and the suck (D) at 1 bar. The efficiency of can production with these parameter controls was increased to more than 95% by mean.