

## Overview

This standard identifies the competencies you need to carry out sulphuric acid anodising of aluminium, in accordance with approved procedures. You will be required to access the appropriate specifications, to check that these are the current issue and to extract all necessary information to carry out the anodising operations. You will be expected to prepare and adjust the processing solutions to give satisfactory anodised coatings at optimal productivity levels. You will be expected to identify any anodising defects and to carry out the necessary actions and adjustments to equipment and anodising solutions in order to correct them. You will need to carry out tests on the components to ensure that the anodised coating meets the specification requirements. Your responsibilities will require you to comply with organisational policy and procedures for the anodising activities undertaken and to report any problems with these activities or with the materials and equipment used, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out. Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying sulphuric acid anodising procedures. You will understand the anodising process and its application, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring the finished components are to the required specification. Your knowledge will also include effluent treatment for the waste streams from the anodising processes and associated pre-treatments. You will understand the safety precautions required when carrying out the sulphuric acid anodising operations. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace and towards the environment.

## Performance criteria

### *You must be able to:*

1. work safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines 2. follow relevant job instructions and specifications 3. ensure the material surfaces to be treated are prepared for the finishing operations 4. check that the finishing equipment and treatment solutions are set up and maintained at required operating conditions and levels 5. carry out finishing according to operating procedures and to meet specifications 6. check that the treated workpiece achieves the required characteristics and meets the finishing specifications 7. deal promptly and effectively with problems within your control and report those that cannot be solved 8. ensure that work records are completed, stored securely and available to others, as per organisational requirements 9. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

## Knowledge and understanding

### *You need to know and understand:*

1. the specific safety precautions to be taken whilst carrying out the activities (including any specific legislation, regulations or codes of practice relating to the activities, equipment or materials) 2. the health and safety requirements of the work area and the activities, and the responsibility these requirements place on you 3. the hazards associated with the activities, and how to minimise them and reduce risks 4. the personal protective equipment and clothing (PPE) to be worn during the activities 5. the types of specifications that are used during the anodising process 6. how to assess component suitability for anodising (to include methods of handling, methods of pre-treatment, the most efficient and appropriate method of application) 7. the basic principles of operation of the anodising process plant and equipment 8. the limitations of component shape/geometry on the anodising process 9. advantages and disadvantages of work placement methods; jigs, wires, barrels/baskets and reel-to-reel 10. how to set up and check that the anodising plant, equipment and solutions are fit for purpose 11. the preparation methods and techniques to be undertaken prior to the anodising process 12. the preparation methods and techniques for mixing process solutions and pre-treatment solutions, safely and correctly 13. how to carry out the anodising process, and the sequence of operations that are required 14. the importance of the sealing process when anodising components 15. the importance of agitation to prevent uneven deposits and temperature layering, and the various means of achieving this whilst recognising the dangers associated with using air agitation 16. the procedures for the transportation and storage of anodising materials 17. the importance of the cleanliness of the workholding and processing equipment 18. cleaning and maintenance procedures for process tanks and the working area 19. the surface treatments available, their characteristics and use (thickness, colour, suitability) 20. recognition of anodising defects (jigging damage, gas entrapment, contact burns, electrolytic pitting, low film misser, absorption of dyes and pre-treatment damage) 21. how to correct anodising processing faults 22. the tools and equipment used in the activities and their calibration, care, preparation and control procedures 23. the procedures for dealing with waste materials and waste solutions safely and for carrying out effluent treatment 24. how to test coated components for specification compliance 25. how to remove poorly applied anodised films without damaging the substrate 26. the necessity to control time, temperature and solution concentration accurately, to maintain coating quality 27. the problems that can occur with the anodising operations and how these can be overcome 28. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve 29. how to access, use and maintain information to comply with organisational requirements and legislation

## Scope/range related to performance criteria

1. Finish materials by sulphuric acid anodising, carrying out all of the following activities: 1. use the correct issue of drawings, process and other related specifications 2. adhere to health and safety regulations, systems and procedures to realise a safe system of work 3. assess the work loading, power requirements, equipment and process capabilities 4. ensure that the equipment is correctly prepared for the anodising operations 5. ensure that any meters and gauges to be used are within their calibration periods 6. clean all tools and equipment on completion of the anodising activities 7. complete the production documentation (condition/pre-treatment of substrates, coating material preparation, equipment settings, confirmation of standard of finish) 8. leave the work area in a safe and clean condition

2. Use one of the following techniques for locating work pieces during the anodising process: 1. hooks or wiring 2. jigs 3. baskets/barrel 4. reel-to-reel 5. strap and clamp

3. Adjust solutions and process settings to change two of the following anodising conditions: 1. temperature of anodising solutions 2. anodic processing time 3. concentration of constituents in the solutions 4. presence of contaminants, including aluminium 5. voltage and anodising current plus three more from 6. temperature of chemical etches 7. temperature of chemical brighteners 8. concentration of chemical etches 9. concentrations of chemical brighteners 10. temperature of cleaners 11. pre- and post-treatment timings 12. effectiveness of rinsing 13. raw water purity and a further three from 14. temperature of dyes 15. concentration of impregnation coating 16. concentration of dyes 17. temperature of multi-colouring and printing process 18. temperature of seals 19. mixture of multi-colour process solutions 20. pH (acidity/alkalinity) of seals 21. process timings (seals and dyes) 22. temperature of impregnation coating

4. Carry out two of the following activities: 1. dispose of spent solutions safely and correctly 2. clean out process tanks 3. prepare new anodising and pre-treatment solutions from basic constituents 5. Measure one of the following: 1. presence of anodised layer 2. thickness of anodised layer 3. sealing quality of anodised film 6. Check the anodised components for three of the following: 1. jiggling damage 2. gas entrapment 3. contact burns 4. low film misser 5. electrolytic pitting 6. evidence of damage to the substrate (caused by pre-treatment) 7. absorption of dyes (where applicable) 7. Check that coatings applied to components to comply with one of the following quality and accuracy standards: 1. military or aviation standards 2. current industry standards and codes of practice 3. international standards 4. company standards and requirements 5. customer standards and requirements

**Developed by** Enginuity

---

**Version Number** 2

---

**Date Approved** 30 Mar 2020

---

**Indicative Review Date** 31 Mar 2023

---

**Validity** Current

---

**Status** Original

---

**Originating Organisation** SEMTA

---

**Original URN** MPF3.34

---

**Relevant Occupations** Engineering and Manufacturing Technologies, Manufacturing Technologies, Process Operatives, Process, Plant and Machine Operatives

---

**Suite** Materials Processing and Finishing Suite 3

---

**Keywords** Engineering; manufacturing; processing; finishing; anodising; sulphuric acid; aluminium; parameters; methods

---