

Overview

This standard identifies the competencies you need to carry out electroplating processes to various substrates, in accordance with approved procedures. The electroplating activities carried out will include copper, gold, silver, platinum, cadmium and other specific processes. It does not cover nickel, zinc, alloy and chromium plating, for which other standards are available. You will be required to access the appropriate specifications, to check that these are of the current issue and to extract all necessary information in order to carry out the electroplating operations. You will be required to carry out all necessary preparations to the base materials prior to plating them and this will include such items as cleaning, degreasing, masking and other appropriate treatments. You will be expected to prepare and adjust the plating solutions to give satisfactory deposits at optimum productivity levels. You will be expected to identify any plating defects, and to carry out the necessary actions and adjustments to equipment and plating solutions in order to correct them. You will need to carry out tests on the components to ensure that the deposited layers meet the specification requirements. Your responsibilities will require you to comply with organisational policy and procedures for the plating 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 electroplating methods, techniques and procedures. You will understand the plating processes and their application and will know about them 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 plating solutions and associated processes. You will understand the safety precautions required when carrying out the preparation and electroplating 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 importance of extraction for acid pickling and for cyanide and alkaline plating solutions 6. the types of specifications that are used during the electroplating activity 7. how to assess component suitability for electroplating (to include methods of handling, methods of pre-treatment, the plating material to use, the most efficient and appropriate method of application) 8. the basic principles of operation of the electroplating equipment used 9. how to set up and check that the electroplating plant, equipment and solutions are fit for purpose 10. the properties of electroplated deposits 11. the mechanisms of corrosion protection arising from an electroplated deposit as a surface layer 12. the properties of different passivation and the effects of sealants and torque control additives 13. how to decide whether components are suited to rack or barrel plating, jigging or wiring techniques 14. how to make up plating solutions, safely and correctly 15. how to identify various coating specifications 16. the de-embrittlement and reactivation procedures 17. the limitations of geometry and its effect on throwing power 18. how to test coated components for specification compliance how to identify processing faults, and how to correct them 19. visual assessment of workpieces for colour and brightness 20. how to control and assess brightener and other additive dosing rates 21. how to neutralise and precipitate out effluent waste streams 22. the benefits of agitation and the need to keep absorption of air into alkaline plating solutions to a minimum 23. the effects of contaminants in plating solutions and how to remove these 24. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve 25. how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1. Finish the materials using electroplating methods, carrying out all of the following:

1. use the correct issue of process and other related specifications
2. adhere to health and safety regulations, systems and procedures to realise a safe system of work
3. ensure that the equipment is correctly prepared for the electroplating operations
4. clean all tools and equipment on completion of the electroplating activities
5. complete the production documentation (such as condition/pre-treatment of substrates, coating material preparation, equipment settings, confirmation of standard of finish)
6. leave the work area in a safe and clean condition

2. Carry out two of the following plating processes:

1. copper
2. cadmium
3. gold
4. platinum
5. silver
6. other specific process

3. Carry out the electroplating process on two of the following substrates:

1. mild steel
2. copper
3. stainless steel
4. zinc base die castings
5. plastics
6. brass
7. aluminium
8. other metals/substrates

4. Measure and correct two of the following electroplating conditions:

1. levels of basic constituents
- temperature
2. carbonate levels
3. plating efficiencies
4. contaminants in plating solutions
5. brightener dosing levels
6. current densities in the processes
7. processing and rinsing times

5. Measure and correct two of the following:

1. total and free alkalinity of cleaners
2. contamination levels in cleaners
3. effectiveness of inhibitor in acid pickling process or dry acid salt activator
4. effectiveness of rinsing
5. temperature of cleaners
6. Carry out electroplating activities using one of the following types of electrolytes:

 1. alkaline
 2. neutral
 3. acidic

7. Prepare for the electroplating activities, by carrying out three of the following:

1. prepare new solutions from basic additives
2. make additions of basic constituents to existing plating solutions and associated processes
3. calculate the amount of brightener and other maintenance additions required
4. set ampere-hour or other automatic dosing equipment
5. dispose of process and other solutions in line with environmental and organisational procedures
6. clean out tanks

8. Check plated components for two of the following:

1. throwing power of plating solution
2. levelling of the plated deposit
3. brightness of deposit
4. colour of the deposit
5. evidence of burning or poorly applied coatings
6. overall coverage
7. presence of blisters or nodules

9. Use one of the following methods for locating the work during the electroplating process:

1. wiring
2. specialised jigs
3. jigs with integral masking
4. jiggling components, which are masked prior to processing
5. barrels
6. reel-to-reel techniques

10. Carry out one of the following quality control checks:

1. thickness testing by micro sectioning
2. corrosion testing
3. thickness testing electromagnetic induction
4. adhesion of deposit
5. thickness testing eddy current permeability
6. brittleness of deposit
7. thickness testing X-ray fluorescence
8. torque tension testing
9. other specific method

11. Check the electroplating complies 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

Finishing materials by electroplating methods

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