SEMMPF342

Finishing materials by zinc plating

Overview

This standard identifies the competencies you need to carry out rack and barrel zinc plating processes, 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 in order to carry out the zinc plating operations. You will be required to carry out all necessary pre and post-preparations to the components and this will include such items as cleaning, rinsing, drying, hexavalent passivation, leach seal silicate top coating, trivalent clear passivations, de-embrittlement and other appropriate treatments.

You will be expected to prepare and adjust the plating solutions to give satisfactory deposits at optimal productivity levels. You will be expected to identify any zinc 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 deposited layers meet their specification requirements.

Your responsibilities will require you to comply with organisational policy and procedures for the zinc 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 rack and barrel zinc plating methods, techniques and procedures. You will understand the zinc plating processes and their 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 zinc plating and associated processes.

You will understand the safety precautions required when carrying out the preparation, zinc plating operations and post-treatments. 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 specification 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 cyanide and alkaline plating solutions 6. how they can the types of specifications that are used for the zinc plating activity 7. how to assess component suitability for zinc plating (to include methods of handling, methods of pre and post treatment, the plating material to use, the most efficient and appropriate method of application) 8. the basic principles of operation of the zinc plating equipment 9. how to set up and check that the zinc plating plant, equipment and solutions are fit for purpose 10. the properties of zinc plating deposits 11. the mechanisms of corrosion protection arising from zinc 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 15. how to identify various coating specifications and how to advise customers about plating thicknesses and post-treatments 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 19. how to identify processing faults and how to correct them 20. how to visually assess workpieces for colour and brightness 21. how to control and assess brightener and other additive dosing rates 22. how to neutralise and precipitate out effluent waste streams 23. the benefits of agitation, and the importance of keeping absorption of air into alkaline zinc plating solutions to a minimum 24. the effects of contaminants in zinc plating solutions and how to remove them 25. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve 26. how to access, use and maintain information to comply with organisational requirements and legislation

Scope/range related to performance criteria

1. Finish materials by zinc plating, carrying out all of the following activities: 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 zinc plating operations 4. ensure that any meters and gauges to be used are within their calibration periods 5. clean all tools and equipment on completion of the zinc plating activities 6. complete the production documentation (condition/pre-treatment of substrates, coating material preparation, equipment settings, confirmation of standard of finish) 7. leave the work area in a safe and clean condition 2. Carry out one of the following zinc plating processes: 1. cyanide zinc plating 2. alkaline zinc plating 3. acid zinc plating 3. Measure and correct two of the following zinc plating process conditions: 1. levels of basic constituents 2. temperature 3. carbonate levels (where applicable) 4. plating efficiencies 5. contaminants in plating solutions 6. brightener dosing levels plus two more from the following 7. total and free alkalinity of cleaners 8. contamination levels in cleaners 9. effectiveness of inhibition in acid pickling process 10. effectiveness of rinsing 11. acidity and contamination levels in pickling solutions 12. temperature of cleaners 4. Use one of the following methods for locating work during the zinc plating process: 1. racks 2. barrels 3. wiring 4. other specific locating method 5. Carry out two of the following post-zinc-plating operations: 1. hexavalent yellow passivation 2. hexavalent olive drab passivation 3. leach seal silicate top coating 4. trivalent clear passivations 5. apply torque governing lubricants to fasteners 6. dry components at temperatures which maintain productivity but do not damage passivates 6. Carry out all of the following, as applicable to the zinc plating process (selected in scope item 2): 1. de-embrittlement of hardened steel components and correct record keeping 2. reactivate de-embrittled components so that they will accept post passivation treatments 3. pH adjustment 4. iron removal from plating solutions 5. change filter cartridges or papers 6. clean out heat exchangers 7. Carry out one of the following quality control procedures 1. thickness testing by microsectioning 2. fluorescence 3. corrosion testing 4. electromagnetic induction 5. torque tension testing 6. adhesion of deposit 7. X-ray 8. eddy current permeability 9. brittleness of deposit 8. Check coatings applied to components by zinc plating 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

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