SEMCOMP321

Identifying defects in composite mouldings

Overview

This standard identifies the competences you need to identify and deal with defects in composite mouldings (such as moulds, panels, components, jigs), in accordance with approved procedures. You will be required to use appropriate drawings, specifications and documentation to identify and deal with defects in composites mouldings. You will be able to identify a range of defects in composite mouldings using various methods and techniques. Defects will be identified in a range of mouldings with a variety of resin and fibre materials. Your responsibilities will require you to comply with organisational policy and procedures for the activities undertaken, and to report any problems with the activities 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 you carry out. Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to identifying defects in composite mouldings, and to making decisions on what action needs to be taken. You will understand composite materials, and their application, and will know about defects in adequate depth to provide a sound basis for dealing with the defects in line with organisation practice and procedures. You will understand the safety precautions required when working with the composite mouldings and when using associated tools and equipment. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines 2. carry out inspection activities and identify defects with regard to the composite moulding 3. assess the defects and determine action required to return the composite moulding to specified condition 4. report recommendations for action to the appropriate people promptly and in accordance with organisational procedures 5. record details of defects in accordance with quality assurance and control systems and procedures 6. complete and store all relevant documentation in accordance with organisational procedures 7. leave the work area in a safe and appropriate condition on completion of the activities

Knowledge and understanding

You need to know and understand:

1. the health and safety precautions to be taken and procedures used when working with composite materials, consumables, tools and equipment in the specific work area 2. the hazards associated with carrying out inspections on composite mouldings, and with the composite materials, consumables, tools and equipment used, and how to minimise these and reduce any risks 3. the protective equipment (PPE) that is needed for personal protection and, where required, the protection of others 4. the specific environmental conditions that must be observed when producing composite mouldings (such as temperature, humidity, styrene levels to threshold limits, fume/dust extraction systems and equipment) 5. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate standards) in relation to work undertaken 6. how to interpret drawings, lay up manuals imperial and metric systems of measurement, workpiece reference points and system of tolerancing 7. the quality procedures used in the workplace to ensure production control (in relation to currency, issue, meeting specification) and the completion of such documents 8. the conventions and terminology used when identifying and rectifying defects (such as dis-bonds, de-lamination, resin injection, resin voids, core potting, repair patches) 9. the different methods used to identify defects in composite mouldings including sensory checks, hand measuring tools, machine tools such as Co ordinate measuring machines, NDT machines (ultrasonic scanning, x-ray, thermography and serigraphy) and testing equipment to check tensile strength, compression, sheer, impact and peel 10. the procedure used to select the method(s) used to identify defects in composite mouldings 11. the advantages and disadvantages of the different methods used to identify defects in composite mouldings 12. failure modes for various composite mouldings, and what can contribute to these 13. different types of composite resin systems, fibres, reinforcements, and their applications 14. different methods of production for composite mouldings, and their applications 15. different methods of trimming composite mouldings, and their applications 16. different methods of producing composite assemblies, and their applications 17. the different bonding agents, methods used, and their applications 18. correct methods of storage and handling of composite materials 19. the tools and equipment used for various activities associated with composite mouldings 20. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out all of the following during the inspection activities: 1. obtain and use the appropriate documentation (such as job instructions, drawings, material data sheets, specifications, planning and quality control documentation) 2. adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work 3. provide and maintain a safe working environment for the composite moulding inspection activities 4. obtain and check that all tools and equipment to be used are in a safe and usable condition and, where appropriate, are within current calibration/certification dates 5. follow safe practice/approved techniques and procedures at all times 6. return all tools and equipment to the correct location on completion of the activities 2. Identify defects in composite mouldings using all of the following methods: 1. touch 2. sound 3. visual Plus one of the following: 4. hand tools (such as measuring equipment) 5. mechanical testing equipment 6. non-destructive testing (such as ultrasonic scanning, x-ray, thermography and serigraphy) 7. co-ordinate measuring machines 8. testing equipment to check features (such as tensile strength, compression, sheer, impact and peel etc) 9. other specific method 3. Identify defects applicable to two of the following resin types: 1. polyester 2. vinyl ester 3. epoxy 4. phenolic 5. bismaleimide 6. cyanate ester 7. other specific type 4. Identify defects applicable to two of the following fibre types: 1. polyethylene 2. glass 3. aramid 4. carbon 5. other specific type 5. Identify defects applicable to two of the following core materials: 1. wood 2. foam 3. syntactic core 4. expanding core 5. nomex honeycomb 6. aluminium honeycomb 7. other specific type 6. Identify fifteen of the following types of defect in composite mouldings: 1. dimensional 2. tolerances 3. surface finish 4. colour separation 5. distortion 6. blisters 7. dents or 'dings' 8. surface cracks 9. incorrect material 10. contamination 11. bridging 12. broken fibres 13. stray fibres 14. ply orientation 15. wrong join type 16. gaps at joins 17. incorrect overlap 18. wrinkles 19. splintering 20. voids 21. resin rich areas 22. fibre deviation 23. damaged cores 24. dis-bonds 25. excessive adhesive 26. wrong inserts 27. insert positions 28. porosity 29. local exotherm 30. fayed/burned area 31. incomplete curing 32. de-lamination 33. impact damage 34. puncture 35. gouges 36. holes 37. abrasion/erosion 38. fluid ingress 39. fractures 40. other specific defect 7. Ensure actions recommended to rectify the defect comply with one of the following standards: 1. customer standards and requirements 2. company standards and procedures 3. recognised compliance agency/body standards

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