

Identifying defects in composite mouldings

Overview

This standard identifies the competences you need to identify and deal with defects in composite mouldings in accordance with approved procedures. You will be required to use appropriate drawings, specifications and documentation to identify any defects in composites mouldings and to recommend how they can be rectified.

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.

Identifying defects in composite mouldings

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. 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

Identifying defects in composite mouldings

Knowledge and understanding

You need to know and understand:

1. how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
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. protective equipment (PPE) that is needed for personal protection and, where required, the protection of others
4. the application of regulations in relation to the storage, use and disposal of composite materials and consumables
5. the specific environmental conditions that must be observed when producing composite mouldings
6. 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
7. how to interpret drawings, lay up manuals, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
8. quality procedures used in the workplace to ensure production control (in relation to currency, issue, meeting specification) and the completion of such documents
9. conventions and terminology used when identifying and rectifying defects
10. 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 sheraography) and testing equipment to check tensile strength, compression, sheer, impact and peel
11. the procedure used to select the method(s) used to identify defects in composite mouldings
12. the advantages and disadvantages of the different methods used to identify defects in composite mouldings
13. failure modes for various composite mouldings, and what can contribute to these
14. different types of composite resin systems, fibres, reinforcements, and their applications
15. different methods of production for composite mouldings, and their applications
16. different methods of trimming composite mouldings, and their applications
17. different methods of producing composite assemblies, and their

Identifying defects in composite mouldings

- applications
- 18. different bonding agents, methods used, and their applications
- 19. correct methods of storage and handling of composite materials
- 20. tools and equipment used for various activities associated with composite mouldings
- 21. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Identifying defects in composite mouldings

Scope/range related to performance criteria

1. Carry out all of the following during the inspection activities:
 1. obtain and use the appropriate 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. 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 composite bonding techniques and procedures at all times
 6. return all tools and equipment to the correct location on completion of the bonding activities
 7. leave the work area in a safe and appropriate condition on completion of the activities
2. Identify defects in composite mouldings using three of the following methods:
 1. touch
 2. sound
 3. visual
 4. hand tools (such as measuring equipment)
 5. mechanical testing equipment

Or one of the following:

6. non-destructive testing (NDT)
7. co-ordinate measuring machines (CMM)
8. testing equipment to check features (such as tensile strength, compression, sheer, impact, peel)
9. other specific test

3. Identify defects applicable to two of the following resin types:
 1. bio resin
 2. thermoplastic
 3. polyester
 4. vinyl ester
 5. epoxy
 6. phenolic
 7. bismaleimide
 8. cyanate ester
 9. other specific resin
4. Identify defects applicable to two of the following fibre types:
 1. natural fibre
 2. thermo plastic
 3. glass

Identifying defects in composite mouldings

4. aramid
5. carbon
6. hybrid
7. other specific type
5. Identify defects applicable to two of the following core materials:
 1. solid timber
 2. end grain balsa
 3. rigid foam
 4. expanding foam
 5. coremat
 6. honeycomb
 7. fibrous honeycomb
 8. aluminium honeycomb
 9. syntactic core
 10. expanding core
 11. thermoplastic core
 12. other specific material
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

Identifying defects in composite mouldings

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. BS, ISO or BSEN standards and procedures
 2. customer standards and requirements
 3. company standards and procedures
 4. recognised compliance agency/body standards

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