

Trimming motorsport composite mouldings using hand tools

Overview

This standard identifies the competences you need to trim motorsport composite mouldings (such as moulds, wings, body panels, ductwork, fairings, jigs) using hand tools, in accordance with approved procedures. You will be required to use appropriate drawings, specifications and documentation to trim various mouldings, using the correct trimming techniques.

You will be expected to select the correct tools and equipment for the trimming activity. You will trim a range of composite mouldings incorporating a variety of features, using cutting, sanding, drilling and polishing techniques and processes. Mouldings trimmed will include a range of resin and fibre materials.

Your responsibilities will require you to comply with organisational policy and procedures for the trimming activities undertaken, and to report any problems with the trimming activities, equipment or materials that you cannot personally resolve, or that 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 composite moulding trimming techniques and procedures. You will understand the trimming techniques used, and their application, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the trimming activities, and when using the 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.

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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. follow relevant specifications for the component to be produced
3. obtain the appropriate tools and equipment for the trimming operations and check they are in a safe and usable condition
4. trim the materials using appropriate methods and techniques
5. check that all the required trimming operations have been completed to the required specification
6. deal promptly and effectively with problems within your control and report those that cannot be solved
7. ensure that work records are completed, stored securely and available to others, as per organisational requirements
8. leave the work area in a safe condition on completion of the activities, as per organisational and legal requirements

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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. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to current industry standards and codes of practice)
6. how to interpret first and third angle drawings, 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 appropriate documents
8. conventions and terminology used for composite trimming activities (scribe lines, sanding grades, types of cutting tools, speeds)
9. how different materials can effect the selection of tip tool geometry when cutting and trimming composite mouldings
10. how to mark out the mouldings in preparation for the trimming activities, and the tools and equipment to be used
11. the different types of manual and power tools used in the trimming operations
12. the various types of cutting tools and abrasives that are used, and their applications
13. the different types of resins, fibres and reinforcement that are used, how they effect the trimming activities, and the tools and equipment that may be used
14. the visual identification of cured composite materials
15. the methods used in the trimming of composite mouldings
16. how to carry out polishing activities on the mouldings, and the equipment and compounds that are used
17. how to carry out drilling, hole sawing and finishing operations (countersinking), and the various tools that are used
18. the care and safe handling of composite mouldings throughout the trimming cycle
19. the problems that can occur with the trimming operations, and what to do if they occur
20. the extent of your own responsibility and to whom you should report

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- if you have problems that you cannot resolve
- 21. how to access, use and maintain information to comply with organisational requirements and legislation

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Scope/range related to performance criteria

1. Carry out all of the following during the trimming activities:
 1. obtain and use the appropriate documentation (such as job instructions, drawings, planning and quality control documentation, material data sheets, specifications)
 2. adhere to procedures or systems in place for risk assessment, hazardous substances, 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 mould trimming activities
 4. obtain the correct tools and equipment for the activity, and check that they are in a safe, tested and usable condition
 5. follow safe practice/approved mould trimming techniques and procedures at all times
 6. return all tools and equipment to the correct location on completion of the mould trimming activities
 7. dispose of waste materials in accordance with approved procedures
 8. leave the work area in a safe and appropriate condition on completion of the activities
2. Carry out all of the following when preparing for the trimming activity:
 1. check that the moulding is correct and complete
 2. check that equipment is suitable for use
 3. check for any defects in the moulding
 4. identify and protect the moulding in the work area
 5. select correct equipment for the activity
3. Mark out motorsport composite mouldings, using all of the following:
 1. scribe
 2. height gauge
 3. moulded scribe lines
 4. centre punch
 5. trimming templates
4. Cut motorsport composite mouldings, using two the following methods:
 1. cutting wheels/discs
 2. saws

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3. routers
 4. trim jigs
5. Sand motorsport composite mouldings, using three of the following methods:
1. rubbing blocks
 2. diamond files
 3. pencil grinders
 4. disc sanders
 5. belt sanders
6. Produce and finish holes, using three of the following:
1. drill jigs
 2. hole saws
 3. counterbores
 4. countersinks
 5. drill bits
 6. thread taps
7. Polish motorsport composite mouldings, using four of the following:
1. wet sanding
 2. polishing compound
 3. orbital sander
 4. polisher
 5. cutting compound
 6. rubbing block
8. Trim motorsport composite mouldings, using techniques for two of the following resins types:
1. polyester
 2. vinyl ester
 3. epoxy
 4. phenolic
 5. bismaleimide
 6. cyanate ester
9. Trim motorsport composite mouldings, using techniques for two of the following fibre types:
1. polyethylene
 2. glass
 3. aramid
 4. carbon
 5. hybrid

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10. Trim motorsport composite mouldings that require, or incorporate, ten of the following features:
 1. straight edges
 2. radius corners
 3. multiple holes
 4. inserts to be drilled
 5. curved edges
 6. returns
 7. multiple hole sizes
 8. inserts to be tapped
 9. flat surfaces
 10. nett edges
 11. countersinks
 12. solid cores
 13. polished surfaces
 14. joggle details
 15. counterbores
 16. honeycomb cores
 17. shaped surfaces
 18. removal of join lines
 19. further lay-up stages
 20. edge filling
11. Check trimmed motorsport composite mouldings comply with one of the following:
 1. current legislation, industry standards, codes of practice and procedures
 2. customer standards and requirements
 3. company standards and procedures
 4. recognised compliance agency/body's standards

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