Overview

This unit identifies the competencies you need to produce components from glass fibre in accordance with approved procedures. You will be required to use appropriate manufacturing drawings, specifications and documentation to produce the various types of components. You will be expected to produce the glass fibre components using the specified/appropriate moulding/laying-up process and techniques. The equipment will include, air circulating ovens, autoclaves, presses, trimming and automated cutting equipment, vacuum tables and automated laying equipment. The components produced will include flat laminates, double curvatures, convex/concave shapes and stiffened mouldings.

Your responsibilities will require you to comply with organisational policy and procedures for the production activities undertaken and to report any problems with the production activities, equipment, materials or consumables that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with minimum supervision, taking personal responsibility for your own actions and the quality and accuracy of the work that you produce.

Your underpinning knowledge will provide a good understanding of your work, and provide an informed approach to applying glass fibre production techniques and procedures. You will understand the glass fibre production process used, and will know about the manufacturing tools and techniques in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring the work output is to the required specification. You will understand the safety precautions required when carrying out the moulding 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.
Performance criteria

You must be able to:

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<tr>
<td>P1</td>
<td>work safely at all times, complying with health and safety and other relevant regulations and guidelines</td>
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<td>P2</td>
<td>follow the correct component drawing or any other related specifications for the component to be produced</td>
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<td>P3</td>
<td>determine what has to be done and how this will be achieved</td>
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<td>P4</td>
<td>obtain and prepare the appropriate tools, equipment and materials</td>
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<td>P5</td>
<td>carry out the moulding or laying-up activities using the correct methods and techniques</td>
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<td>P6</td>
<td>produce components to the required specification</td>
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<td>P7</td>
<td>check that all the required operations have been completed to specification</td>
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<td>P8</td>
<td>deal promptly and effectively with problems within your control and report those that cannot be solved</td>
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SEMFEW350 Producing components from glass fibre

Knowledge and understanding

You need to know and understand:

K1 the specific safety practices and procedures that you need to observe when working with glass fibre (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
K2 the health and safety requirements of the work area where you are carrying out the activities and the responsibility they place on you
K3 the protective equipment that you need to use for both personal protection and where appropriate, protection of others
K4 the hazards associated with glass fibre and how they can be minimised
K5 the procedure for the correct separation and safe disposal of waste materials
K6 the layout of the area to give maximum throughput
K7 the interpretation of drawings, standards, quality control procedures and specifications used for the lay-up activity and the currency/issue checks of the documents you are working with
K8 the use of and conventions/terminology used in laying-up (such as material tailoring, 'B' staging, vacuum bagging, backing materials, bleed felt, foaming adhesives, intensifiers, autoclave techniques)
K9 the types of component trimming/cutting methods available and trimming methods on the tool
K10 the methods of achieving consolidation at foam/honeycomb/discontinuous laying-up points
K11 the reasons for part cure procedures, and their effect
K12 the material types and their merits (such as material life, their construction, types of weave, resins, bulk problems with liquid resins, thermoplastics, pre-impregnated materials, foam, honeycomb, discontinuous materials)
K13 the procedures when temperature cure is used and the need for thermocouples on temperature control
K14 the methods for preparing/handling tools and materials (such as material cutting, tool preparation techniques, effects of poor bagging, lay-up aids, use of benches and trolleys)
K15 the procedures for de-moulding, lost wax removal and first article inspection (such as test samples, non-destructive testing (NDT) requirements)
K16 the quality control procedures that need to followed during the lay-up operations
K17 the procedures for ensuring you have the correct type of tools, equipment
K18 the methods and techniques for lifting, handling and supporting the components/equipment/materials during the lay-up activities
K19 recognition of lay-up defects such as misalignment, distortion, foreign object damage, contamination and surface defects
SEMFEW350
Producing components from glass fibre

K20  the tools and equipment used in the lay-up activities and their calibration, care, preparation and control procedures
K21  why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
K22  the problems that can occur with the lay-up operations and how these can be overcome
K23  the recording documentation that needs to be completed for the lay-up activities undertaken and where appropriate marking and identifying specific pieces of work in relation to the documentation
K24  the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
Additional Information

You must be able to:

1. carry out all the following activities during the installation:
   1.1 use the correct issue of drawings, specifications, material data sheets and planning documentation
   1.2 use copies of relevant COSHH sheets and risk assessments
   1.3 obtain materials (in life batches, correctly protected)
   1.4 obtain tools to be used and check they are fit for purpose (part marked, cleared inspection, undamaged)
   1.5 return all tools and equipment to the correct location
   1.6 leave the work area in a safe condition on completion of the activities

2. apply moulding and laying-up methods and techniques to include four of the following:
   2.1 use of metal tooling
   2.2 vacuum bagging
   2.3 cutting methods
   2.4 rolling
   2.5 use of composite tooling
   2.6 pressure bagging
   2.7 lost wax process
   2.8 matched metal
   2.9 tape laying
   2.10 interference moulding

3. carry out all of the following operations:
   3.1 room temperature control
   3.2 lay-up
   3.3 mat orientation
   3.4 trimming
   3.5 curing (temperature/pressure cycle)
   3.6 tool preparation
   3.7 number of plies
   3.8 de-moulding

4. produce a range of components with features that include two from:
   4.1 flat laminates
   4.2 double curvatures
   4.3 convex/concave shapes
   4.4 stiffened mouldings

5. produce a range of components using one type of resin from:
   5.1 polyester
   5.2 elastomer
   5.3 phenolic
   5.4 silicon
   5.5 epoxy
   5.6 bismaliemide
SEMFEW350
Producing components from glass fibre

5.7 thermoplastic

6. produce a range of components using one type of mat from:
   6.1 glass fibre woven
   6.2 glass fibre unidirectional
   6.3 discontinuous glass

7. produce a range of components using one type of stiffener from:
   7.1 honeycomb
   7.2 foam
   7.3 syntactic core

8. produce a range of components using three ancillary materials from:
   8.1 bagging films
   8.2 tapes
   8.3 solvents
   8.4 fillers
   8.5 bleed plies
   8.6 release agents
   8.7 foaming adhesives
   8.8 sealants

9. produce components which comply with one of the following standards:
   9.1 ISO 9000 series and procedures
   9.2 customer standards and requirements
   9.3 company standards and procedures
# SEMFEW350

Producing components from glass fibre

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<th>SEMTA</th>
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