

## Producing sand moulds manually

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### Overview

This standard identifies the competences you need to produce sand moulds using manual methods, in accordance with approved procedures. You will be required to select the appropriate equipment to use, based on the type and size of the pattern, the moulding method employed and the metal to be cast. The moulds to be produced will be for either ferrous or non-ferrous metal and moulding will take place, using recognised techniques, in jobbing and semi- mechanised foundries.

You will be expected to produce the moulds using either greensand, chemically bonded gas activated sand, chemically bonded resin/catalyst activated sand or resin bonded heat activated sand. The patterns used will be loose or boarded, circular, square or irregular in shape and will have projections and internal cavities. The profiles will be curved and tapered. The moulds will be produced either in boxes or boxless, as appropriate.

Your responsibilities will require you to comply with organisational policy and procedures for the moulding activities undertaken, and to report any problems with the patterns, sand or equipment in use, that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work to instructions, with minimal supervision, taking personal responsibility for your actions and for the quality and accuracy of the moulds that you produce.

Your underpinning knowledge will be sufficient to provide a sound basis for your work and will enable you to adopt an informed approach to applying manual sand moulding techniques. You will have an understanding of the manual sand moulding process and its application and will know about the equipment, materials and consumables in adequate depth to provide a sound background for carrying out the activities to the required specification. Your knowledge will be sufficient to enable you to identify sub-standard sand, patterns and moulding equipment.

You will understand the safety precautions required when carrying out the sand moulding activities and when using the associated tools and equipment. You will be required to demonstrate safe working practices throughout. You will also understand your responsibilities for safety and the importance of taking the necessary safeguards to protect 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 legislation, regulations, directives and other relevant guidelines
2. follow the correct component drawing or any other related specifications for the component to be produced
3. obtain and prepare the appropriate tools, equipment and materials
4. carry out the moulding or laying-up activities using the correct methods and techniques
5. produce components to the required specification
6. check that all the required operations have been completed and components are to 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

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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 obtain the job instructions, and how to interpret their information
6. the different pattern types used in the moulding process (loose and plated)
7. the jointing methods that are required for the different pattern types
8. the different types of core print used to locate and secure cores (including drag and cope prints)
9. the different sand moulding processes used (greensand and chemically bonded sand)
10. the additions and additives that are used when mixing sands, and how these affect the moulding process
11. the effects of using incorrect amounts of additions and additives to moulding sands
12. why different types of sand mixes have limited or unlimited life for producing moulds
13. the application and use of release agents and mould coatings
14. how to identify mould defects (soft spots, broken/damaged mould surfaces or clagging/sticking)
15. the organisational quality control procedures for producing and inspecting moulds
16. the importance of keeping the core box equipment clean and free from damage, good housekeeping of coremaking tools and equipment and maintaining a clean working area
17. the extent of your own authority and whom you should report to if you have problems that you cannot resolve when making the moulds
18. 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. Produce sand moulds, carrying out all of the following activities:
    1. confirm that all the required materials and equipment are available and are in a safe and usable condition
    2. adhere to health and safety regulations, systems and procedures to realise a safe system of work
    3. comply with job instructions and moulding specifications
    4. use the correct tools and equipment for the moulding activity
    5. follow the defined moulding procedures ensure that the moulds produced meet the required specification for quality and accuracy
    6. leave the work area in a safe condition on completion of the moulding activities
  2. Prepare the pattern equipment for use, to include both of the following:
    1. visually inspecting the pattern for damage
    2. applying release agents to the pattern (as applicable)
  3. Produce drag and cope mould parts from patterns which are either:
    1. loose flat back and split type
- OR
2. plated flat type and split type
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4. Produce moulds with one core, with core locations covering both of the following positions:
    1. horizontal
    2. vertical
  5. Produce mould parts, using one of the following methods:
    1. use of moulding boxes
    2. boxless, using mould location devices
  6. Produce moulds using one of the following types of sand:
    1. greensand (naturally or synthetically bonded)
    2. chemically bonded resin/catalyst
    3. chemically bonded gas activated
    4. resin bonded heat activated

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5. other (specify)
7. Form runner, riser and feeder systems on the mould, using one of the following methods:
  1. cut and formed manually
  2. preformed with fixed formers
  3. preformed with loose formers
8. Finish and repair the moulds, using one of the following methods:
  1. patching up greensand moulds
  2. repairing rigid sand moulds using adhesives
9. Apply mould coatings/dressings to the moulds, using one of the following methods:
  1. spray
  2. brush
  3. flood
  4. dry
10. Check sand moulds meet all of the following quality and accuracy standards:
  1. complete and free from obvious defects (soft spots, cracks, broken or damaged mould surfaces)
  2. meet the required specification (shape, dimensional accuracy)
11. Sort the finished moulds, placing them into the appropriate designated area for either:
  1. acceptable moulds
  2. disposal of sub-standard moulds

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