

Closing and securing sand moulds for casting

Overview

This standard identifies the competencies you need to close and secure sand moulds, and prepare the moulds for casting. Manual and mechanised methods will be used, in accordance with approved procedures.

You will be required to select the appropriate equipment to use, based on the type, size and number of the moulds to be closed and secured. The moulds you will close and secure will have been produced as one-offs or by batch production methods. You will be required to check the condition of the moulds you receive and to reject any considered as sub-standard, in accordance with the company quality control procedures.

You will be expected to clean the mould drags and copes, to ensure they are free from loose sand and other impurities. You will need to check that all cores are in place and are correctly secured and that the runner, riser and feeder systems are connected and complete. Any core sealing and vent protection required must be checked prior to closing. You will undertake, where appropriate, any joint sealing which is specified by the company control procedures. The mould parts will, where appropriate, be trial closed, using mechanical assistance where necessary and checked for damage prior to final closure. The mould parts will be secured using approved methods.

Your responsibilities will require you to comply with organisational policy and procedures for the closing and securing of the sand moulds and to report any problems with the moulds, cores, materials 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 a minimum of supervision, taking personal responsibility for your 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 enable you to adopt an informed approach to the closing and securing of various types of sand moulds. You will understand the different types of materials used to make the moulds and the associated machinery that is used to handle the different types and size of moulds. You will understand the different methods of locating and securing the moulds and why different methods are used to suit different casting requirements.

You will understand the safety precautions required when carrying out the mould closing and securing 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 legislation, regulations, directives and other relevant guidelines
2. follow the relevant instructions, assembly drawings and any other specifications
3. ensure that the specified components are available and that they are in a usable condition
4. assemble the components in their correct positions using the appropriate methods and techniques
5. secure the components using the specified connectors and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required 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 interpret the information
6. why it is necessary to check the moulds prior to commencing mould closing operations
7. the defects that can occur in the moulds and cores (dirty moulds, cracked surfaces, exposed reinforcements, friable surfaces, broken or weak mould and core sections, incomplete mould or cores, distorted cores, mismatch, damaged or broken core prints and core locations, core lifting eyes exposed, mould location devices missing or distorted, uncoated moulds or cores)
8. the actions that are needed when moulds or cores are found to be sub-standard
9. the different types of sands that are used to produce the moulds and cores
10. the reasons why mould parts need to be secured together before casting
11. the differences between box, boxless and core assembled moulds, and how these differences affect the preparation process
12. how to calculate the ferrostatic pressure in the moulds
13. the effects on casting quality and accuracy of incorrectly closed and secured moulds
14. the reason why joint sealing is undertaken
15. why different types of mould locating device are used with different types of moulds
16. why different types of mould securing device are used
17. why different methods are used to secure moulds produced from different sands
18. why some moulds are placed on special equipment for casting (tilting tables)
19. to the importance of keeping the equipment clean and free from damage, good housekeeping of tools and equipment and maintaining a clean working area
20. the extent of your own authority and whom you should report to if you have problems that you cannot solve when closing and securing

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sand moulds

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. Complete mould closing and securing by carrying out all of the following activities:
 1. check and confirm that the moulds received are complete and free from defects
 2. adhere to health and safety regulations, systems and procedures to realise a safe system of work
 3. comply with job instructions, mould closing and securing specifications
 4. use the correct tools and equipment for the mould closing and securing activities
 5. follow the defined closing and securing procedures
 6. ensure the closed and secured mould meets the required specification for quality and accuracy
 7. leave the work area in a safe condition on completion of the mould closing and securing activities
2. Close and secure one of the following types of mould:
 1. boxed
 2. boxless
 3. core assembly
3. Close and secure moulds produced from one of the following types of sand:
 1. greensand
 2. chemically bonded resin catalyst
 3. chemically bonded gas activated
 4. ester-silicate bonded
 5. dry silica (vacuum sealed)
4. Remove any impurities from the mould cavity, and seal the mould joint using one of the following methods:
 1. adhesive
 2. sand (cut joint)
 3. flexible mastic
 4. plumbago and oil
5. Locate the moulds using one of the following methods:
 1. pins
 2. diabolos

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3. rebates
 4. cores
6. Trial close the moulds to ensure casting quality can be maintained and check/rectify five of the following:
1. joint crushes
 2. mould sealing is complete
 3. cores are not touching
 4. core securing devices (studs/chaplets) are correct and in place
 5. core crushes
 6. mould location devices/methods are correct and intact
 7. core vent protection is complete
 8. mould protection materials are removed
7. Complete mould closing, to include all of the following:
1. locate the moulds using pins, rebates, diabolos or cores, as appropriate
 2. close moulds manually, mechanically or by combined means
 3. secure the moulds using clamps/clips, weights or nuts and bolts

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