

Assembling cores to form complete moulds

Overview

This standard identifies the competencies you need to assemble, locate and secure cores to form complete (block) moulds for casting. The cores can be assembled within prepared moulding boxes or as assemblies built on plates or in pits. 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 cores to be assembled and secured to form the moulds. You will be required to check the condition of the cores you receive, and to reject any considered as sub-standard, in accordance with the company control procedures.

You will, where appropriate, dress and apply a core coating. Cores will be assembled to form complete moulds, and secured using various methods. On completion of the assembly, you will be expected to carry out final checks, to ensure that the quality of the mould and cores meets company standards. Core sealing will take place using approved sealing methods and materials. Assembled moulds will be passed to the closing area.

Your responsibilities will require you to comply with organisational policy and procedures for the assembling of cores to form 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 show a good understanding of your work and will provide an informed approach to the assembly and securing of cores to form moulds and to the control of metal thickness in assembled moulds. You will have an understanding of the different types of materials used to make the cores and the associated machinery that is used to handle the different sizes of cores. You will understand the different methods of locating the cores to form the complete mould, and to ensure safety during the casting operation.

You will understand the safety precautions required when carrying out the core assembling 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 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. the procedure to be followed in the event of equipment or machine malfunction
7. why it is necessary to check the cores prior to commencing the assembly operations
8. the defects that can occur in the cores (cracked surfaces, exposed reinforcements, friable surfaces, broken or weak core sections, incomplete cores, damaged or broken core prints and core locations, uncoated cores)
9. the actions that are needed when cores are found to be sub-standard
10. the storage requirements of cores produced from various types of sands
11. the differences in assembly methods (using pre-formed box at ground level, boxless on plate or sand at ground level, boxless in a pit and boxed in a pit)
12. the different processes and machines used to make the cores
13. why and how metal thickness checks are made (using such methods as direct measurement, clay slugs, gauges, templates, jigs and fixtures)
14. why different core location devices are used during the assembly activities (pins, rebates, prints, diabolos, set-offs and dovetails)
15. why different methods of securing cores in moulds are used when castings are required to be pressure tight or have other operational requirements
16. why different methods are used to secure the cores to form complete moulds (print locations, adhesives, straps, nuts and bolts, wire ties, pins, pre-formed cavities, interlocking cores and fixtures)
17. the effects on casting quality and accuracy of incorrectly located and secured cores
18. why different types of securing devices are used on ferrous and non-ferrous alloys
19. to the importance of keeping the equipment clean and free from

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- 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 resolve when assembling the cores to form complete 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. Assemble cores, carrying out all of the following activities:
 1. confirm that the cores 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, core assembly specifications
 4. use the correct tools and equipment for the core assembly and preparation activities
 5. follow the defined core assembly and preparation procedures
 6. ensure that the completed core assembly meets the required specification for quality and accuracy
 7. leave the work area in a safe condition on completion of the core assembly activities
2. Assemble the core to form complete moulds in one of the following locations:
 1. pre-formed boxed cavity at ground level
 2. boxless within a pit
 3. boxless on base plate or sand bed at ground level
 4. boxed in a pit
3. Assemble cores produced from one of the following sands:
 1. chemically bonded gas activated
 2. ester silicate bonded
 3. chemically bonded resin catalyst
 4. resin bonded heat activated
4. Apply mould coatings using one of the following methods:
 1. brush
 2. spray
 3. flood
5. Assemble the cores using both of the following methods:
 1. manual methods
 2. mechanical methods
6. Determine cast metal thickness using two of the following methods:
 1. direct measurement
 2. gauges
 3. jigs
 4. clay slugs

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5. templates
6. fixtures
7. Assemble a minimum of four cores per assembly, using two of the following location devices:
 1. pins
 2. prints
 3. set-offs
 4. dovetails
 5. rebates
 6. diabolos
 7. joining cores
 8. other specific method
8. Secure the cores together to form complete moulds, using two of the following methods:
 1. print locations
 2. nuts and bolts
 3. pins
 4. interlocking cores
 5. adhesives
 6. wires (tied down or back)
 7. pre-formed cavities
 8. fixtures
 9. straps
9. Seal and protect the core vents using one of the following materials:
 1. adhesive
 2. flexible mastic
 3. sand
 4. plumbago and oil
10. Complete visual and dimensional checks to the mould, checking all of the following:
 1. all cores have been assembled
 2. moulds and cores are clean and undamaged
 3. core vents are sealed and protected (where appropriate)
 4. cores and mould comply with all quality and product specifications

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