Overview

This standard identifies the competences you need to assemble rotor and armature windings, in accordance with approved procedures. This will involve selecting the correct components and materials, fitting and insulating components and fitting and terminating the coil. You will be required to select the appropriate tools and equipment to use, based on the operations to be performed and type of components to be fitted and to check that they are in a safe and serviceable condition. In carrying out the operations, you will be required to follow laid-down procedures and specific assembly techniques. The assembly activities will also include making all necessary checks and adjustments to ensure that components are correctly positioned and free from damage.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken and to report any problems with the assembly activities, components or equipment that you cannot personally resolve, or 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 assembly techniques and procedures to rotor and armature windings. You will understand the rotor or armature being assembled and its application and will know about the assembly techniques, tools and methods, 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 assembly 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:

P1 work safely at all times, complying with health and safety, environmental and other relevant regulations, directives and guidelines

P2 follow the relevant instructions, assembly drawings and any other specifications

P3 ensure that the specified components are available and that they are in a usable condition

P4 use the appropriate methods and techniques to assemble the components in their correct positions

P5 secure the components using the specified connectors and securing devices

P6 check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification

P7 deal promptly and effectively with problems within your control and report those that cannot be solved
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### Knowledge and understanding

You need to know and understand:

- **K1** the health and safety requirements of the area in which the electrical assembly and insulating activity is to take place and the responsibility these requirements place on you
- **K2** the importance of wearing protective clothing and other appropriate safety equipment (PPE) during electrical assembly and insulating activities
- **K3** the hazards associated with assembling rotor and armature windings and how the risks can be minimised
- **K4** how to obtain and interpret drawings, planning sheets and records and other documents needed for the assembly activities
- **K5** the basic operating principles of the rotor and armatures being assembled
- **K6** the factors to consider when choosing pre-formed coils
- **K7** the assembly methods and techniques to be used when assembling rotating equipment rotor/armature windings
- **K8** the common types of winding configuration used for rotor/armature assembly
- **K9** the methods used to fit slot insulators
- **K10** the purpose of insulation cuffs
- **K11** factors that determine the wedge length, width, squareness and profile
- **K12** the methods used to mark out and cut materials for the manufacture and trimming of wedges
- **K13** the methods used to fit wedges into slots
- **K14** the methods used to splice windings and the factors that affect the pitch of coils
- **K15** the procedure for protecting coil ends
- **K16** the common methods of attaching rotor/armature windings to the commutator
- **K17** the method used to check the electrical integrity of joints
- **K18** the methods used to apply insulating varnish and the types used
- **K19** the visual checks and preparation requirements for components to be used in electrical assembly activities
- **K20** the methods and equipment used to transport, handle and lift the components into position and how to check that the equipment is within its current certification dates
- **K21** how to check that tools and equipment are free from damage or defects, are in a safe and usable condition and are configured correctly for the intended purpose
- **K22** the reporting and documentation requirements relating to rotor/armature assembly and how to use them
- **K23** the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
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Additional Information

Scope/range related to performance criteria

You must be able to:

1. carry out all of the following during the assembly of the rotor and armature windings:
   1.1 use the correct assembly drawings, specifications and job instructions
   1.2 adhere to risk assessment, COSHH and other relevant safety standards
   1.3 ensure that components are free from damage, foreign objects, dirt or other contamination
   1.4 check that all tools and equipment are within calibration date, where appropriate
   1.5 use safe and approved techniques to assemble and connect rotor/armature components
   1.6 leave the work area in a safe and tidy condition

2. prepare and assemble windings using all of the following:
   2.1 rotor/armature wire
   2.2 slot wedges
   2.3 brazing material
   2.4 preformed coils
   2.5 dummy coils
   2.6 solders
   2.7 insulating material
   2.8 equaliser rings
   2.9 fluxes
   2.10 separating strips
   2.11 resin/glass bonding tape

3. use all of the following equipment and tools for the assembly operations:
   3.1 tinning and soldering equipment
   3.2 drying and baking ovens
   3.3 lathes
   3.4 multimeters
   3.5 insulating resin baths
   3.6 shaft supports
   3.7 impedance tester
   3.8 coil winding machines

4. use all of the following assembly procedures:
   4.1 prepare components (such as coil ends, wedge length, width, squareness and profile)
   4.2 insulate (such as slot, shaft, end winding support)
4.3 secure windings (such as main, auxiliary, lap, wave, duplex, triplex, multiplex)
4.4 band end windings
4.5 solder connections (such as risers, coil ends)
4.6 check mechanical integrity
4.7 check electrical integrity (such as continuity, insulation, voltage withstand)

5. assemble rotating equipment to one of the following quality and accuracy standards:
   5.1 organisational drawings and procedures
   5.2 customer drawings and requirements
   5.3 BS and ISO standards
   5.4 other international standards

6. complete the relevant documentation, to include one of the following and pass it to the appropriate people:
   6.1 job/order cards
   6.2 work authorisation documents
   6.3 assembly records
   6.4 acceptance/test documentation
   6.5 other appropriate media
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Relevant occupations
Engineering technicians; Engineering and manufacturing technologies; Engineering; maintenance team technician; manufacturing technologies; production and process engineers

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