

Assembling large transformer and inductor cores

Overview

This standard identifies the competences you need to assemble large transformer and inductor cores, in accordance with approved procedures. This will involve selecting the correct components and materials, cutting and forming components, constructing the cores, applying insulation, completing the curing process and checking electrical and mechanical integrity of the transformer/inductor core. 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 large transformer or inductor cores. You will understand the transformer or inductor core 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 activities and when using the associated tools and equipment, especially those for lifting and handling the components safely and correctly. 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 it 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

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 and interpret drawings, planning sheets and records and other documents needed for the core assembly activities
6. the basic operating principles of the transformers and inductors being assembled
7. the factors to consider when selecting steels to fabricate large transformer or inductor cores
8. the methods and techniques to be used when assembling large transformer or inductor cores
9. the different types of core insulation used and the methods used to cut and form them
10. the various core construction-laying techniques that are used (such as single or multiple laminations, butt or overlap joints, square or mitred junctions)
11. the methods and techniques used to build yokes and limbs, limb cores, inductor cores and magnetic shields and shunts
12. the methods used to fit the core clamp
13. the factors to consider when fitting foundation feet, core and tie bolts and insulation and earth strips
14. the purpose of core limb banding tape
15. the different methods used for curing
16. the procedures that will ensure full strength processing in respect of steel banding, removal of core limbs, drying procedure and application of suitable varnish
17. the methods used to check for electrical insulation of the completed assembly and the importance of these checks
18. the visual checks and preparation requirements for components to be used in large transformer or inductor core assembly activities
19. the methods, tools/equipment used to transport, handle and lift the components into position and
20. how to check that the tools/equipment are within current certification dates, free from damage and defects, in a safe and usable condition, and configured correctly for purpose
21. the extent of your own responsibility and whom you should report to if you have problems that you cannot resolve
22. 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 the transformer or inductor cores by carrying out all of the following activities:
 1. use the correct assembly drawings, specifications and job instructions
 2. adhere to health and safety regulations, systems and procedures to realise a safe system of work
 3. ensure that components are free from damage, foreign objects, dirt or other contamination
 4. check that all tools and equipment are within calibration date, where appropriate
 5. use safe and approved techniques to assemble transformer cores and related components
 6. leave the work area in a safe and tidy condition
2. Assemble transformer or inductor cores, using six of the following methods and procedures:
 1. cutting and forming laminates
 2. impregnating and curing components
 3. orientating and positioning components
 4. electrical bonding of components
 5. aligning components
 6. soldering/brazing
 7. assembling and clamping
 8. securing/using mechanical fasteners/threaded devices
 9. assembling components by pressure
 10. torque setting
 11. setting clearances
 12. applying threaded locking methods
3. Carry out assembly operations using all of the following components:
 1. electrical steels
 2. clamps
 3. laminates
 4. foundation feet
 5. core limb binding tape
 6. core and tie bolts
 7. insulating materials
 8. earth strips
4. Assemble transformer or inductor cores using four the following assembly aids and equipment:

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1. cutting and punching machines
 2. lifting and moving equipment
 3. workholding devices
 4. measuring equipment
 5. laminate cutting machines
 6. specialist assembly tools
5. Assemble three of the following transformer or inductor core types:
1. rectangular
 2. elliptical
 3. multi-limb cores
 4. multi-step
 5. plain yokes/limbs
 6. multi-gap inductor cores
 7. round
 8. stepped yokes/limbs
 9. magnetic shields and shunts
6. Assemble transformer or inductor cores, using three of the following core construction/laying techniques:
1. butt joints
 2. square junctions
 3. single lamination
 4. overlap joints
 5. mitred junctions
 6. multiple lamination
7. Carry out the required quality checks using appropriate equipment, to include six of the following:
1. positional accuracy
 2. electrical continuity
 3. dimensions
 4. component security
 5. orientation
 6. completeness
 7. alignment
 8. freedom from damage or foreign objects
8. Assemble cores which comply with one of the following quality and accuracy standards:
1. organisational drawings and procedures
 2. customer requirements
 3. current industry standards, codes of practice and procedures
 - 4.

other international standards

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