



**Australian Government**

**Assessment Requirements for UEEEL0064  
Rewind HV three phase induction machines  
rated for voltages above 3.3 kV**

**Release: 1**

# Assessment Requirements for UEEEL0064 Rewind HV three phase induction machines rated for voltages above 3.3 kV

## Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least one occasion and include:

- dismantling machine and storing parts securely
- preparing stator for winding
- following winding specifications
- selecting correct coils and insulation
- winding and connecting stator correctly
- assembling machine and preparing for testing
- adhering to quality procedures
- completing work report/forms accurately
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
- following quality procedures, workplace procedures and instructions
- rewinding three phase induction machines, including taking readings
- using tools, equipment and testing devices.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- high voltage (HV) three phase motor winding techniques rated above 3.3 kilovolt (kV), including:
  - HV winding conductors and their applications
  - HV winding wire connection methods encompassing:
    - conductor handling
    - conductor preparation
    - connection mediums

- insulation types and methods
- critical details and measurements when stripping a stator encompassing:
  - winding types:
    - hairpin wound stator and lap wound stator
  - winding diagram
  - wedges of a radially ventilated machine
  - factors to be considered when selecting cables for a stator
- procedures for checking the condition of a stripped stator in preparation for rewind encompassing:
  - manufacturer specifications
  - sequence of events between the removal of the old winding and the start of rewinding
  - core loss test, the effect this test may have on the core and expected test results
  - methods of overcoming hot spots in a stator core
  - level of insulation required to insulate the steel bracing rings that support the overhang
  - difference between the slot liners and packers of a 6.6 kV machine
- procedures for the fitting of coils to core, wedging and bracing encompassing:
  - significance of the slot portion of coils for machines above 3.3 kV
  - method of inserting the coils of a ribbon winding into slots
  - effects of undue mechanical stress on B stage insulated coils
  - importance of coil pitch and why it is important
  - sequence of events in fitting the first pole pitch group of coils in a lap winding
  - sequence of events in fitting the coils of a concentric winding
  - purpose and location of the excess packing in a slot
  - difference between the wedges for a lap and hairpin winding
  - method of fitting a wedge
  - difference that may be encountered between the wedges for a radial ventilated and the wedges for an axially ventilated machine
  - methods used to brace and strengthen the overhang of a lap winding and a hairpin winding
- procedures for making inter turn and inter coil connections on a hairpin winding and inter coil connections on a lap and bar winding encompassing:
  - sequence of events in making turn to turn connections, and insulating the turns of a lap winding:
    - connection methods, including silver solder or brazing and soft solder
  - sequence of events, from hand forming the coil to final insulation, in making the turn to turn connections in a hairpin winding, using a welded joint
  - sequence of events in making the coil to coil connections in a bar winding
- testing according to Australian, British and International Electrotechnical Commission (IEC) standards:
  - 6.6 kV B stage insulated winding and VPI winding test
- materials, procedures, tests and precautions required during and after the impregnation of

- completed windings according to Australian, British and IEC standards:
- precautions to be taken when handling and using varnishes and resins
  - important features of an oven used to cure large impregnated machines
  - application and features of various impregnating materials:
    - water-based varnish, Xylol-based varnish and 100% solids resin
  - method of carrying out a gel test on a resin and a viscosity test on a varnish
  - typical quality procedures carried out on an impregnating varnish
  - procedure and precautions for carrying out a hot dip impregnation, a flood coat impregnation and a VPI impregnation
  - tests to be carried out after impregnation and bake on a 6.6 kV B stage insulated winding and a VPI winding
  - winding to terminal connections according to Australian, British and IEC standards:
    - criteria for selection of winding to terminal cables:
      - voltage rating, full load current and fault capacity
    - common types of terminal boxes and their structure:
      - phase segregated, phase separated and phase insulated
    - method of making the joint between winding and terminal cables and insulating such a joint
  - procedures and precautions to be followed when performing static electrical testing of a completed rewind according to Australian, British and IEC standards encompassing:
    - types and purpose of tests
    - testing safety precautions
    - testing procedures:
      - repetitive surge test, loss tangent test, polarisation index (PI) test, cold resistance test and polarity test
    - interpretation of test results
    - calculation of winding cold resistance and line and phase resistance
  - relevant induction machines relevant industry standards
  - relevant quality workplace procedures
  - relevant job safety assessments or risk mitigation processes
  - relevant tools, equipment and materials
  - relevant WHS/OHS legislated requirements
  - relevant workplace documentation
  - relevant workplace policies, procedures and instructions.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated suitable workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, relevant industry standards, codes of practice and operation manuals.

## Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>