Australian Government

Assessment Requirements for UETTDRIS73 Develop engineering solutions for energy supply power transformer problems

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector 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 and performance criteria on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- developing engineering solutions for energy supply power transformer, including:
  - understanding the extent of the transformer problems
  - forming effective strategies for solution development and implementation
  - obtaining transformer parameters, specifications and performance requirements appropriate to each problem
  - testing and finding solutions to transformer problems
  - documenting instruction for implementation of solutions that incorporate risk control measure to be followed
  - documenting justification of solutions implemented in accordance with professional standards
  - dealing with unplanned events on at least one occasion.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

Knowledge Evidence

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

- transformer construction and operating principles encompassing:
  - various types of lamination style and core construction used in single phase, three phase, double wound and auto transformers
  - different winding styles/types used in transformers

  - how input current is limited on no-load and how power is transferred from primary to secondary when a load is connected
  - using the transformation ratio to determine an unknown quantity of V, I and VA
  - significance of nameplate data items
  - operation of a transformer under load/no-load conditions
  - the reason any particular type of transformer is used in a specific application
  - safety features specified in regulatory standards with respect to transformers
  - safety features specified in regulatory standards with respect to isolating transformers
  - basic insulation resistance, continuity and winding identification tests
- transformer parameters encompassing:
  - the percentage impedance of a transformer by test
  - percentage impedance of a transformer by calculation
  - the equivalent circuit of a transformer
  - calculation of voltage regulation
  - losses that occur in a transformer
  - tests to determine losses
  - efficiency and state typical values
  - the all-day efficiency of a transformer
- cooling methods encompassing:
  - methods of natural and forced cooling
  - properties of transformer oil
  - tests performed on transformer oil
  - auxiliary equipment
  - the purpose and operation of the types of auxiliary equipment used on transformers - bushings, explosion vents, surge diverters, tap changers, conservator, breathers and desiccants, gas relays and temperature indicators
- instrument transformers encompassing:
  - construction of current transformers
  - uses and ratings of current transformers
  - construction of voltage transformers
  - uses and ratings of voltage transformers
  - safety techniques when using instrument transformers
- transformer connections encompassing:
  - vector group of a transformer from a connection diagram
  - connections of a three phase transformer to create a particular vector group
  - reasons for using the different vector groups
  - purpose of tertiary windings
  - consequences/effect of an incorrect connection
- parallel operation encompassing:
  - polarity markings for the windings of a transformer

  - conditions/restrictions for parallel operation of transformers
  - calculation of loading on transformers operating in parallel
  - connection of transformers in parallel to supply a common load
  - the consequences/effect of an incorrect connection
- harmonics in transformers encompassing:
  - how harmonics are generated in transformers
  - problems caused by harmonics in transformers
  - measurement of the harmonics in a transformer
  - methods/equipment used to overcome harmonics in transformers
- high voltage (HV) isolation encompassing:
  - the term HV
  - procedures for isolating HV apparatus
  - regulations with respect to access permits
  - clearances to be observed with respect to HV up to 33 kV
  - the term 'step' and 'touch' potential.

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 workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated conditions involving realistic and authentic activities that replicate operational 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 other simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

UET Training Package Companion Volume Implementation Guide is found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7