



Australian Government

UEEIC0043 Solve problems in temperature measurement components and systems

Release: 1

UEEIC0043 Solve problems in temperature measurement components and systems

Modification History

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

Application

This unit involves the skills and knowledge required to solve problems in temperature measurement components and systems as they apply to various processes and control work functions.

It includes working safely, setting up and calibrating temperature measuring components and systems, applying problem-solving techniques, using a range of measuring devices, and providing solutions derived from measurements and calculations to predictable problems in temperature measurement components and systems.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEECD0051 Use drawings, diagrams, schedules, standards, codes and specifications

UEEIC0047 Use instrumentation drawings, specifications, standards and equipment manuals

Competency Field

Instrumentation & Control

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

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| 1 Prepare to work on temperature measurement components and system | 1.1 | Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are obtained and applied |
| | 1.2 | Hazards are identified, risks assessed and control measures implemented |
| | 1.3 | Nature of the temperature measurement problem is identified from documentation or appropriate person/s |
| | 1.4 | Appropriate person/s is consulted to ensure work is coordinated effectively with others affected by the work |
| | 1.5 | Materials required for work are determined in accordance with workplace procedures |
| | 1.6 | Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety in accordance with workplace procedures |
| 2 Solve temperature measurement problem | 2.1 | WHS/OHS risk control work measures and procedures are followed |
| | 2.2 | Need to inspect, test or measure live electrical components is determined in accordance with WHS/OHS regulatory requirements and workplace procedures |
| | 2.3 | Temperature measurement apparatus is checked and isolated in accordance with workplace procedures |
| | 2.4 | Relevant methods are used to solve measurement problem from tests and calculated values as they apply to flow measurement components and systems |
| | 2.5 | Unplanned situations are responded to in accordance with workplace procedures and approval of an authorised person/s |
| | 2.6 | Problem is solved using sustainable energy principles and without damaging apparatus, the surrounding environment or services in accordance with workplace procedures |
| 3 Complete work and document work activities | 3.1 | WHS/OHS work completion risk control measures and workplace procedures are followed |
| | 3.2 | Worksite is cleaned and made safe in accordance with |

workplace procedures

3.3 Justification for solutions to resolve flow measurement problems is documented

3.4 Work completion is documented and appropriate person/s notified in accordance with workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

temperature measurement apparatus and systems as they apply to installation, fault finding, maintenance or development work functions must include at least three of the following:

- determining the operating parameters of a temperature measuring system
- setting up and calibrating a temperature measuring system
- altering an existing temperature measuring system to comply with specified operating parameters
- developing a temperature measuring system to comply with a specified function and operating parameters

Unit Mapping Information

This unit replaces and is equivalent to UEENEEI105A Solve problems in temperature measurement components and systems.

Links

Companion Volume implementation guides are found in VETNet - -

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

Assessment Requirements for UEEIC0043 Solve problems in temperature measurement components and systems

Modification History

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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 two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including:
 - identifying risk control measures
 - applying safe working practices
- applying sustainable energy principles and practices
- completing work and documenting work activities
- coordinating work with others
- dealing with unplanned events/situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- identifying sources of materials
- obtaining tools, equipment and testing devices
- preparing to work on temperature measurement components and systems
- solving problems in temperature measurement components and systems
- solving temperature measurement problems.

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:

- introduction to temperature measurement, including:
 - temperature measurement terms
 - international temperature scale
 - temperature scales
 - conversion of temperature readings
 - temperature measuring elements
 - temperature sensor selection factors
 - errors in temperature measurement

- methods used to reduce errors.
- types and applications of temperature transducers
- transducers input/outputs - measurement and evaluation
- transducer connections
- filled system thermometers, including:
 - applications of filled system thermometers
 - calibration of filled systems
 - filled systems operating principles
 - liquid in glass thermometers construction
- other temperature measuring techniques, including:
 - thermistor characteristics and circuit operation
 - thermistor temperature measuring circuits and operation
 - temperature measurement characteristics of solid-state devices and circuits
 - temperature indicators: characteristics and applications
 - liquid crystals
 - thermometers: bimetallic and digital thermistor
- problems in temperature measurement components and systems
- radiation thermometers, including:
 - operating principles, terms and factors affecting its use
 - construction, signal conditioning, and calibration of optical pyrometers and radiation
- relevant manufacturer specifications
- relevant safe work method statements (SWMS)/job safety assessments or risk mitigation processes, including risk control measures and safe working practices
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- resistance temperature detectors (RTDs) and RTD measuring circuits, including:
 - calculating of unbalanced Wheatstone bridge circuits voltage outputs
 - determining RTD standard resistance values or temperature
 - non-linear voltage output compensation methods
 - RTD lead-resistance compensation methods and immersion errors
 - selecting RTD configurations and terms
- sustainable energy principles and practices
- temperature measurement principles, including:
 - terms and international temperature scales, temperature conversions, measuring elements, sensor selection factors, errors in temperature measurement and methods used to reduce them
 - types and applications of temperature transducers, connections, input/outputs (I/O), and measurement and evaluation
- thermocouple measuring circuits, including:
 - advantages and disadvantages and the characteristics of thermocouples and connection

wires

- calibrating and determining thermocouple measuring instruments, test equipment and junction temperature configurations
- electromagnetic field distribution in thermocouple circuits
- handling and selection of thermocouples, including installation errors
- identification of thermocouple connection wires
- industrial thermocouple assembly and fabrication methods
- thermo-electric effects, principles and laws
- thermowell properties
- relevant industry standards, regulations and codes.

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 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 other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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