Australian Government

Department of Education, Employment and Workplace Relations

UEENEEG181A Provide advice on effective and energy efficient lighting products

Release: 1

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers advising customers of effective and energy efficient lighting products within the scope of manufacturers' product data. It encompasses a basic knowledge of lighting principles, light source types and typical applications and interpreting manufacturers' technical data and documenting advice given.

Application of the Unit

Application of the Unit **2)**

This unit is intended as an additional competency to relevant competencies need to effectively respond to inquiries in the retail and wholesale lighting sectors

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to provide advice on lighting products	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Appropriate questioning and active listening are used, drawing on basic knowledge of lighting to determine the nature of the enquiry.
	1.3 Lighting documentations/files that will assist in providing the necessary advice are reviewed and understood
2 Provide advice on lighting products	2.1 OHS risk control work measures and procedures are followed.
	2.2 Basic knowledge of lighting and manufacturers' data is applied to provide the necessary advice.
	2.3 Higher technical or costing inquiries are referred to an appropriate person of higher authority.
	2.4 Inquiries and how they where responded to are documented in accordance with routine procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.
Evidence shall show that a basic knowledge has been acquired of lighting, light sources and luminaries.
The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG181A Illumination and lighting principles

Evidence shall show an understanding of illumination and lighting principles to an extent indicated by the following aspects:

T1 Technology of light encompassing:

- Electromagnetic spectrum and visible (frequency/wave length) range
- Light output from a source (luminous flux), efficacy of different types of lamps and terms, units and symbols used.
- Light intensity — definition, terms, units, symbols and relationship with luminous flux
- Illuminance — definition, terms, unit, symbol and relationship with luminous flux and environmental factors
- Significance of inverse square law on illuminance
- Luminance — definition, term, unit, symbol and relationship with luminous intensity and illuminance
- Vision and illuminance standards for particular environments and activities

T2 Nature of light encompassing:

- Primary and additive colours
- Frequency and colour that light is perceived
- Comparison of the colour spectrum of sunlight and light generated from different lamp types.
- Colour temperature scale and the perceived colour of a light source
- Colour rendering and colour distortion.

T3 Incandescent lamp encompassing:

- Types and principles
- Features — envelope, filament type and temperature (K), fill gas, cap and common power ratings
- Effect of filament evaporation over time
- Effect on parameters (ϕ, η, P, hr) with variations in rated voltage
- Application and future

T4 Fluorescent lamps encompassing:

- Type T series — basic principle, double and single phosphor coating and CRI; expectations (efficacy [l/w]; visual ambience [K]; visual satisfaction [CRI]; life [hr])

REQUIRED SKILLS AND KNOWLEDGE

- Type T accessories — basic operation of electromagnetic ballast; starter; capacitor; features and advantage of electronic ballast.
- Compact fluorescent (CFL) types — integrated and non-integrated ballasts; form; rating for equivalent light out of GLS lamp;
- Application and future

T5 High intensity discharge (HID) lamps encompassing:

- Mercury lamp — types (blended light lamps and high pressure (HP) lamp), structural features, spectral intensity and CRI
- Metal halide lamp — principles, structural features, lamp forms, spectral intensity and CRI
- Application and future

T6 LED lamps encompassing:

- Types, structural features, spectral intensity and CRI
- Application and future

T7 Luminaires (Light fittings) encompassing:

- Mechanical function and components (include ingress protection rated enclosure with suitable mounting arrangement; mechanisms to accommodate lamp(s), electrical ancillaries when needed; optical system and excessive temperature rise).
- Ingress Protection (IP) ratings and examples of their application to luminaires
- Electrical function and components (Electrical components must be appropriate for the insulation class or ELV fault protection and include supply terminals; lamp holder(s); electrical ancillaries when needed; and appropriated nternal wiring).
- Optical function and components (Optical components include a variety of mechanism to: distribute light, direct light, filter light and/or limit glare; and achieve maximum possible light output ratio).
- Light output ratio of common typical luminaire without and with reflector and diffuser mechanisms.
- Light distribution and reading a polar luminance distribution curve.
- Classification of light distribution and beam spreadTypes and features of indoor luminaires (Features include light distribution, symmetry, screening and utilisation factor)
- Types and features of outdoor luminaires (Features include types of light distribution and reflector control)
- Examples of currently available luminaires for indoor and outdoor applications.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.
The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.
Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.
The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.
Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.
Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Providing advice on lighting products as described in 8) and including:

A Determining the nature of the advice required
B Reviewing appropriate lighting documentation and providing appropriate advice
C Applying basic knowledge of lighting to providing relevant advice
D Referring high technical and costing inquiries to an appropriate person.

E Documenting inquiries and responses in accordance with routine procedures.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:
OHS policy and work procedures and instructions.
Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.
These should be used in the formal learning/assessment environment.
Note:
Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.
The resources used for assessment should reflect current industry practices in relation to providing advice on effective and energy efficient lighting products.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.
Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.
This unit shall be demonstrated by providing advice on lighting products for each of the following groups:

Group A	Lamp types
At least three of those listed	Incandescent lamp types
	Fluorescent lamp types
	Discharge lamps
	LED lamp types
	Ancillary apparatus

Group B	Luminaires
At least three of those listed	Optical functions and fitting design
	Light distribution
	Mounting techniques
	Modern technology applied to luminaries
	Luminaires for indoor and outdoor use

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical