



Australian Government

Department of Education, Employment and Workplace Relations

UEENEEG184A Provide photometric data for illumination system design

Release: 1

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the provision of photometric data to support illumination system designs. It encompasses working safely, applying knowledge of photometric, calculations for the selecting and arranging light sources for particular applications, recognising the visual requirements of the human subject, complying with standards and documenting justification for the data provided.

Application of the Unit

Application of the Unit 2)

This unit is intended as a foundational competency underpinning further advanced competencies in the application of illumination principles and luminary's layout and design.

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, practice in this unit is 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 photometric data	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 The required illumination parameters of the design are obtained from a design brief, job specification or by consultation with the client.
	1.3 Compliance and recommended illumination parameters for particular situations and tasks are obtained and understood.
	1.4 Lighting manufacturers' technical information for products under consideration are obtained and understood
2 Provide photometric data	2.1 OHS risk control work measures and procedures are followed.
	2.2 Photometric principles are applied to calculating photometric data required for particular applications and variety of appropriate lighting products.
	2.3 Data includes illumination compliance requirements and recommendations given in standards.
	2.4 Data is documented, including justification for conclusion, in accordance with established procedures.
	2.5 Photometric data is forwarded to appropriate personnel in accordance with established 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 knowledge has been acquired of providing photometric data for illumination system design.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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Photometric principles, vision and colour

Evidence shall show an understanding of photometry, vision and colour to an extent indicated by the following aspects

T1 Nature of light encompassing:

- dual nature of light electromagnetic spectrum
- frequency and wavelength (nm)

T2 Photometric principles and definitions encompassing:

- scope and definitions from AS/NZS 1680.1 and AS ISO 1000 - 1998
- luminous flux, definition and unit of measurement
- luminous intensity, definition and SI unit of measurement
- radians and steradians
- illuminance and luminance
- basic optics, reflection, refraction
- reflectance and transmittance
- diffuse surfaces
- the point source and the inverse square law
- cosine law
- relationship between watts and lumens
- older imperial measurements (These older units may include the footcandle or lumen per square foot, candlepower etc).

T3 Physiology of the eye and light detection encompassing:

- Scotopic, mesopic and photopic vision
- contrast sensitivity
- colour vision – rods and cones
- light levels and recognition of colour
- adaptation
- accommodation and visual acuity
- brightness and lightness
- image detection
- glare and comfort
- cognition and visual perception

REQUIRED SKILLS AND KNOWLEDGE

T4 Colour encompassing:

- Munsell and CIE Colour System
- chromaticity coordinates
- black body radiation and colour temperature
- uniform chromaticity scale diagrams
- factors determining colour appearance

T5 Photometry encompassing:

- the integrating sphere
- distribution photometry
- selected requirements of AS1680.3 (Measurement, calculation and presentation of photometric data)
- the goniophotometer
- measurement of luminous flux
- measurement of luminance and cut-off angle
- measurement of illuminance (single luminaire)
- graphical representation of photometric data
- test reports and data presentation
- lux meters and measuring equipment
- required light levels for various situations as per Australian/New Zealand Standards

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, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Providing photometric data for illumination system design as described in 8) and including:
 - A Obtaining illumination parameters from a design brief, job specification or by consultation with the client.
 - B Understanding compliance and recommended illumination parameters for particular situations and tasks.
 - C Understanding manufacturers' technical information.
 - D Documenting photometric data including justification for conclusions
 - E Dealing with unplanned events

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 photometric data for illumination system design.

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 in relation to at least three of the following:

- Determination of lighting levels for specific situations
- Interpretation of manufacturers' photometric data
- Determination of lighting level transitions where safety is a consideration
- Calculations using the inverse square law
- Measurement of lighting levels using a light (lux) meter
- Presentation of a simple photometric report
- Present a report (lighting levels) on an existing installation

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