Title	**Demonstrate knowledge of sign illumination systems and produce LED illuminated signs**		
Level	**4**	**Credits**	**20**

Purpose	This unit standard is for people working in the signmaking industry. People credited with this unit standard are able to: demonstrate knowledge of light emitting diode (LED), fluorescent, and neon signage lighting systems, and installation requirements for electrical components of signage systems; and fit LED systems into sign components.

Classification	Sign Making > Sign Making - Core

Available grade	Achieved

Guidance Information

1 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the:
Health and Safety at Work Act 2015;
Electricity (Safety) Regulations 2010;
Standard AS/NZS 3832:1998: *Electrical installations - Cold-cathode illumination systems*.

Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

2 Definitions
Job requirements – refer to specific requirements for the signmaking job at hand. These requirements may or may not be covered in the workplace job documentation and may include special instructions or quality requirements expected by the customer and/or the production standards of the signmaking workplace and/or organisation.
Product specifications – refers to technical data such as dimensions, electrical characteristics, ratings, performance and industry standards.

Workplace procedures – refer to organisation policies and procedures that are documented in memo, electronic, or manual format and available in the workplace, and are consistent with manufacturer's requirements. They may include but are not limited to – standard operating procedures, site specific procedures, site safety procedures, equipment operating procedures, quality assurance procedures, product quality specifications, references, approved codes of practice, housekeeping standards, environmental considerations, on-site briefings, supervisor's instructions, and procedures to comply with legislative and local body requirements relevant to the signmaking sector.

3 Assessment information
Evidence may be presented from a workplace job(s) or from a simulated project if this unit standard is not able to be achieved within the learner's workplace.

Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, workplace procedures and legislative requirements.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of LED, fluorescent, and neon signage lighting systems.

Performance criteria

1.1 Describe the use of different LED systems suitable for signage and compare the advantages and disadvantages.

Range types – back lit panels, edge lit panels, channel lettering, reverse halo lit lettering, flex LED systems, module LED systems; advantages and disadvantages – colours, durability, weatherability.

1.2 Explain illumination requirements, and considerations for even illumination for signage lighting systems.

Range module spacing, lumens per module, lumens per square metre (lux), panel or letter depth, LED lens angles, diffusion properties of acrylic panels.

1.3 Describe the use of fluorescent lighting systems suitable for signage and compare advantages and disadvantages.

1.4 Describe the use of neon lighting systems suitable for signage and compare advantages and disadvantages.

Outcome 2

Demonstrate knowledge of installation requirements for electrical components of signage systems.

Performance criteria

2.1 Explain hazards of working with electricity and the regulatory limitations for non-registered people working with electricity as outlined in Schedule 1.1 and 1.2 of the Electricity (Safety) Regulations 2010.

Range prescribed electrical work, not prescribed electrical work, extra low voltage supplies.

2.2 Explain weathertightness ingress protection (IP) ratings for electrical components and identify IP requirements for components of LED signage systems.

2.3 Describe wiring requirements and perform basic electrical calculations for multiple LED lighting modules in terms of number and size of drivers or transformers (power supply modules or units and their ratings) required, and estimated total energy usage.

Range power, voltage, current.

Outcome 3

Fit LED systems into sign components.

Range lighting may include but is not limited to – halo, back lit, side lit, LED neon strip; evidence must include a minimum of three different types of lighting.

Performance criteria

3.1 Select appropriate LED system parts and install into sign components according to product specifications and job requirements.

Range system parts – flex LED system, module LED system, backlit panel, channel letter.

3.2 Make and insulate wire connections.

Range solder, crimp, screw connectors.

3.3 Space LED modules to produce even illumination across the sign and rectify any problems relating to uneven illumination.

Range problems may include but are not limited to – hotspots, uneven wash, shadows, electrical failure.

3.4 Bench check sign illumination effect prior to installation to ensure compliance with sign requirements.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 April 2017	31 December 2025
Review	2	29 September 2022	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact the Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.