



Australian Government

CPCCSG3014 Manufacture gas-charged glass-formed illuminated signs

Release: 1

CPCCSG3014 Manufacture gas-charged glass-formed illuminated signs

Modification History

Release 1.

This version first released with CPC Construction, Plumbing and Services Training Package Version 2.

Revised unit of competency. Replaces superseded equivalent CPCCSI3014A Manufacture gas-charged glass-formed illuminated signage.

Application

This unit of competency specifies the outcomes required to form glass tubes into specific shapes, fill them with gas, and provide a source of power to the tubes to produce illuminated signs commonly referred to as neon signs. It covers using tools and equipment to shape the glass tubes, and then attaching electrodes and pumping gas through the tubes before sealing and powering up the signs for display. It also covers installing the sign to a backing for display purposes and maximum visual effect.

The unit supports sign manufacturers who produce illuminated signs using neon gas.

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

Pre-requisite Unit

Nil

Competency Field

Signs and graphics

Unit Sector

Construction

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions.

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|---|--------------------------------------|-----|---|
| 1 | Plan and prepare work. | 1.1 | Job requirements are identified from drawings and specifications. |
| | | 1.2 | Sequence of tasks required is determined and confirmed with relevant personnel. |
| | | 1.3 | Tools and equipment are selected to carry out tasks according to job requirements, checked for serviceability, and faults are rectified or reported before starting work. |
| | | 1.4 | Health and safety requirements are identified and applied to planning. |
| 2 | Mark out design. | 2.1 | Design is set out to scale on fire retardant sheeting using layout methods according to job requirements. |
| | | 2.2 | Sections are calculated and marked out to design specifications. |
| | | 2.3 | Joint locations are determined from layout and marked out on pattern. |
| | | 2.4 | Electrodes are marked out to indicate double backed or right angled position. |
| 3 | Bend glass. | 3.1 | Glass is heated over a gas flame until pliable. |
| | | 3.2 | Glass is bent to form shape consistent with pattern and specifications, and any errors in shaping are rectified. |
| 4 | Attach electrodes and connect glass. | 4.1 | Electrodes are attached to pattern specification and requirements of Australian standards. |
| | | 4.2 | Glass tubing is connected using procedures and techniques according to job requirements. |
| 5 | Prepare glass for lighting system. | 5.1 | Pumping station is activated and section is connected to pumping station according to job requirements and safety procedures. |
| | | 5.2 | Glass is vacuumed and pumped with gas using equipment and materials consistent with job |

- requirements.
- 5.3 Glass is sealed and bombarded using equipment consistent with job requirements and industry standards.
 - 5.4 Glass is cooled safely and aged according to job requirements.
 - 5.5 Neon sections are tested to determine transformer loadings according to Australian standards and safety procedures.
 - 5.6 Doubled sections of glass are blackened to form design shape.
- 6 Secure finished sign and clean up.
 - 6.1 Neon glass sign is securely attached to panel using attachments and supports according to job requirements.
 - 6.2 Sign and surrounding surface area are cleaned and waste materials removed according to statutory and regulatory authority requirements.
 - 6.3 Tools and equipment, including personal protective equipment (PPE), are cleaned, maintained and stored according to workplace requirements.

Foundation Skills

This section describes the language, literacy, numeracy and employment skills essential to performance in this unit but not explicit in the performance criteria.

Skill	Performance feature
Learning skills to:	transfer key principles and techniques of heating and forming glass tubes to form and join glass sections to new designs.
Numeracy skills to:	measure and calculate lengths and widths to set out sign design according to scale.
Oral communication skills to:	use questioning techniques to identify and confirm client requirements, share information, listen and understand.

This section describes the language, literacy, numeracy and employment skills essential to performance in this unit but not explicit in the performance criteria.

Skill	Performance feature
Reading skills to:	read and interpret a range of information relating to the safe and appropriate use of tools and equipment for heating and shaping glass over a live flame, including safe work method statements (SWMS) and manufacturer specifications.
Writing skills to:	report faults in tools and equipment to manufacturer and relevant personnel in short, simple reports.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Health and safety requirements</i> must include:	- selection, correct fitting, and use of PPE prescribed under legislation, regulations and workplace policies and practices - emergency procedures, including: - evacuation - first aid - location and use of fire-fighting equipment - hazard identification and risk control procedures - safe operating procedures, including the conduct of operational risk assessment and treatments associated with: - concealed services (water, power and gas) - lighting - restricted access barriers - work site visitors and the public - working in confined spaces - working in proximity to others - use of gas and live flame - use of high voltage electricity - use of machines - use of tools and equipment - workplace environmental requirements.
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Unit Mapping Information

CPCCSI3014A Manufacture gas-charged glass-formed illuminated signage

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad>

Assessment Requirements for CPCCSG3014 Manufacture gas-charged glass-formed illuminated signs

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Performance Evidence

A person demonstrating competency in this unit must satisfy all of the elements, performance criteria and foundation skills of this unit, and must manufacture two different gas-charged glass-formed illuminated signs as follows:

- one sign must contain a directional symbol, such as an arrow
- one sign must consist of at least three words written in script lettering and sans serif font, using three different colours.

In doing the above work, the person must:

- work, shape and join the glass tubed sections safely and accurately to form the required shapes or letters
- select and use relevant tools and equipment to handle and form the glass
- safely attach required number of electrodes and connect glass tubing
- prepare the glass and pump gas to the glass assembly safely
- bombard, cool and age the glass to specifications
- affix each finished sign to a panel measuring a minimum 400 mm length x 300 mm height.

Knowledge Evidence

A person demonstrating competency in this unit must demonstrate knowledge of:

- statutory and regulatory authority requirements relating to safe handling of materials, including:
 - removal of waste products
 - storage of chemicals and materials
- key features of drawings and specifications of gas-charged glass-formed signs, including dimensions, symbols and abbreviations
- methods and techniques to:
 - shape and form glass

- pump gas into glass
- processes to measure and set out when preparing to manufacture gas-charged illuminated signs, including applying direct and indirect layout methods
- Australian standards appropriate to manufacturing gas-charged illuminated signs, including:
 - AS 2508.2.012 Safe storage and handling; information cards for hazardous materials
 - AS 3100 Approval and test specification – General requirements for electrical equipment
 - AS 3953 Loading guide for dry-power transformers
 - types and characteristics of fonts and lettering styles used in the manufacture of signs
- safety procedures required when working with live flame and gas
- terminology used in sign manufacture
- types and characteristics of gas-charged glass-formed illuminated signs
- types, characteristics and correct handling procedures for materials used in the manufacture of gas-charged glass-formed illuminated signs
- types and uses of electrodes and transformers when manufacturing gas-charged glass-formed illuminated signs
- purpose and application of the following when working with tools and equipment used in the manufacture of gas-charged glass-formed illuminated signs:
 - safety data sheets (SDS)
 - safe work method statements (SWMS).

Assessment Conditions

Suitable assessment of performance requires:

- equipment:
 - glass heaters
 - tongs
- materials:
 - custom wood panel measuring at least 400 mm in length x 300 mm in height
 - electrodes
 - fastenings and fixings used to attach sign components
 - glass tubes
 - neon gas
 - transformers
- contingencies:
 - identify and rectify faults in illuminated signs
- specifications:
 - Australian standards:
 - AS 2508.2.012 Safe storage and handling; information cards for hazardous materials

- AS 3100 Approval and test specification – General requirements for electrical equipment
- AS 3953 Loading guide for dry-power transformers
- SDS for materials used when manufacturing gas-charged illuminated signs
- SWMS
- relationship with client:
 - check and confirm design of glass shapes and job specifications
- timeframe:
 - according to job requirements.

Assessor requirements

As a minimum, assessors must satisfy the assessor requirements in the Standards for Registered Training Organisations (RTOs) current at the time of assessment.

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