



Australian Government

MSL965001 Design and manufacture glass apparatus and glass systems

Release: 1

MSL965001 Design and manufacture glass apparatus and glass systems

Modification History

Release 1. Supersedes and is equivalent to MSL965001A Design and manufacture glass apparatus and glass systems

Application

This unit of competency covers the ability to design and manufacture glass apparatus and glass systems. It includes consulting with clients regarding design specifications and cost, as well as designing equipment and systems to improve efficiency, increase production capabilities and improve safety of equipment and processes.

This competency is applicable to skilled and experienced scientific glassblowers. They will apply specialised technical knowledge and precise technical skills and considerable planning and judgement in their work.

While no specific licensing or certification requirements apply to this unit at the time of publication, laboratory operations are governed by relevant legislation, regulations and/or external accreditation requirements. Local requirements should be checked.

Pre-requisite Unit

MSL963001 Operate basic handblowing equipment

MSL963002 Repair glass apparatus using simple glassblowing equipment

Competency Field

Scientific glassblowing

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

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

1	Scope the design of glass apparatus and	1.1	Clearly identify the function, operating procedures and requirements for apparatus and/or glass system
		1.2	Confirm details of glass apparatus and glass systems

system		required	
		1.3	Prepare specifications for new glass apparatus and glass system requirements
		1.4	Prepare design proposal and timelines
		1.5	Obtain client's approval for design proposal
2	Design glass apparatus and systems	2.1	Identify or prepare appropriate blueprints, drawings or designs
		2.2	Consult with clients regarding design specifications and cost
		2.3	Design the equipment
		2.4	Obtain client's approval for manufacture
3	Manufacture glass apparatus and systems	3.1	Identify hazards and workplace safety requirements
		3.2	Select and prepare glass stock and materials
		3.3	Select and prepare tools and equipment in accordance with job requirements
		3.4	Construct apparatus or system
		3.5	Perform annealing operations
		3.6	Perform glass finishing operations
		3.7	Trial and commission apparatus or system
4	Maintain a safe work environment	4.1	Use specified safety equipment, safety procedures and personal protective equipment (PPE) to ensure own safety and that of others
		4.2	Minimise the generation of wastes
		4.3	Ensure the safe disposal of wastes
		4.4	Clean, care for and maintain work area, equipment and tools

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| | 4.5 | Report any hazards or incidents according to workplace procedures |
| 5 | Maintain records | |
| | 5.1 | Record data into reporting system |
| | 5.2 | Maintain glass apparatus and system equipment logs in accordance with workplace requirements |
| | 5.3 | Ensure security and confidentiality of workplace information |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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

Range of Conditions

This field allows for different 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.

Standards, codes, procedures and/or workplace requirements

Standards, codes, procedures and/or workplace requirements include the latest version of one or more of:

- Australian and international standards covering the requirements for the laboratory safety; quality and environmental management; and labelling, storage, handling and transport of hazardous materials
- national work health and safety (WHS) standards and codes of practice
- specific codes, guidelines and procedures, such as principles of good laboratory practice (GLP)
- workplace documents, such as standard operating procedures (SOPs); quality and equipment manuals; maintenance schedules; material safety data sheets (MSDS); safety procedures; material, production and product specifications; production and laboratory schedules; workplace recording and reporting procedures; and waste minimisation and safe disposal procedures

Hazards

Hazards include, but are not limited to, one or more of:

- glass dust
- sharps and broken glassware
- residues on used glassware, such as mercury
- heat sources, such as burners and ovens
- fluids under pressure (acetylene and oxygen)
- cuts associated with glass grinders and cutters
- manual handling of heavy bags, containers and equipment

Safety procedures

Safety procedures include, but are not limited to, one or more of:

- ensuring access to service shut-off points
- recognising and observing hazard warnings and safety signs
- correct labelling of samples and hazardous materials
- extracting dust
- following established manual handling procedures
- handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer instructions, and workplace procedures and regulations
- regular cleaning and/or decontamination of equipment and work areas
- using PPE, such as heat resistant gloves, safety glasses, goggles, face guards, coveralls, respirators and safety boots

WHS and environmental management requirements

WHS and environmental management requirements include:

- complying with WHS and environmental management requirements at all times, which may be imposed through state/territory or federal legislation. These requirements must not be compromised at any time
- applying standard precautions relating to the potentially hazardous nature of samples
- accessing and applying current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health, where relevant

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSL965001A Design and manufacture glass apparatus and glass systems

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=5c63a03b-4a6b-4ae5-9560-1e3c5f462baa>

Assessment Requirements for MSL965001 Design and manufacture glass apparatus and glass systems

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Performance Evidence

Evidence of competence in this unit must satisfy all of the requirements of the elements and performance criteria, and include demonstration of:

- designing and safely manufacturing at least two (2) glass apparatus and glass systems
- consulting with clients about design specifications and cost
- interpreting a brief, including design requirements and cost
- applying basic theoretical knowledge of chemistry and physics to make relevant design conclusions
- incorporating design elements that reflect use requirements, improve efficiency, safety and/or increase production capabilities
- preparing blueprints, drawings or designs for the glass apparatus and glass systems
- selecting appropriate grades of glass and components and preparing them for use
- trialling and commissioning glass apparatus and glass systems and making adjustments as necessary
- communicating problems to either supervisor or outside service technician
- completing workplace documentation accurately and communicating work results.

Knowledge Evidence

- Must provide evidence that demonstrates knowledge of:
- design principles for glass apparatus and glass systems
- types of glass used in job role (including special formula glass), their properties and applications
- incompatible glass types
- glass-to-glass and glass-to-metal seals
- theoretical and practical knowledge of glassworking methods and procedures, including chemistry, physics, electrode sealing techniques and electrode placement in glass
- basic theory of operation and use for the glass apparatus and systems for which design and manufacture are required
- characteristics, capabilities and limitations of glassblowing techniques
- relevant hazards, work health and safety (WHS) and environment requirements.

Assessment Conditions

- Judgement of competence must be based on holistic assessment of the evidence. Assessment methods must confirm consistency of performance over time, rather than a single assessment event. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions.
- This unit of competency is to be assessed in the workplace or a simulated workplace environment. A simulated workplace environment must reflect realistic operational workplace conditions that cover all aspects of workplace performance, including the environment, task skills, task management skills, contingency management skills and job role environment skills.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- 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.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept in each case).
- This unit of competency may be assessed with:
 - MSL965002 Perform glass coating, grinding and finishing operations
 - MSL965003 Construct, modify and maintain high vacuum systems
- Holistic assessment methods include:
 - inspection of glass apparatus, glass systems and workplace documentation completed by the candidate
 - review of candidate's work outputs over a period of time to assess accuracy, consistency and timeliness
 - feedback from supervisors and/or clients
 - oral/written questioning about properties of glass, design principles, glassworking methods and procedures, quality problems and safe work procedures.
- Access is required to instruments, equipment, materials, workplace documentation, procedures and specifications associated with this unit, including, but not limited to:
 - a scientific glassblowing facility, appropriate safety equipment, materials and safe work procedures, and repair methods
 - bench burner, hand torch, micro torch and ribbon burner, gas supplies and gas economiser
 - hand tools, such as carbon paddles and mandrels, range of forceps, glass tubing gauges, angle setting jigs, calipers, glass support rollers, brass shapers, carbon rods, glass knife, stainless steel gauze, vernier calipers and other measuring tools, and strain viewer, dydinium glasses and polariscope
 - glassworking lathe, mechanical glass cutters and saws, and mechanical glass grinding equipment
 - annealing oven
 - measuring and recording equipment
 - various glass types, including soda-lime, borosilicate, quartz, silica and special formula glasses; glass to metal and glass to glass seals.

- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- The assessor must demonstrate both technical competence and currency.
- Technical competence can be demonstrated through:
 - relevant VET or other qualification/Statement of Attainment AND/OR
 - relevant workplace experience.
- Currency can be demonstrated through:
 - performing the competency being assessed as part of current employment OR
 - having consulted with a laboratory about performing the competency being assessed within the last twelve months.

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