Australian Government

CPPSPS4005A Install, service and repair swimming pool and spa heating systems

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

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Modification History

Version	Comments
1	This version first released with CPP07 Property Services Training Package Version 13.

Unit Descriptor

This unit of competency specifies the outcomes required to install, service and repair swimming pool and spa heating systems in line with relevant regulatory requirements. It includes preparing for work; installing, testing and servicing swimming pool or spa heating systems; troubleshooting faults in swimming pool and spa heating systems; and completing service, repair and installation activities.

Application of the Unit

This unit of competency supports the work of swimming pool and spa technicians engaged in servicing domestic, commercial and public swimming pools and spas.

Licensing/Regulatory Information

Service technicians are not permitted to undertake any installation, replacement, maintenance and repair functions that are restricted to licensed trades or occupations (subject to relevant state and territory regulations). Different states and territories may have regulatory mechanisms that apply to this unit. Users are advised to check for regulatory limitations.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	**Prepare for work.**	1.1	Applicable provisions of Australian standards, and legislative, manufacturer and enterprise requirements are identified and followed.
		1.2	***Work instructions*** are obtained, reviewed and confirmed as required with ***relevant persons***.
		1.3	Installation, service and/or repair requirements of swimming pool or spa heating system are confirmed in line with enterprise procedures.
		1.4	***Swimming pool or spa heating system*** to be installed, serviced or repaired is identified and confirmed in line with enterprise requirements.
		1.5	***Tools, materials and equipment*** needed to carry out the work are selected and checked for correct operation and safety.
		1.6	Potential and existing ***risks and hazards*** in the work area are identified and controlled in line with work health and safety (WHS) and enterprise requirements.
		1.7	***Sustainability principles*** are applied to work preparation and application in line with enterprise requirements.
2	**Install and test swimming pool or spa heating system and components.**	2.1	***Personal protective equipment*** is selected and used in line with WHS and enterprise requirements.
		2.2	Swimming pool or spa heating system or component is installed in line with relevant Australian standards, and manufacturer, client and enterprise requirements.

		2.3	Installation work is coordinated with relevant licensed personnel as required in line with regulatory and enterprise requirements.
		2.4	Swimming pool or spa heating system or component is commissioned in line with manufacturer specifications and enterprise procedures.
3	**Service swimming pool or spa heating systems.**	3.1	Personal protective equipment is selected and used in line with WHS and enterprise requirements.
		3.2	***Service and maintenance requirements*** are identified from manufacturer specifications in line with enterprise requirements.
		3.3	Replacement components are checked and fitted in line with manufacturer specifications.
		3.4	Servicing of swimming pool or spa heating system is carried out in line with manufacturer instructions and enterprise procedures.
4	**Troubleshoot faults in swimming pool or spa heating systems.**	4.1	Personal protective equipment is selected and used in line with WHS and enterprise requirements.
		4.2	Logical processes, including the application of basic principles, system knowledge and experience, are used in conjunction with technical manuals to ensure efficient and accurate ***troubleshooting*** of faults.
		4.3	Defects are located and causes of the defects are identified and recorded in maintenance documentation, including where required any other systems disturbed.
		4.4	Specialist advice is obtained, where required and available, to assist with the troubleshooting process.
		4.5	Components are repaired or replaced in line with manufacturer instructions, and regulatory, client and enterprise requirements.
		4.6	Fault finding and repair or replacement work is coordinated with relevant licensed personnel as required in line with regulatory and enterprise requirements.
		4.7	Appropriate personnel are sourced to undertake repairs

			or replacement activities that are outside scope of personal expertise, require specialist skills or equipment, or must be performed by licensed personnel in line with enterprise requirements.
		4.8	Fault finding and repair or replacement activities are carried out using sustainability practices and without unnecessary waste of materials or damage to equipment and the surrounding environment or services.
		4.9	Swimming pool or spa heating system is commissioned in line with manufacturer specifications and enterprise procedures.
5	**Complete installation, repair and service activities.**	5.1	Swimming pool or spa heating system is installed or reinstated to operational condition in line with work instructions and enterprise procedures.
		5.2	Work area is restored to original condition and checked for safety hazards, waste is disposed of, and tools and equipment are cleaned and stored in line with WHS and enterprise requirements.
		5.3	Malfunctions, faults, wear or damage to swimming pool or spa and environs, tools and equipment are reported for repair or replacement in line with enterprise procedures.
		5.4	Notification of work completion is made to relevant persons in line with enterprise procedures.
		5.5	Information is provided to clients on compliance of swimming pool or spa and environs with safety legislation in line with enterprise requirements.
		5.6	Relevant documentation is completed and securely maintained in line with enterprise procedures.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to interact in an ethical manner with clients from diverse social, economic and cultural backgrounds
- decision-making and problem-solving skills that involve applying logical processes, basic principles, system knowledge and experience in conjunction with information in technical manuals to ensure efficient and accurate troubleshooting of faults
- literacy skills to read and interpret technical manuals and specifications related to swimming pool and spa heating systems
- numeracy skills to perform calculations related to troubleshooting faults in swimming pool and spa heating systems
- research skills to identify and locate technical information on swimming pool and spa heating systems
- technology skills to use tools and equipment associated with installing, fault finding, repairing and commissioning swimming pool and spa heating systems

Required knowledge

- Australian Competition and Consumer Commission product safety guidelines
- commonwealth, state or territory, and local government legislation and regulations, Australian standards and codes of practice impacting on the installation, repair and servicing of heating systems for swimming pools and spas related to:
  - dangerous goods
  - electrical and plumbing regulations controlling conduct of electrical and plumbing work
  - environment protection
  - environmental health
  - work health and safety
  - private and public swimming pools and spas
  - waste disposal
- energy efficiency:
  - energy consumption of different heating systems
  - ways of maximising energy efficiency of swimming pool and spa heating systems
- hazards associated with heated water in swimming pools and spas:
  - algae
  - bacteria
  - chemical treatment
  - protozoa

- viruses
- water testing

- swimming pool and spa heat loss and gain:
  - calculations of energy loss and gain
  - conduction loss
  - controlling energy loss
  - convection loss
  - energy loss
  - heat gains:
    - heaters
    - indirect sources
    - sunlight
  - pool and spa covers
  - thermal radiation loss
  - water temperatures for different water-related activities
- swimming pool and spa heating system:
  - appliance details
  - common faults
  - components
  - heater sizing:
    - gas
    - heat pumps
    - solar
  - maintenance
  - operating principles of different heating systems
  - programming
  - purpose of heating system
  - types, operation and servicing of heating systems:
    - electric
    - gas
    - heat exchangers
    - heat pumps
    - solar

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	This unit of competency could be assessed by installing and testing a swimming pool or spa heating system or component and applying theoretical knowledge and advanced fault diagnostic skills to identify and repair faults in line with regulatory requirements. This includes faults that are not covered fully by maintenance manual fault diagnosis guides.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person should demonstrate the ability to: • comply with relevant plumbing and electrical regulations • interpret work instructions • select and use appropriate personal protective equipment • install and test swimming pool or spa heating systems in line with client and enterprise requirements • service swimming pool or spa heating systems • troubleshoot routine and complex faults in swimming pool or spa heating systems • complete installation, repair and service activities.

Context of and specific resources for assessment	Assessment of essential underpinning knowledge may be conducted in an off-site context and is to comply with relevant regulatory and Australian Standards' requirements.
	Resource implications for assessment include:
	• relevant codes, standards and government regulations
	• a technical reference library with current publications on swimming pool and spa heating systems:
	  • operating principles
	  • components
	  • faults and troubleshooting.

Method of assessment	Assessment methods must: • satisfy the endorsed Assessment Guidelines of the CPP07 Property Services Training Package • include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application • reinforce the integration of employability skills with workplace tasks and job roles • confirm that competency is verified and able to be transferred to

	other circumstances and environments. This unit could be assessed on its own or in combination with other units relevant to the job function.
Guidance information for assessment	Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support. Assessment processes and techniques should, as far as is practical, take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Work instructions may include**:**	• access to site and specific site requirements
	• equipment and systems location information
	• equipment, tools and material requirements
	• heating system information:
	  • features, functions and capabilities
	  • manufacturer instructions
	  • service and maintenance requirements
	  • type
	  • warranties and guarantees
	• personal protective clothing and equipment requirements
	• reporting requirements
	• specific client requirements
	• timeframes
	• work schedules
	• work tasks and procedures.

Relevant persons may include:	• business owner • client • colleague • equipment and systems manufacturer • site manager or project manager • supervisor

	• swimming pool or spa manager or operator • technician • tradesperson.

Swimming pool and spa heating systems include:	• electric
	• gas
	• heat exchangers
	• heat pumps
	• solar:
	  • freestanding
	  • glazed
	  • plastic
	  • roof-mounted
	  • rubber
	  • solar blankets.

Tools, materials and equipment include***:***	• adhesives • communications equipment • computer and software • fasteners • hand tools • ladders • personal protective equipment • power tools • swimming pool and spa heating equipment and fittings.

Risks and hazards **may** include:	• burns and scalds
	• chemical hazards
	• confined spaces
	• electrical hazards
	• exposure to:
	  • algae
	  • asbestos
	  • bodily fluids
	  • contaminated surfaces
	  • contaminated water:
	  • bacteria
	  • faecal
	  • viruses
	  • disinfection by products
	  • dogs
	  • dust
	  • fibres

	• glass • heights • insects • live power • natural and other gas build-up • noise • snakes • spiders • sun • swimming pool and spa chemicals • vermin • vomit contamination • weather • inadequate ventilation • manual handling • non-compliance with building codes and regulations • personal health hazards • plant and equipment hazards • trips and falls • unaccompanied minors • water hazards.
Sustainability principles:	• cover the current and future social, economic and environmental use of resources • may include: • appropriate material selection that has minimal environmental impact • disposal of waste material to ensure minimal environmental impact • efficient energy and water use • efficient insulation • efficient use and recycling of materials.
Personal protective equipment may include:	• buoyancy vest or personal flotation device (PFD) • gloves • hard hat or protective head covering • hearing protection (e.g. earplugs and earmuffs) • high visibility vest • non-slip and waterproof boots or other safety footwear • protective eyewear and glasses • protective outdoor clothing • respirator or face mask • safety harness

	• sun protection (e.g. sunhat, sunscreen and sunglasses) • uniforms or overalls • water-resistant clothing.
Service and maintenance requirements may include:	• adjustments • cleaning • confirming operation • identifying worn parts • inspecting • lubricating • programming automated systems • replacing consumable or worn parts • routine repairs • testing.
Troubleshooting involves:	• identifying standard faults using relevant manuals and specifications as required • identifying from first principles faults beyond available maintenance data for swimming pool and spa heating systems • fault finding during scheduled or unscheduled maintenance activities • individual activities or troubleshooting tasks performed during the supervision of other personnel.

Unit Sector(s)

Competency field

Unit sector Swimming pool and spa service

Custom Content Section

Not applicable.