



Australian Government

MSAPMWJ301A Operate a high pressure water jetting system

Release 2

MSAPMWJ301A Operate a high pressure water jetting system

Modification History

Release 2: ISC upgrade to incorporate changes to Australian Standard.

Unit Descriptor

This unit of competency covers the operation of a high pressure water jetting system which may be used to clean, prepare, abrade, cut or demolish concrete, steel or other plant, equipment, vessels or infrastructure. This work is undertaken in compliance with *AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance*, or its authorised replacement and *Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting December 2013*, its state equivalent (where one exists) or the authorised replacement.

Application of the Unit

In a typical scenario, one or more operators (the number of operators is to be in accordance with the standard) will operate a high pressure water jetting system. AS/NZS 4233.1:2013 defines this work as work with:

- (a) *High pressure water jetting systems pressurised by positive displacement pumps with an output capability greater than 800 bar litres per minute.*
- (b) *High pressure water jetting operations carried out at pressures above 800 bar litres per minute and includes jetting operations involving the use of additives and abrasives.*
- (c) *Water jetting operations below 800 bar litres per minute where there is a foreseeable risk of injury to operators.*

It further defines:

High pressure water jetting systems with an output capability greater than 800 bar litres per minute and less than 5600 bar litres per minute are identified as Class A and systems with an output capability in excess of 5600 bar litres per minute are identified as Class B.

The competent operator as defined by this unit of competency will be able to operate independently. Operators who are not competent to operate independently should be competent to operate under supervision (refer to *MSAPMWJ201A Use high pressure water jetting equipment*).

Operators will also need to be competent in a range of other units of competency in order to be allowed to operate independently on site. Work will be undertaken on a worksite which may be a client's site or a site belonging to the organisation.

AS/NZS 4233.1:2013 states that 'Verification of competency or refresher training on high pressure water jetting operations shall be carried out and documented at appropriate intervals not exceeding two years to ensure the continued competency of operators'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable

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

Elements and Performance Criteria

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|---|------------------------------|-----|---|
| 1 | Prepare for work | 1.1 | Obtain required job details |
| | | 1.2 | Complete site access and work control requirements |
| | | 1.3 | Identify site hazards and required hazard controls |
| | | 1.4 | Prepare equipment required for the job |
| | | 1.5 | Complete personnel requirements |
| | | 1.6 | Complete required pre-work paperwork |
| 2 | Complete on-site preparation | 2.1 | Arrive at site ready for job |
| | | 2.2 | Liaise with job owner as part of preparation |
| | | 2.3 | Obtain required permits/work authorities |
| | | 2.4 | Interpret and follow job pack |
| | | 2.5 | Check available water |
| | | 2.6 | Check waste disposal |
| | | 2.7 | Recognise and control job and site-specific hazards |

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|---|---|-----|--|
| | | 2.8 | Communicate needs back to base |
| 3 | Set up job | 3.1 | Prepare worksite |
| | | 3.2 | Set up water jetting equipment |
| | | 3.3 | Liaise with other work groups, as appropriate |
| | | 3.4 | Establish appropriate means of communication between operators |
| | | 3.5 | Ensure hazard controls are operational and adequate |
| | | 3.6 | Liaise with job owner, as required |
| | | 3.7 | Select key variables |
| | | 3.8 | Check and use required personal protective equipment |
| | | 3.9 | Test emergency shut-off |
| 4 | Undertake water jetting job in accordance with procedures | 4.1 | Start up high pressure water jetting system |
| | | 4.2 | Communicate as appropriate |
| | | 4.3 | Operate equipment to proceed with job, as specified |
| | | 4.4 | Monitor job conditions |
| | | 4.5 | Monitor job and equipment and take appropriate action |
| | | 4.6 | Maintain required line of sight |
| | | 4.7 | Monitor hazards and activate emergency stop, as required |
| | | 4.8 | Diagnose faults and take appropriate action |
| | | 4.9 | Complete required paperwork |
| 5 | Complete job | 5.1 | Shut down equipment |
| | | 5.2 | Liaise with job owner |
| | | 5.3 | Clean job site and equipment |
| | | 5.4 | Service and inspect equipment |
| | | 5.5 | Store equipment |

- 5.6 Restock running spares and consumables
- 5.7 Report any issues or incidents, as required
- 5.8 Debrief relevant stakeholders
- 5.9 Complete required paperwork

Required Skills and Knowledge

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

Required skills

Required skills include:

- recognising conditions which will lead to out of specification product or unsafe situation
- implementing the enterprise's procedures in a timely manner
- using equipment in accordance with procedures and manufacture instructions
- conveying information relevant to the operation clearly and effectively
- maintaining appropriate levels of environmental controls and quality assurance
- determining and applying pressure drop and reaction force
- interpreting and applying pressure drop charts and nozzle charts
- reading and interpreting safety data sheets (SDS)
- recognising equipment problems and taking action to prevent equipment failure
- reading and numeracy to interpret workplace documents, instrumentation and technical information

Required knowledge

Required knowledge includes:

- hazards associated with the process, plant, equipment where water jetting is to be carried out
- high pressure water jetting hazards
- injuries resulting from high pressure water jets and appropriate responses
- application of the hierarchy of control in controlling the hazards
- relevant safety signs and symbols
- principles of hydraulics
- relevant communication systems including hand signals
- heat stress, fatigue, hydration, physiology and biomechanics, as applied to water jetting
- principles and application of nozzle design
- how high pressure water jets work
- diesel engine systems
- quantitative pressure and flow relationships

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.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that use of equipment is understood and that the importance of critical properties, settings and readings is known. Competence must be demonstrated in the operation of equipment to the level required for this unit of competency. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective actions. Holistic assessment of this unit of competency with other related units is preferred. This unit includes all aspects of MSAWJ201A Use high pressure water jetting equipment. Assessment of this unit should automatically include evidence of competency for MSAWJ201A. Consistent performance should be demonstrated. In particular look to see that: • hazards are identified and controlled • job is completed efficiently and to required standards • quality is monitored • required measurements/observations are continually made • all health, safety and environment (HSE) requirements are followed • problems are anticipated and appropriate action is taken (i.e. problem fixed or reported). • The assessor should be able to demonstrate competence in water jetting operations and have adequate industry experience (with three to five years being a guideline) in water jetting.
Context of and specific resources for assessment	Assessment will require access to operating equipment over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operations. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be

	required to probe the reasoning behind observable actions.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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.

Procedures	All operations are performed in accordance with standard procedures. Procedures may be written, verbal, computer-based or in some other form, and may include: • all work instructions • standard operating procedures (SOPs) • Australian standards • Guidance Notes • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations
Site access requirements	Site access requirements may include: • site induction • other site/client requirements
Work control requirements	Work control requirements may include: • client/site requirements, such as permits or other authorities to enter site, commence and continue work
Prepare required equipment	Preparation of required equipment may include: • determining equipment required for the job • selecting (e.g. from store) equipment needed for the job • checking equipment is in appropriate condition for the job

	- checking equipment is within inspection date - loading equipment onto truck or similar, if required - filling fuel and ensuring adequate supply of other consumables
Equipment	Equipment may include: - pump - pump motor/driver - hoses - guns, lances and nozzles - personal protective equipment - other equipment, plant, tools and hazard control devices required by the job
Personnel requirements	Personnel requirements may include: - briefing other team members - participating in/leading toolbox meeting - checking team members are fit for work - other requirements
Job owner	Job owner may include: - client or their representative - site manager or their representative - production manager or their representative - maintenance manager or their representative - other person with prime responsibility for the plant/plant area which is the subject of the water jetting
Job paperwork	Job paperwork may be electronic, hard copy or other format and may include: - tool storeroom records - equipment loaded records - maintenance/inspection records/checklists - tag out/reports for failed equipment - hazard controls - work packs
Personal protective equipment	Personal protective equipment may include: - personal protective equipment as specified in: - Section 4 AS/NZS 4233.1: 2013 <i>High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance</i>, or its authorised replacement Section 5 <i>Safe Work Australia Guide for Managing Risks from High Pressure Water Jetting</i> December 2013, or its authorized

	replacement • medical alert card as specified in Section 9.5 of <i>AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance</i>, or its authorised replacement • other equipment as required
Liaise with job owner	Liaise with job owner may include: • confirming job owner needs and standards • confirming job and job site • checking job owner is satisfied with completed job • confirming compliance with site requirements • other job owner communications
Job pack	Job pack may include: • permits/clearances • safe work method statements • job safety and environment analysis (JSEA) or other hazard analysis and control information • Safety Data Sheets (SDS)
Water	Water is to be checked for appropriate: • amount (volume and pressure) • quality/properties • availability
Waste disposal	Waste disposal checks ensure that waste generated will be disposed of in an environmentally appropriate manner and in accordance with site requirements. Waste may include: • contaminated water • material removed by water jetting • waste fuels • other wastes and emissions
Worksite preparation	Worksite preparation may include: • establishing exclusion zone (e.g. with barricades or tape) • fixing signage • ensuring safe footing for personnel • participating in/verifying isolations
Prepare water jetting equipment	Preparing water jetting equipment may include: • interpreting equipment markings • assembling equipment • checking electrical earth

	• compliance with relevant Australian standards • flushing equipment • visual inspection of hoses
Communication	Communication may include: • hand signals • radio head phones • other appropriate means
Key variables	Key variables may include: • pressure • flow rate • rpm of pump motor/driver • power of pump motor/driver • nozzle type and size • hose assemblies • control system variables
Hazards	Hazards may include: • high pressure hazards • site/process hazards • hazards arising from materials in job site, including materials being removed by water jetting • hose set-up and hose runs
Hazard controls	Hazard controls may include: • appropriate controls for all hazards identified • controls identified in the relevant permits to work • controls required by <i>AS/NZS 4233.1: 2013 High Pressure Water Jetting Systems Part 1. Safe Operation and Maintenance, or its authorised replacement</i> • other appropriate controls
Job conditions	Job conditions may include: • total work hours (for day/from base) • rest/rotation periods • weather • heat stress symptoms • site conditions
Monitor job and equipment	Monitoring job and equipment includes monitoring: • the pump and its motor (means of providing motive power) • productivity • system efficiency

	• product quality • mechanical equipment • high pressure jet formation • waste management • hose condition
Appropriate action	Appropriate action includes: • recognising actual and potential problems • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Solutions	Solutions may include: • activating emergency stop • stopping work until situation is resolved • raising alarm • responding to injury
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through federal or state/territory legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence

Unit Sector(s)

Surface finishing

Competency field

Not applicable

Co-requisite units

Not applicable