



Australian Government

Department of Education, Employment and Workplace Relations

NWP420A Install, operate and maintain hydrometric instruments and equipment

Revision Number: 2

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Modification History

NWP420A Release 2: Layout adjusted. No changes to content.

NWP420A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to install, operate and maintain hydrometric instruments and equipment in sound order and to organisational standards. The role requires understanding of the capacity, purpose and application of the instruments and equipment and the ability to select, install, test and maintain hydrometric instruments and equipment to provide accurate data for the client.

This unit replaces NWP341A Install and maintain hydrometric instruments and equipment

Application of the Unit

This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems. This unit is part of the skills set for hydrography and is suitable for entry level and working under the supervision of a senior hydrographer.

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 range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan the installation of hydrometric instruments and equipment	<p>1.1 Analyse the purpose and suitability of <i>hydrometric instruments and equipment</i> required for the site and its conditions.</p> <p>1.2 Ensure that the manufacturers' specifications are applied.</p> <p>1.3 Confirm organisational procedures for installing the instruments and equipment and reflect these in the plan of installation task schedules.</p> <p>1.4 Prepare relevant equipment, logistical requirements, authorisations and <i>documentation</i> required for the installation.</p>
2 Install hydrometric instruments, equipment and systems	<p>2.1 Assemble, prepare and test <i>assignment instruments and equipment</i> prior to transportation to the site to ensure that they are fit for purpose.</p> <p>2.2 Install <i>assignment instruments and equipment</i> in accordance with manufacturers' specifications, <i>organisational standards and safe work practices</i>.</p> <p>2.3 Conduct installation tests in accordance with standard operating procedures to ensure the correct operation of instruments and equipment.</p> <p>2.4 Complete records and commissioning of the installation process in accordance with organisational procedures.</p>
3 Test and maintain hydrometric instruments, equipment and systems	<p>3.1 Test assignment instruments and equipment in accordance with organisational, industry standards and client requirements.</p> <p>3.2 Make and test adjustments to comply with the required tolerances.</p> <p>3.3 Report errors or deviations from the appropriate range or tolerance levels in accordance with organisational and industry standards.</p> <p>3.4 Maintain test records in accordance with organisational requirements.</p> <p>3.5 Complete <i>routine maintenance</i> in accordance with organisational requirements and maintenance schedules.</p> <p>3.6 <i>Store and protect instruments</i> and equipment in accordance with organisational and manufacturers' requirements.</p>
4 Operate hydrometric monitoring equipment	<p>4.1 Use monitoring equipment to collect data required by assignment plan and purpose.</p> <p>4.2 Make calculations and adjustments according to the requirements of the site and equipment.</p> <p>4.3 Check the accuracy and reliability of readings and confirm or adjust calibrations.</p>
5 Report processes and outcomes	<p>5.1 Compile reports and data according to organisational requirements and monitoring plan.</p> <p>5.2 Identify potential and current problems proactively and take corrective action or report to relevant agents.</p> <p>5.3 Identify indicators of urgency and high risk for priority response.</p>

Required Skills and Knowledge

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

Required skills:

- interpret and apply technical documentation to the installation and maintenance of instruments and equipment
- apply mechanical skills to the effective installation and maintenance of instruments and equipment
- apply electrical/electronic skills to the effective installation and maintenance of instruments and equipment
- apply computer systems and system analysis equipment and tools to conduct in situ calibration and commissioning of monitoring equipment and systems
- use required work practices to minimise environmental impact of the installation process
- use safety equipment and personal protective equipment appropriately
- use hand and power tools and other relevant equipment effectively and safely
- identify and respond to potential or actual operational problems
- conduct inspections
- produce reports
- collect and analyse data
- read and interpret plans, specifications, maps and job instructions
- communicate with employees and customers using clear and direct communication
- use communication systems
- give and receive instructions
- apply skills specific to the industry and for working safely in remote locations including:
 - remote area survival
 - water safety
 - high voltage work environment

Required knowledge:

- mathematical and scientific principles appropriate to the work role
- operating parameters, processes and capacity limitations of hydrometric instruments and equipment
- electrical/electronic systems operating principles
- risk factors and potential hazards involved with installing and monitoring instruments and equipment
- effects of weather and conditions on operation of hydrometric instruments and equipment
- computer based instrument/system analysis software and packages
- occupational health and safety procedures
- policies and standard operating procedures
- relevant utilities and service bodies
- communication systems

- standards relevant to the installation tasks including:
 - AS 3778 for water measurement installations
 - World Meteorological Organisation / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
 - application of best practice methodology where standards not applicable or available

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

The candidate should demonstrate, in accordance with standard organisational and industry procedures, the ability to install, operate and maintain hydrometric instruments and equipment in sound order and to organisational standards including:

- interpreting and applying complex technical information and applications related to the installation and maintenance of a range of hydrometric instruments and equipment
- conducting accurate and reliable tests of a range of hydrometric instruments and equipment and make adjustments to maintain accuracy
- installing and maintaining a range of hydrometric instruments and equipment in a range of sites and conditions and under conditions of extreme weather and high risk
- analysing risks in a range of locations and conditions and working safely in routine and extreme conditions
- identifying, reporting and solving potential and current problems, and taking immediate action to address high risk conditions

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical

requirements of the workplace

- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency 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.

Hydrometric instruments and equipment may include:

- sensors
- transducers
- samplers
- data loggers
- telemetry
- power supplies
- float wells
- weirs and flumes
- gauge boards

Documentation may include:

- job specifications and work plans
- maps and plans
- survey data
- notice of entry procedures
- quarantine procedures
- mines regulations
- organisational procedures and manuals
- instrument and systems manufacturers' manuals
- standards relevant to the installation tasks including:
 - AS 3778 for water measurement installations
 - World Meteorological Organisation / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
- documentation of best practice methodology where standards not applicable or available

Assignment instruments and equipment may include:

- personal protective equipment
- hand and power tools
- portable power supplies
- computer equipment
- pumping equipment
- test equipment
- communications equipment
- signage
- 4WD vehicles
- surveying equipment:

- pegs
- staffs
- levels
- GPS
- electronic data management systems
- water velocity measurement devices:
 - mechanical current meters
 - acoustic-Doppler current meters and profiles

Organisational standards and safe work practices may include reference to:

- by-laws and organisational policies
- standard operating procedures
- environment protection standards and requirements
- occupational health and safety standards and requirements, including use of personal protective equipment
- safe handling of hazardous substances
- appropriate use of road and worksite signage
- survey of sections
- procedures for discharge measurement in open channels using mechanical current meters:
 - waded gaugings
 - flood gaugings by cableways
 - travellers or boats
- procedures for discharge measurement in open channels using:
 - acoustic-Doppler current meters or profilers waded gaugings
 - flood gaugings by staffed cableway
 - unstaffed traveller waybridge or boat

Routine maintenance may include:

- using appropriate cleaning agents and materials to remove surface dirt and contaminants
- applying lubricants in accordance with work instructions and manufacturers' specifications
- performing annual or other routine and scheduled inspections of physical surroundings of the monitoring installation to identify external impacts (adverse or otherwise) on data quality and monitoring system performance
- performing preventative maintenance management systems
- maintaining instrument/system management databases and record systems to assist with planning outages or alternative monitoring systems
- replacing components in accordance with work instructions and manufacturers' specifications
- conducting minor repairs
- conducting calibrations
- conducting appropriate vegetation management in gauging sections, around meteorological monitoring sites to maintain constant environmental factors affecting the monitoring site

Store and protect

- stowing instruments and equipment securely and in appropriate containers for storage and transport

instruments by a range of processes including:

- protecting instruments and equipment, as appropriate, from extremes of:
 - heat
 - moisture
 - electromagnetic radiation
 - shock
 - vibration

Unit Sector(s)

Not applicable.

Competency field

Hydrography.