



Australian Government

Department of Education, Employment and Workplace Relations

NWP347B Monitor, operate and control coagulation and flocculation processes

Revision Number: 2

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Modification History

NWP347B Release 2: Layout adjusted. No changes to content.

NWP347B Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to monitor, operate and control coagulation and flocculation plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

Application of the Unit

This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that coagulation and flocculation processes in water treatment plants conform to organisational standards and comply with statutory requirements.

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 required 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 Monitor coagulation and flocculation plant performance.	1.1 Monitor test results and <i>processes</i> to ensure compliance with the parameters of the operation. 1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i>.
2 Control chemical use.	2.1 Use, handle and store <i>chemicals</i> according to organisational procedures and statutory requirements. 2.2 Determine and apply chemical dosing according to plant processes, organisational procedures and statutory requirements. 2.3 Maintain chemical supply and usage records according to statutory requirements.
3 Operate and control coagulation and flocculation processes.	3.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements. 3.2 Collect process samples and conduct standard <i>tests</i>. 3.3 Carry out <i>system adjustments</i> and <i>process calculations</i> to improve system performance according to organisational procedures and statutory requirements.
4 Compile coagulation and flocculation process records.	4.1 Compile <i>reports</i> from plant and system data to meet organisational procedures and statutory requirements. 4.2 Report observations outside defined parameters for further action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- perform process calculations
- prepare and apply chemical dosing
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and customers

Required knowledge:

- process layout
- features and components of coagulation and flocculation systems
- theory of process operations
- chemicals used for coagulation and flocculation
- chemical dosing processes
- risk factors and potential hazards related to coagulation and flocculation systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- water testing procedures
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- procedures for storing and handling dangerous goods and chemicals
- interpretation of material safety data sheets
- chemical and biological principles that form the basis of coagulation and flocculation processes

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the 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 the ability to monitor, operate and control coagulation and flocculation processes, including:

- conducting routine plant inspections, taking samples and performing basic tests
- preparing and applying chemical dosing according to instructions
- identifying and reporting system faults
- making basic system adjustments according to instructions
- completing required documentation

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
- 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 requires 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 only taken at the point 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. Add any 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.

- Processes*** may include:
- chemical addition
 - flash mixing
 - flocculation
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
 - standard operating procedures
 - environment protection
 - occupational health and safety, including use of personal protective equipment
 - chemicals
 - dangerous goods
 - lifts and cranes
 - World Health Organisation standards
 - Australian Drinking Water Guidelines
 - National Water Quality Management strategy
 - Environment Protection Authority regulations
 - licensing agreements
 - electrical standards
- Chemicals*** may include:
- aluminium and iron based coagulants
 - synthetic organic polymers
 - pH adjusting chemicals such as lime, soda ash, caustic soda
- Routine plant inspections*** may require:
- interaction and communication with other employees, other authorities and the general public
 - visual observation
 - identification of corrosion damage
 - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements
 - use of equipment, including:
 - electronic monitoring and metering systems
 - manual chart recording systems
 - basic hand tools
 - sampling and laboratory testing equipment
 - computerised equipment
 - communication equipment

- Tests** may include:
- personal protective equipment
 - flocculation growth
 - flocculation time
 - mixing time
 - mixing energy
 - pH
 - colour
 - turbidity
 - routine jar tests
 - residual aluminium or iron
- System adjustments** may include:
- pH correction
 - chemical dosing
- Process calculations** may include:
- preparation of dosing solutions
 - jar test dosages
 - dry and liquid chemical feed rates
 - mixing intensity
- Reports** may include:
- plant performance data
 - chemical usage

Unit Sector(s)

Not applicable.

Competency field

Treatment