

## 41029 Design irrigation pump systems

<b>Kaupae   Level</b>	5
<b>Whiwhinga   Credit</b>	20
<b>Whāinga   Purpose</b>	<p>This skill standard is for people working in, or intending to gain skills in, designing irrigation pump systems to meet operational requirements, site conditions, and regulatory standards</p> <p>People credited with this skill standard will be able to apply hydraulic calculations and mitigate performance risks when designing pump systems.</p> <p>This skill standard provides a foundation for further training in advanced irrigation system design, pump and motor optimisation, and energy-efficient irrigation management and has been developed to align with the New Zealand Certificate in Irrigation System Design (Level 4) [Ref: 2557].</p>

### Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

<b>Hua o te ako   Learning outcomes</b>	<b>Paearu aromatawai   Assessment criteria</b>
1. Evaluate pump system performance to inform design decisions.	a. Interpret pump performance curves and assess efficiency.
	b. Apply affinity laws to predict performance changes and optimise design parameters.
	c. Analyse energy consumption metrics to ensure design meets operational efficiency targets.
2. Select and integrate pump components to meet design and site requirements.	a. Select and document pumps, motors, and components that align with system demands and site-specific conditions.
	b. Justify component choices based on performance specifications and compatibility with the overall system design.
	c. Integrate selected pumps, motors, and components into a complete irrigation pump system design that meets hydraulic requirements and site conditions.

Hua o te ako   Learning outcomes	Paearu aromatawai   Assessment criteria
3. Evaluate and mitigate risks to the pump system.	a. Evaluate potential risks to the pump system related to hydraulic performance and site conditions.
	b. Develop and document mitigations addressing identified risks to ensure system reliability and continuity.
	c. Confirm and document all design choices comply with the New Zealand Piped Irrigation Systems Design Code of Practice and other relevant standards.

### Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria

#### Assessment specifications:

Akōnga/learners must be assessed in the context of a commercial irrigation system, using naturally occurring evidence.

Activities can be assessed against existing, new or modified irrigation systems.

The irrigation system is for an agricultural or horticultural property, sports turf surface, landscape, golf course, amenities and wastewater.

All assessment activities and evidence must meet the requirements of worksite procedures, accepted industry practice and any subsequent amendments to legislation.

Evidence for all outcomes must be presented in accordance with: New Zealand Piped Irrigation Systems Design Code of Practice; and Irrigation; available from the Irrigation New Zealand website, <http://irrigationnz.co.nz/> and any subsequent amendments.

Providers must give due consideration to embedding ngā kaupapa (principles) o Te Tiriti o Waitangi when designing delivery activities relevant to this standard. These principles are outlined in [Guidelines for Providers: Embedding Tirohanga Māori](#).

Providers must give due consideration to the needs and values of Pacific peoples and other cultural groups when designing delivery activities relevant to this standard, ensuring practices are inclusive and equitable.

#### Definitions:

*Accepted industry practice* refers to approved codes of practice and standardised procedures accepted by the wider tree felling industries as examples of best practice.

*Worksite procedures* refer to documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to standard operating procedures, site safety procedures, equipment operating procedures, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.

### Ngā momo whiwhinga | Grades available

Achieved.

## Ihirangi waitohu | Indicative content

### Pumps and Components

- Pump Types: centrifugal, submersible, and turbine pumps based on water source and depth.
- Component Matching: filters, valves, and pressure regulators that align with system requirements.
- Efficiency Considerations: components that enhance overall system efficiency and reliability.

### System Performance

- System Curves: resistance curves to understand pressure requirements varying flow rates.
- Affinity Laws: affinity laws to predict changes in pump performance speed or impeller diameter.
- Energy Metrics: energy consumption opportunities for efficiency improvements.

### Risks, Mitigation and Compliance

- Risk Assessment: system failures impact on operations.
- Contingency Strategies: plans to mitigate identified risks system reliability.
- Maintenance Protocols: regular maintenance schedules
- Code of Practice: NZ Piped Irrigation System Design Code of Practice for system design and performance.
- Regulatory Requirements: local regulations and consent conditions related to water use and system operation.

### Rauemi | Resources

Legislation relevant to this skill standard includes but is not limited to:

- Irrigation New Zealand website (codes of practice), <http://irrigationnz.co.nz/>;
  - Health and Safety at Work Act 2015 [Health and Safety at Work Act 2015 No 70 \(as at 05 April 2025\), Public Act Contents – New Zealand Legislation](#);
  - Resource Management Act 1991 [Resource Management Act 1991 No 69 \(as at 05 April 2025\), Public Act Contents – New Zealand Legislation](#);
  - National Policy Statement for Freshwater Management 2014 [National Policy Statement for Freshwater Management | Ministry for the Environment](#);
  - Public Works Act 1981 [Public Works Act 1981 No 35 \(as at 05 April 2025\), Public Act Contents – New Zealand Legislation](#);
  - Resource Management (National Environmental Standards for Freshwater) Regulations 2020 [Resource Management \(National Environmental Standards for Freshwater\) Regulations 2020 \(LI 2020/174\) \(as at 01 January 2025\) Contents – New Zealand Legislation](#);
  - National Environmental Monitoring Standards (NEMS) [National Environmental Monitoring Standards » National Environmental Monitoring Standards \(NEMS\)](#);
  - Site specific water resource consent or water supply agreement, weather data [Home | NIWA](#);
  - Descriptions and soil profile data sheets [S-Map Online | Manaaki Whenua - Landcare Research](#);
- and any subsequent amendments or replacements.

**Pārongo Whakaū Kounga | Quality assurance information**

<b>Ngā rōpū whakatau-paerewa   Standard Setting Body</b>	Muka Tangata – People Food and Fibre Workforce Development Council
<b>Whakaritenga Rārangi Paetae Aromatawai   DASS classification</b>	Engineering and Technology > Water Industry > Irrigation
<b>Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga   CMR</b>	0052

<b>Hātepe   Process</b>	<b>Putanga   Version</b>	<b>Rā whakaputa   Review Date</b>	<b>Rā whakamutunga mō te aromatawai   Last date for assessment</b>
<b>Rēhitatanga   Registration</b>	1	18 December 2025	N/A
<b>Kōrero whakakapinga   Replacement information</b>	N/A.		
<b>Rā arotake   Planned review date</b>	31 December 2030		

Please contact Muka Tangata – People Food and Fibre Workforce Development Council at [qualifications@mukatangata.nz](mailto:qualifications@mukatangata.nz) to suggest changes to the content of this skill standard.