40440 Operate systems for boiler feedwater treatment

Kaupae | Level	4
Whiwhinga | Credit	15
Whāinga | Purpose	This skill standard is intended for people working as boiler operators and energy and chemical process operators in an energy and chemical plant. People credited with this skill standard are able to describe: boiler feedwater treatment processes; and the effects of boiler feedwater treatment systems, in an energy and chemical plant. They are also able to operate boiler feedwater treatment equipment and processes; and carry out water quality sampling for a boiler feedwater treatment system, in an energy and chemical plant. This skill standard can be used in the New Zealand Energy and Chemical qualifications at Level 4 and above.

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

Hua o te ako | Learning outcomes	**Paearu aromatawai** | Assessment criteria
1. Describe boiler feedwater treatment processes in an energy and chemical plant.	a. Describe boiler feedwater treatment in terms of methods of chemical treatments used.
	b. Describe processes used in boiler feedwater treatment in terms of mechanical treatments used.
	c. Identify and describe boiler feedwater equipment in terms of purpose and design concepts.
	d. Describe materials used for the construction of boiler feedwater treatment equipment in terms of process conditions and product compatibility.
	e. Describe hazards associated with water treatment chemicals in terms of safe use.

Hua o te ako | Learning outcomes	**Paearu aromatawai** | Assessment criteria
2. Describe the effects of boiler feedwater treatment systems in an energy and chemical plant.	a. Describe the impacts of inadequate boiler feedwater treatment in terms of boiler operations.
	b. Describe the reasons for the different water treatment requirements of boilers at different operating pressures in terms of water quality.
	c. Describe types of blow down and their operation in terms of the effect on water quality.
	d. Describe steam condensate return on boiler operational effectiveness in terms of the impacts on corrosion, boiler efficiency and fouling.
	e. Describe the processes for wet and dry boiler lay-up in terms of the purpose for each type of lay-up.
3. Operate boiler feedwater treatment equipment and processes in an energy and chemical plant.	a. Locate boiler feedwater treatment plant equipment in accordance with the site-specific asset tagging system and organisational requirements.
	b. Identify and describe deviations from normal operating parameters that can occur in a boiler feedwater treatment plant in terms of the operational steps and techniques used to respond to each deviation and in accordance with organisational requirements.
	c. Operate a boiler feedwater treatment plant using safe work practices in accordance with organisational requirements.
	d. Carry out checks and routine procedures in a boiler feedwater treatment plant in accordance with organisational requirements.
	e. Identify plant disruptions and take corrective actions in accordance with organisational requirements.
	f. Complete all plant documentation related to the processes and equipment operation in accordance with organisational requirements.

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4. Carry out water quality sampling for a boiler feedwater treatment system in an energy and chemical plant.	a. Take and analyse samples in accordance with organisational requirements.
	b. Document water quality data in accordance with organisational requirements.
	c. Interpret water quality data and identify deviations from operating standards in accordance with organisational requirements.
	d. Take and record required actions in accordance with organisational requirements.

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

Assessment specifications

- evidence for the practical components of this skill standard must be supplied from the workplace.
- 1a: methods include but are not limited to – corrosion control, scale inhibition, condensate treatment, pH control, embrittlement prevention, oxygen scavenging.
- 1b: processes include but are not limited to – filtration, demineralisation, chemical softening, de-aeration, distillation, reverse osmosis.
- 1c: equipment includes but is not limited to – chemical injection unit, analyser, regeneration unit.
- 1d: materials include but are not limited to – metals, plastics, fibreglass, rubber.
- 1e: water treatment chemicals include but are not limited to – acids, alkalis, coagulants, scavengers, any other plant specific boiler feedwater treatment chemicals.
- 2a: impacts include but are not limited to – corrosion, scale, fouling, foaming, total dissolved solids, dissolved gases, pH variation.
- 2b: water quality includes but is not limited to – total dissolved solids, alkalinity, suspended solids, dissolved gases.
- 2c: blow down types include but are not limited to – continuous, intermittent, automatic.
- 2d: operational effectiveness includes but is not limited to – energy efficiency; conservation of water; contamination from oil, iron and process materials; conductivity levels.
- 3b: evidence of three (3) deviations from normal operating parameters is required.
- 3e: plant disruptions include but are not limited to – process deviations, equipment malfunctions; evidence of three (3) different types of plant disruption is required.
- Learning outcome 4: evidence of three (3) water quality parameters is required.

Definitions:

Energy and chemical plant may be in – petrochemical, agri-nutrient, power generation, dairy processing, meat processing, and wood fibre manufacturing, or other plants that operate with a combination of high temperatures, pressures, steam and/or chemicals in gas, liquid or solid form.

Organisational requirements – documented policies and procedures. These may include: equipment; manufacturers' procedures; plant procedures; suppliers' instructions; site signage; codes of practice; company health and safety plans; on site briefings; and supervisor's instructions. This includes all regulatory and legislative obligations that apply to the plant.

Plant – the operational unit, equipment and/or workplace at which the person is working.

Ngā momo whiwhinga | Grades available

Achieved

Ihirangi waitohu | Indicative content

None

Rauemi | Resources

Legislation and codes of practice relevant to this skill standard include but are not limited to:

- Health and Safety at Work Act 2015;
- Hazardous Substances and New Organisms Act 1996;
- Resource Management Act 1991;
- Approved Code of Practice for The Design, Safe Operation, Maintenance and Servicing of Boilers available at https://worksafe.govt.nz/dmsdocument/1571-acop-the-design-safe-operation-maintenance-and-service-of-boilers;
- Approved Code of Practice for the Management of Substances Hazardous to Health (MOSHH) in the Place of Work, Occupational Safety and Health Service, 1997; and any subsequent amendments.

Pārongo Whakaū Kounga | Quality assurance information

Ngā rōpū whakatau-paerewa | Standard Setting Body	Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council
Whakaritenga Rārangi Paetae Aromatawai | DASS classification	Manufacturing > Energy and Chemical Plant > Operation of Energy and Chemical Plant
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga | CMR	0079

Hātepe | Process	**Putanga** | Version	**Rā whakaputa** | Review Date	**Rā whakamutunga mō te aromatawai** | Last date for assessment
Rēhitatanga | Registration	1	24 April 2025	N/A
Kōrero whakakapinga | Replacement information	This skill standard replaced unit standard 21456.		
Rā arotake | Planned review date	31 December 2029		

Please contact Hanga-Aro-Rau Workforce Manufacturing, Engineering and Logistics Development Council at qualifications@hangaarorau.nz to suggest changes to the content of this skill standard.