40438 Operate refrigeration equipment in an energy and chemical plant

Kaupae | Level	4
Whiwhinga | Credit	10
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 refrigeration systems used in the energy and chemical industry; and operate refrigeration equipment 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 refrigeration systems used in the energy and chemical industry.	a. Describe refrigeration systems in terms of operating and design concepts.
	b. Describe components of refrigeration systems in terms of purpose and operating concepts.
	c. Identify and describe control and protection systems for refrigeration components in terms of their purpose and in accordance with organisational requirements.
	d. Describe refrigerants used in terms of their potential hazards, use, and chemical properties.
	e. Describe refrigerant systems in terms of their safety systems and protection requirements.
	f. Describe potential causes of operational problems in terms of the operational steps and techniques required to avoid them.

Hua o te ako | Learning outcomes	**Paearu aromatawai** | Assessment criteria
2. Operate refrigeration equipment in an energy and chemical plant.	a. Locate the refrigeration equipment using the site drawing system in accordance with organisational requirements.
	b. Apply start-up and shut-down procedures in accordance with organisational requirements.
	c. Operate refrigeration equipment using safe work practices in accordance with organisational requirements.
	d. Carry out preventative maintenance and standard operating procedures on refrigeration equipment in accordance with organisational requirements.
	e. Identify and take corrective actions for refrigeration equipment process disruptions in accordance with organisational requirements.
	f. Apply emergency shut-down procedures in accordance with organisational requirements.
	g. Complete all plant documentation related to the process and equipment operation 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: refrigeration systems include but are not limited to – mechanical absorption, vapour compression; design concepts include: latent heat evaporation, system size and sustained operational efficiency.
- 1b: components include but are not limited to – drier, evaporator, condenser, oil separator, expansion valve, temperature regulating valve, slide loading valve, regulator, liquid receiver, compressors, safety device, pressure regulating valve, economiser vessel, condensers, heat injection loops.
- 1c: components identified in 1b.
- 1d: refrigerants include but are not limited to – ammonia, fluorocarbons, propane.
- 1e: safety systems and protection requirements include but are not limited to – safety data sheets, safety equipment, safety procedures, isolations, decanting.
- 1f: operational problems include but are not limited to – leakage, freeze up, liquid carry over, blocked strainers, non-condensable gas in system, water in system, high system pressure, over charge, under charge.
- 2b and 2f: evidence for assessment may be obtained in a simulated environment.
- 2e: process disruptions may include but are not limited to – process deviations, equipment malfunctions. Evidence of two (2) different types of process disruption 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 regulations relevant to this skill standard includes but is not limited to:

- Health and Safety at Work Act 2015;
- Health and Safety at Work (Hazardous Substances) Regulations 2017;
- Resource Management Act 1991;

  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 21454.		
Rā arotake | Planned review date	31 December 2029		

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