40375 Outline foundational chemistry concepts relevant to energy and chemical processes

Kaupae | Level	2
Whiwhinga | Credit	4
Whāinga | Purpose	This skill standard is intended for people who are able to explain chemical concepts and chemical reactions used in energy and chemical processes; and describe the chemistry of hydrocarbons relevant to energy and chemical processes. This skill standard can be used in the New Zealand Energy and Chemical qualifications at Level 2 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. Explain chemical concepts relevant to energy and chemical processes.	a. Describe the structure of atoms in relation to energy and chemical processes.
	b. Describe the periodic table of elements in relation to energy and chemical processes.
	c. Identify ions and ionic compounds in relation to energy and chemical processes.
	d. Identify the three states of matter in relation to energy and chemical processes.
	e. Explain how pH affects energy and chemical processes.
	f. Explain factors affecting reaction rate in terms of particle collision in relation to energy and chemical processes.
2. Describe the chemistry of hydrocarbons relevant to energy and chemical processes.	a. Identify the main types of hydrocarbon groups in relation to energy and chemical processes.
	b. Describe the atom bonding structure for each of the hydrocarbon groups in 2a.

Hua o te ako | Learning outcomes	**Paearu aromatawai** | Assessment criteria
3. Explain chemical reactions used in energy and chemical production processes	a. Identify the primary purpose of chemical reactions used in energy and chemical production processes.
	b. Describe the movement of temperature in chemical reactions used in energy and chemical processes.
	c. Explain factors impacting safety in terms of incomplete combustion products resulting from chemical reactions used in energy and chemical processes.

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

Ranges for assessment criteria include:

- 1a: sub-atomic particles, charge, atomic number, mass number.
- 1b: elements – metals, non-metals, alloys and their associated properties, symbols, properties.
- 1c: cations, anions, charge, formulae.
- 1d: solid, liquid, gas.
- 1e: acids, bases, neutral.
- 1f: concentration, surface area, pressure, temperature, catalyst.
- 2a. paraffins, olefins, napthenes, aromatics
- 2c. synthesis, reforming, fractionation, fermentation, cracking, hydration
- 2d. exothermic, endothermic
- 2d. ignition hazards, respiratory hazards

Ngā momo whiwhinga | Grades available

Achieved

Ihirangi waitohu | Indicative content

None

Rauemi | Resources

None

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	27 March 2025	N/A
Kōrero whakakapinga | Replacement information	This skill standard replaced unit standard 19418.		
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.