

## 40372 Control chemical reactions in an energy and chemical plant

<b>Kaupae   Level</b>	4
<b>Whiwhinga   Credit</b>	8
<b>Whāinga   Purpose</b>	<p>This skill standard is intended for people working as energy and chemical process operators in an energy and chemical plant.</p> <p>People credited with this skill standard are able to: describe chemical reactions, and abnormal chemical reaction conditions in an energy and chemical plant; and control chemical reactions in an energy and chemical plant.</p> <p>This skill standard can be used in the New Zealand Energy and Chemical qualifications at Levels 4 and above.</p>

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

Hua o te ako   Learning outcomes	Paearu aromatawai   Assessment criteria
1. Describe chemical reactions in an energy and chemical plant.	a. Describe types of chemical reaction in terms of the cause of the reaction, the outcome and the chemical equation.
	b. Describe the purpose of a catalyst in a chemical reaction in terms of the mechanism used to achieve the purpose.
	c. Describe causes of problems experienced with chemical reactions in terms of the effects on the process.
	d. Identify reactions to be controlled and describe their purpose and conditions.
	e. Describe control and protection systems in terms of each of the reactions identified in 1d.
2. Describe abnormal chemical reaction conditions in an energy and chemical plant.	a. Identify abnormal chemical reaction conditions in an energy and chemical plant.
	b. Describe abnormal chemical reaction conditions in accordance with organisational requirements.
	c. Describe actions to correct abnormal chemical reaction conditions in accordance with organisational requirements.

Hua o te ako   Learning outcomes	Paearu aromatawai   Assessment criteria
3. Control chemical reactions in an energy and chemical plant.	a. Control chemical reactions using safe work practices in accordance with organisational requirements.
	b. Manage chemical reaction parameters to optimise the rate of production and product quality in accordance with organisational requirements.
	c. Store and dispose of spent chemical or catalyst 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: types include but are not limited to – spontaneous, combustion, catalytic, exothermic, endothermic, equilibrium, oxidation, reduction
- 1c: problems include but are not limited to – exotherm, cracking, catalyst poisoning.
- 1d: conditions include but are not limited to – chemical equation, location, equipment and ancillary systems, temperatures and pressures through the process, feed ratios, effects of variations of key parameters.
- 2a and b: evidence of three (3) abnormal conditions is required.
- 2c: evidence of three (3) corrective actions 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

- Chemical reaction parameters, such as – temperature, pressure, feed ratio.

**Rauemi | Resources**

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

- Health and Safety at Work Act 2015;
- Hazardous Substances and New Organisms Act 1996;
- Resource Management Act 1991;  
and any subsequent amendments.

**Pārongo Whakaū Kouna | Quality assurance information**

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

<b>Hātepe  </b> Process	<b>Putanga  </b> Version	<b>Rā whakaputa  </b> Review Date	<b>Rā whakamutunga mō te aromatawai  </b> Last date for assessment
<b>Rēhitatanga  </b> Registration	1	30 January 2025	N/A
<b>Kōrero whakakapinga  </b> Replacement information	This skill standard replaced unit standard 3064.		
<b>Rā arotake  </b> Planned review date	31 December 2029		

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