

<b>Title</b>	<b>Demonstrate knowledge of and control a chemical reaction in an energy and chemical plant</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>8</b>

<b>Purpose</b>	<p>This unit standard is intended for people working as energy and chemical process operators in an energy and chemical plant.</p> <p>People credited with this unit standard are able to: demonstrate knowledge of chemical reactions, and abnormal chemical reaction conditions in an energy and chemical plant; and control chemical reactions in an energy and chemical plant.</p>
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<b>Classification</b>	Energy and Chemical Plant > Safety and Legislation for Energy and Chemical Plant
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<b>Available grade</b>	Achieved
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### Guidance Information

- 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.
- 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.
- For the purposes of assessment:
  - evidence for the practical components of this unit standard must be supplied from the workplace.

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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of chemical reactions in an energy and chemical plant.

#### Performance criteria

- 1.1 Describe types of chemical reaction in terms of the cause of the reaction, the outcome and the chemical equation.
- Range types include but are not limited to – spontaneous, combustion, catalytic, exothermic, endothermic, equilibrium, oxidation, reduction.
- 1.2 Describe the purpose of a catalyst in a chemical reaction in terms of the mechanism used to achieve the purpose.
- 1.3 Describe causes of problems experienced with chemical reactions in terms of the effects on the process.
- Range problems include but are not limited to – exotherm, cracking, catalyst poisoning.
- 1.4 Identify and describe reactions to be controlled in terms of their purpose and conditions.
- Range 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.
- 1.5 Describe control and protection systems in terms of each of the reactions identified in 1.4.

### Outcome 2

Demonstrate knowledge of abnormal chemical reaction conditions in an energy and chemical plant.

#### Performance criteria

- 2.1 Identify and describe abnormal chemical reaction conditions in accordance with organisational requirements.
- Range evidence of three abnormal conditions is required.
- 2.2 Describe actions to correct abnormal chemical reaction conditions in accordance with organisational requirements.
- Range evidence of three corrective actions is required.

**Outcome 3**

Control chemical reactions in an energy and chemical plant.

**Performance criteria**

- 3.1 Control chemical reactions using safe work practices in accordance with organisational requirements.
- 3.2 Manage chemical reaction parameters to optimise the rate of production and product quality in accordance with organisational requirements.
- Range parameters may include but are not limited to – temperature, pressure, feed ratio.
- 3.3 Store and dispose of spent chemical or catalyst in accordance with organisational requirements.

<b>Planned review date</b>	31 December 2024
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	8 November 1995	31 December 2014
Revision	2	15 December 1998	31 December 2014
Review	3	29 May 2000	31 December 2014
Revision	4	24 July 2002	31 December 2014
Review	5	27 June 2005	31 December 2014
Rollover and Revision	6	25 July 2006	31 December 2014
Review	7	22 May 2009	31 December 2016
Review	8	24 October 2014	31 December 2022
Review	9	27 February 2020	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0079
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**Comments on this unit standard**

Please contact the Primary Industry Training Organisation [standards@primaryito.ac.nz](mailto:standards@primaryito.ac.nz) if you wish to suggest changes to the content of this unit standard.