Title	**Demonstrate knowledge of and control a chemical reaction in an energy and chemical plant**		
Level	**4**	**Credits**	**8**

Purpose	This unit standard is intended for people working as energy and chemical process operators in an energy and chemical plant. 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.

Classification	Energy and Chemical Plant > Safety and Legislation for Energy and Chemical Plant

Available grade	Achieved

Guidance Information

1 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.

2 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.

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

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.

Replacement information	This unit standard was replaced by skill standard 40372.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

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	31 December 2027
Review	10	30 January 2025	31 December 2027

Consent and Moderation Requirements (CMR) reference	0079

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.