Title	**Demonstrate knowledge of and operate product separation equipment to separate product in an energy and chemical plant**		
Level	**4**	**Credits**	**10**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of separation equipment in an energy and chemical plant; separate product; and identify corrective actions for deviations from stable conditions, and emergency situations and procedures in a product separation process, in an energy and chemical plant.

Classification	Energy and Chemical Plant > Operation of 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 – energy and chemical, 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.
- evidence for all outcomes must be presented in accordance with organisational requirements.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of separation equipment in an energy and chemical plant.

Performance criteria

1.1 Identify and describe separation equipment in terms of its purpose.

Range equipment may include but is not limited to – towers, columns, strippers, absorbers, accumulators, scrubbers, tanks, condensers, centrifuges, steam separators, precipitators, coalescer, interface separators, phase separators, knockout pots and cyclones; evidence of at least ten is required.

1.2 Describe the reasons for the selection of materials used in the construction of separation equipment in terms of their properties.

Range mild steel, alloy steels, non-ferrous metals, ceramics.

1.3 Describe separation equipment in terms of causes and effects of corrosion, erosion, expansion, and thermal stress.

1.4 Describe the basic principles of design and operation of the separation vessel and its auxiliary equipment.

Range distillation, centrifugal, density, chemical, low temperature (Joule-Thomson effect).

1.5 Describe the requirements for certification of separation equipment.

1.6 Identify potential hazards of incorrect operation and describe the steps to avoid them.

Range flooding, carry over, low residence time, poor separation.

1.7 Describe preventative maintenance and routine procedures for separation equipment.

1.8 Describe storage of separation equipment in terms of the principles of long, medium, and short-term storage.

Range nitrogen capping, dry storage, chemical storage.

Outcome 2

Separate product in an energy and chemical plant.

Performance criteria

2.1 Assess upstream and downstream effects of the separation to determine operating requirements.

2.2 Identify control systems for separation equipment and auxiliary systems.

Range flow, pressure, temperature, level.

2.3 Demonstrate the operation of separation equipment.

Range start, shut down, isolate, control.

2.4 Report and log separation actions.

2.5 Operate separation equipment to achieve optimum efficiency.

Range product specifications, product throughout, environmental impact, product quality.

Outcome 3

Identify corrective actions for deviations from stable conditions, and emergency situations and procedures in a product separation process in an energy and chemical plant.

Performance criteria

3.1 Identify corrective actions for any deviations from stable operating conditions.

Range flooding carry over, low residence time, poor separation, blockages.

3.2 Identify equipment protection systems in terms of their purpose, and inputs.

Range trip systems, purge systems, over and under pressure relief, instrumentation, fire protection systems.

3.3 Identify and describe emergency situations and procedures.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	6 February 1997	31 December 2018
Revision	2	3 August 2000	31 December 2018
Review	3	24 January 2002	31 December 2018
Review	4	20 February 2009	31 December 2018
Rollover and Revision	5	20 April 2017	31 December 2022
Review	6	27 February 2020	N/A

Consent and Moderation Requirements (CMR) reference	0079

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 if you wish to suggest changes to the content of this unit standard.