

Field Manufacturing

Review of *Energy and Chemical Plant* unit standards

Subfield	Domain	ID
Energy and Chemical Plant	Monitoring of Energy and Chemical Plant	3060, 21452, 28157, 28158
	Operation of Energy and Chemical Plant	3032, 3035-3037, 3045, 3047, 3048, 3051, 3053, 4553, 17604, 17608-17611, 21454-21466, 28159-28167, 28283, 28284
	Safety and Legislation for Energy and Chemical Plant	3046, 3058, 3064, 21468, 21469, 28168

The Primary ITO has completed the review of the unit standards listed above.

Date new versions published

February 2020

Planned review date

December 2024

Summary

The review commenced in July 2019 as the unit standards had reached their scheduled review date and to take into account changes to qualification graduate outcomes in the New Zealand Certificate in Energy and Chemical Operations (Boiler Operation) (Level 3) [Ref: 2306], the New Zealand Certificate in Energy and Chemical Field Operations (Level 4) with strands in Advanced Steam Generation Plant Operation, Chemical Plant Operation, Geothermal Plant Operation, Petrochemical Plant Operation, and Petrochemical Transfer and Storage (with optional strands in Gas Turbine Operation, and Steam Turbine Operation) [Ref; 2307], and the New Zealand Certificate in Energy and Chemical Process Operations (Level 5) [Ref: 2308].

A Working Group was convened with members representing all sectors of energy and chemical operations, for example; steam plant, chemical plant, geothermal, petrochemical, and gas and steam turbine. Organisations included the food processing industries (for example, dairy, meat), agrichemical manufacturing, electricity providers, and engineering companies. Working Group members had the responsibility of contributing their expertise to unit standard updates as well as liaising with their networks over the duration of the review. The Working Group met in late July 2019 and changes were proposed to unit standards to meet current industry requirements. Subsequent consultation with the Working Group was carried out by email and phone during August and September.

Updated unit standards were finalised in late September and sent out for wider stakeholder consultation by online survey in October. Feedback was discussed with the Working Group and changes were incorporated where appropriate.

Main changes

- Credits were increased and decreased for some unit standards to better reflect the time taken to learn, practice and be assessed for the skills and knowledge specified in the unit standards.
- The level increased for unit standards 21459 and 21460; and decreased for unit standard 3035 to better align with the level descriptors.
- Titles were updated for some standards to better reflect the outcomes.
- Content changed significantly to reflect current industry practices for unit standards 21452, 21458, 28158, and 28284.
- Four new unit standards were written to cover gaps that were identified through the review process.

Category C unit standards will expire at the end of December 2022

The last date for assessment of superseded versions of Category B unit standards is December 2022

Detailed list of unit standards – classification, title, level, and credits

All changes are in **bold**.

Key to review category	
A	Dates changed, but no other changes are made - the new version of the standard carries the same ID and a new version number
B	Changes made, but the overall outcome remains the same - the new version of the standard carries the same ID and a new version number
C	Major changes that necessitate the registration of a replacement standard with a new ID
D	Standard will expire and not be replaced

Manufacturing > Energy and Chemical Plant > Monitoring of Energy and Chemical Plant

ID	Title	Level	Credit	Review Category
3060	Take and process product samples in an energy and chemical plant Demonstrate knowledge of, take, and process product samples in an energy and chemical plant	3	3	B
21452 32029	Monitor routine energy and chemical plant operations Describe and monitor routine energy and chemical plant operations, and carry out operational handover	3 3	5 5	C
28157	Demonstrate knowledge of types of instrumentation used in the energy and chemical industry Demonstrate knowledge of instruments used in the energy and chemical industry	3	5	B
28158 32030	Operate control systems in an energy and chemical plant Demonstrate knowledge of and operate control systems in an energy and chemical plant	4 4	15 15	C

Manufacturing > Energy and Chemical Plant > Operation of Energy and Chemical Plant

ID	Title	Level	Credit	Review Category
3032	Operate valves in an energy and chemical plant Describe and operate valves in an energy and chemical plant	4	10 7	B
3035	Operate fired pressure equipment in an energy and chemical plant Demonstrate knowledge of and operate fired pressure equipment in an energy and chemical plant	5 4	10	B
3036	Operate unfired pressure equipment in an energy and chemical plant Demonstrate knowledge of and operate unfired pressure equipment in an energy and chemical plant	4	8	B

ID	Title	Level	Credit	Review Category
3037	Operate and monitor an advanced steam generation process Demonstrate knowledge of, operate, and monitor an advanced steam generation process	5	15 20	B
3045	Operate solid handling systems in an energy and chemical plant Demonstrate knowledge of and operate solid handling systems in an energy and chemical plant	3	5	B
3047	Interpret, use, and sketch process drawings for an energy and chemical plant Demonstrate knowledge of, interpret, and sketch process drawings for an energy and chemical plant	3	5	B
3048	Operate product storage equipment in an energy and chemical plant Demonstrate knowledge of and operate product storage equipment in an energy and chemical plant	4	8	B
3051	Operate heat exchange equipment in an energy and chemical plant Demonstrate knowledge of heat transfer and exchange, and operate heat exchange equipment in an energy and chemical plant	4	7	B
3053	Operate a gas turbine in an energy and chemical plant Demonstrate knowledge of and operate a gas turbine in an energy and chemical plant	4	10 20	B
4553	Operate equipment used in an energy and chemical plant Describe, operate, and monitor pumps, fans, and compressors used in an energy and chemical plant	3	5 10	B
17604	Operate primary treatment systems for effluent water in an energy and chemical plant Demonstrate knowledge of and operate primary treatment systems for effluent water in an energy and chemical plant	4	8	B
17608	Operate sludge treatment systems for effluent water in an energy and chemical plant Demonstrate knowledge of and operate sludge treatment systems for effluent water in an energy and chemical plant	4	8	B
17609	Operate geothermal binary plant in the energy and chemical industry Describe and operate geothermal binary plant in the energy and chemical industry	4	20	B
17610	Operate pre-treatment systems for effluent water in an energy and chemical plant Describe and operate pre-treatment systems for effluent water in an energy and chemical plant	4	8	B
17611	Operate biological treatment systems for effluent water in an energy and chemical plant Demonstrate knowledge of and operate biological treatment systems for effluent water in an energy and chemical plant	4	8	B
21454	Operate refrigeration equipment in an energy and chemical plant Demonstrate knowledge of and operate refrigeration equipment in an energy and chemical plant	4	10	B

ID	Title	Level	Credit	Review Category
21455	Purge systems in an energy and chemical plant Describe purging, and purge systems in an energy and chemical plant	4	10	B
21456	Operate systems for boiler feedwater treatment Demonstrate knowledge of and operate systems for boiler feedwater treatment	4	15	B
21457	Isolate and reinstate a section of an energy and chemical plant Demonstrate knowledge of the principles of isolating and isolate and reinstate a section of an energy and chemical plant	4	6 10	B
21458	Operate a steam turbine in an energy and chemical plant 32061 Demonstrate knowledge of and operate a steam turbine in an energy and chemical plant	4 4	20 20	C
21459	Demonstrate knowledge of pipework and fittings used in an energy and chemical plant Demonstrate knowledge of pipework and fittings used in an energy and chemical plant	2 3	5	B
21460	Meet requirements of person responsible for an unattended small steam or hot water boiler	3 4	8 10	B
21461	Demonstrate knowledge of the basic principles of steam generation and of combustion theory relating to boiler operation Demonstrate knowledge of the basic principles of steam generation and combustion relating to boiler operation	3	5	B
21462	Demonstrate knowledge of the basic equipment and systems used for steam generation in a boiler operation Demonstrate knowledge of the equipment and systems used for steam generation in boilers	3	8	B
21463	Perform boiler plant operations Demonstrate knowledge of and perform boiler plant operations	4	15	B
21464	Demonstrate knowledge of basic thermodynamics relevant to the energy and chemical industry Demonstrate knowledge of basic thermodynamics relevant to the energy and chemical industry	3	5	B
21465	Operate pumps in an energy and chemical plant Describe and operate pumps in an energy and chemical plant	4	8	B
21466	Operate compressors in an energy and chemical plant Describe and operate compressors in an energy and chemical plant	4	8	B
28159	Demonstrate knowledge of geothermal processes and equipment in an energy and chemical plant	4	15 10	B
28160	Operate geothermal steam-field equipment and processes in an energy and chemical plant	4	20	B
28161	Demonstrate knowledge of unfired pressure equipment used in the energy and chemical industry Demonstrate knowledge of unfired pressure equipment used in the energy and chemical industry and plant	3	5	B

ID	Title	Level	Credit	Review Category
28162	Operate systems for process start-up and shutdown in an energy and chemical plant Describe and carry out process start-up and shutdown in an energy and chemical plant	5	20	B
28163	Control process conditions in an energy and chemical plant Describe and control normal and abnormal process conditions in an energy and chemical plant, and recommend improvements	5	30	B
28164	Apply a safe work management system in an energy and chemical plant Describe and apply safe work management system in an energy and chemical plant	5	20	B
28165	Coordinate an outage in a complex energy and chemical plant	5	30	B
28166	Analyse energy and chemical plant operations to determine compliance and risk implications Analyse commercial operational compliance and risks and develop a risk action plan in an energy and chemical plant	5	10	B
28167	Review process safety incidents in an energy and chemical plant Demonstrate knowledge of and review process safety incidents in an energy and chemical plant	5	10	B
28283	Coordinate and monitor health and safety and risk assessment procedures used in an energy and chemical plant Describe hazard management, and apply and monitor risk assessment procedures in an energy and chemical plant	4	10 5	B
28284	Apply hazard management and risk assessment procedures used in an energy and chemical plant	3	10	C
32107	Demonstrate and apply knowledge of hazards and handling of chemicals in an energy and chemical plant	3	7	
32028	Demonstrate knowledge of work control procedures in an energy and chemical plant	3	3	New
32031	Describe the properties and use of engineering materials used in an energy and chemical plant primary process	4	3	New
32032	Describe, operate, and monitor a generator and associated systems in an energy and chemical plant	4	10	New
32033	Describe, carry out, and receive shift to shift handover of operational plant in the energy and chemical industry	4	4	New

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

ID	Title	Level	Credit	Review Category
3046	Operate energy and chemical plant fire safety equipment Demonstrate knowledge of and operate fire safety equipment in an energy and chemical plant	3	5	B

ID	Title	Level	Credit	Review Category
3058	Perform gas tests for an energy and chemical plant Demonstrate knowledge of gas testing, and perform gas tests in an energy and chemical plant	4	5	B
3064	Control a chemical reaction in an energy and chemical plant Demonstrate knowledge of and control a chemical reaction in an energy and chemical plant	4	8	B
21468	Demonstrate knowledge of energy and chemical plant pollutants and their control measures	3	5	B
21469	Identify, use, and monitor safety equipment in an energy and chemical plant Demonstrate knowledge of, use, and monitor safety equipment in an energy and chemical plant	3	5	B
28168	Use boiler house chemicals in an energy and chemical plant Demonstrate knowledge of and use boiler house chemicals in an energy and chemical plant	3	5 7	B