Title	**Demonstrate knowledge of, and operate and control the plastics extrusion process**		
Level	**3**	**Credits**	**15**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the operation; and the construction of a plastics extrusion line; apply and control plastics extrusion line settings; operate a plastics extrusion process line; demonstrate knowledge of, select, set up, and test ancillary equipment; identify and describe the correction of routine product extrusion faults; describe consequences of not applying quality procedures during extrusion, and actions to be taken when products do not meet specifications; perform a material or colour changeover, and restart a pre-set plastics extrusion line; and demonstrate knowledge of the construction of advanced plastics extrusion tooling.

Classification	Plastics Processing Technology > Extrusion

Available grade	Achieved

Explanatory notes

1 Legislation relevant to this unit standard includes but is not limited to the Health and Safety at Work Act 2015.

2 Definition
Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

3 All evidence requirements must be performed in accordance with workplace procedures.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of the operation of a plastics extrusion line.

Evidence requirements

1.1 Extrusion dies are identified and their construction and operation are described.

Range extrusion dies – rod, sheet, pipe, profile.

1.2 Extrusion equipment for rod, sheet, pipe, and profile products are identified, and their construction and operation are described.

Range construction and operation of at least two of – pay off, sizing, cooling, haul off, printing, embossing, indenting, cutting, belling, packaging, coiling, on-line measuring.

Outcome 2

Demonstrate knowledge of the construction of a plastics extrusion line.

Evidence requirements

2.1 Extruder components are identified and their purpose is described.

Range examples of components are – safety features, screw and barrel, loading devices, barrel heating and cooling, screw cooling, die, diehead, screen pack, barrel venting, main drive, gearbox, thrust assembly;
evidence is required for at least eight components.

2.2 Pre- and post-extrusion and ancillary equipment are identified and their purpose is described.

Range examples of equipment functions are – pay off, cooling and sizing, haul off, printing, marking, measuring, testing, cutting, coiling, belling, packaging;
evidence is required for at least six items.

2.3 Plant services to the extrusion line are identified and their purpose and controls are described.

Range plant services – electrical, water, compressed air, vacuum.

Outcome 3

Apply and control plastics extrusion line settings.

Range evidence is required for one extrusion line set-up.

Evidence requirements

3.1 Machine set-up information is interpreted and the extrusion line is set up.

3.2 Extrusion line settings are controlled to maintain product specification, and are reported to supervisor.

Outcome 4

Operate a plastics extrusion process line.

Range product examples are – pipe, sheet, profiles, corrugated pipe, belled pipe, corrugated sheet, labelled product, printed product;
evidence is required for two products.

Evidence requirements

4.1 Extrusion operations are performed and quality inspection procedures are consistently applied.

Range extrusion operations examples are – product removal, product finishing, product handling, product packaging.

4.2 Extrusion equipment is monitored and adjusted to ensure productivity and product quality meets job specification.

Range equipment function examples are – extruder, pay off, cooling and sizing, curing, haul off, printing, marking, measuring, testing, cutting, coiling, belling, packaging;
evidence is required for at least six items of equipment.

Outcome 5

Demonstrate knowledge of, select, set up, and test ancillary equipment.

Range equipment function examples are – pay off, sizing, cooling, haul off, printing, marking, testing, cutting, belling, packaging, coiling, on-line measuring.

Evidence requirements

5.1 Ancillary and down-stream equipment is identified and purpose described.

Range evidence is required for at least three types of equipment.

5.2 Ancillary and downstream equipment is selected, set up, and tested.

Range evidence is required for at least three types of equipment which are different to those provided for evidence requirement 5.1.

Outcome 6

Identify and describe the correction of routine product extrusion faults.

Evidence requirements

6.1 Routine product extrusion faults are identified and their correction is described.

Range examples of routine product extrusion faults are – dimensions, surface appearance, colour, deformations;
evidence is required for at least three different routine product extrusion faults.

6.2 Extrusion process faults are reported.

Outcome 7

Describe consequences of not applying quality procedures during extrusion, and actions to be taken when products do not meet specifications.

Evidence requirements

7.1 The consequences of not applying quality procedures during extrusion are described.

7.2 Actions to be taken if a product does not meet specifications are described.

Range examples of actions are – identification of reject product/s, product isolation, extrusion line adjustment, product rework, negotiation with customer or rejection.

Outcome 8

Perform a material or colour changeover and restart a pre-set plastics extrusion line.

Evidence requirements

8.1 The line is purged of old material.

8.2 The line is shut down.

8.3 The hopper is cleaned of all previous materials.

Range examples of procedures are – hopper cleaning, cleaning and fitting a hopper magnet.

8.4 Raw material and additives for extruding are verified against job specification and loading procedures are followed.

8.5 The line is purged with new material.

8.6 Work area is cleared and cleaned to ensure safe operating conditions.

Range examples of work areas are – floors, stairs, platforms, machine surfaces, ledges, intake and output areas, hand tools.

8.7 Pre-set line is run with the new materials and monitored to meet job specification.

Outcome 9

Demonstrate knowledge of the construction of advanced plastics extrusion tooling.

Evidence requirements

9.1 The construction and applications of advanced extrusion tooling are described using engineering drawings as a reference.

Range advanced extrusion tooling includes – mechanically and thermally auto-centred pipe dies; multi-strand dies; co-extrusion dies for sheet, pipe, and profile.

Planned review date	31 December 2021

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	15 September 2016	N/A

Consent and Moderation Requirements (CMR) reference	0013

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

Please note
Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.