Title	**Demonstrate knowledge of heat, moisture, air-flow, corrosion, and wind loadings relative to roof structures**		
Level	**4**	**Credits**	**5**

Purpose	This unit standard is intended for use in the training and assessment of people carrying out roof installation and covers causes, effects and solutions relating to heat, moisture, air-flow, corrosion, and wind loadings relative to roof structures. people credited with this unit standard are able to: - demonstrate knowledge of the effect of ventilation on heat and moisture in a roof cavity; - demonstrate knowledge of how water vapour forms and how the movement of water vapour is controlled in roofs; - demonstrate knowledge of corrosion of roof structures; - describe causes how wind loading affects building design in accordance with Standards; and - describe loads on roofs.

Classification	Plumbing, Gasfitting and Drainlaying > Roofing

Available grade	Achieved

Guidance Information

1 This unit standard has been developed for learning and assessment on-job.

2 References
Construction Contracts Act 2002;
Historic Places Act 1993;
Local Government Act 2002;
Building Act 2004 and associated regulations;
Health and Safety at Work Act 2015;
Resource Management Act 1991;
Acceptable Solutions and Verification Methods for New Zealand Building Code Clause E2 External Moisture;
Licensed Building Practitioner Scheme – Understanding the Regulatory Environment Booklet – available at: http://www.business.govt.nz/lbp/the-board/getting-licensed/applying-for-licensing;
NZS 3604:2011 Timber-framed buildings;
NZS 3902:2004 Housing, alterations and small buildings contract;
NZS 4121:2001, Design for access and mobility: Buildings and associated facilities;
New Zealand Building Code Hand Book – available at: http://www.building.govt.nz/building-code-compliance/building-code-and-handbooks/building-code-handbook;

and all subsequent amendments and replacements.

3 This unit standard applies to both new roof and re-roofing installations.

4 Range
- a Candidates must refer to current legislation and Standards during assessment.
- b Demonstration of safe working practices are essential components of assessment of this unit standard.
- c All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:
  - i legislation;
  - ii policies and procedures;
  - iii ethical codes;
  - iv Standards – may include but are not limited to those cited in the New Zealand Building Code handbook;
  - v applicable site, enterprise, and industry practice; and,
  - vi manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the effect of ventilation on heat and moisture in a roof cavity.

Performance criteria

1.1 Identify thermal insulation types and the effect that the insulation has on temperature.

Range cold, warm, inverted roofs;
insulation types – bulk, reflective.

1.2 Describe the requirements of the Building Code for cavity ventilation.

1.3 Identify the advantages of proper ventilation.

Range evidence of four advantages is required.

Outcome 2

Demonstrate knowledge of how water vapour forms in roof structures, its effect on roof structures and how it is managed.

Performance criteria

2.1 Describe the relationship between night sky radiation, water vapour, and condensation.

2.2 Explain how condensation is formed in roofs and the effect condensation has on roofing materials and structures.

Range includes but is not limited to – metal, timber, translucent sheeting, underlay; roof types – attic, skillion.

2.3 Explain how condensation can be managed or minimised in roof structures.

Range insulated, un-insulated roofs structure configurations – attic, skillion, underlay.

Outcome 3

Demonstrate knowledge of corrosion of roof structures.

Performance criteria

3.1 Describe environmental and atmospheric corrosion and its effects on roof structures.

3.2 Describe galvanic corrosion and its effect on roof structures.

3.3 Describe elimination and minimisation techniques that can be used to reduce corrosion.

Range New Zealand Building Code E2 AS1 Table 20.

3.4 Identify compatible materials and incompatible material combinations and describe the effects of the incompatibility.

Range evidence of four compatible and four incompatible material combinations is required.

Outcome 4

Describe how wind loading affects building design in accordance with Standards.

Performance criteria

4.1 Describe the purpose of AS/NZS 1170 and NZS 3604 and where information can be obtained about localised wind zones.

4.2 Describe the impacts of wind loading on building design and components.

Range fasteners, roof framing, structures.

Outcome 5

Describe loads on roofs and identify ways to minimise roof loading.

Performance criteria

5.1 Describe loads on roofs in terms of cause and effect and outline methods to minimise roof loading.

Range includes but is not limited to – uniformly distributed load, point load, peripheral load, snow and hail load, load of the structure, design load.

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	23 January 2009	31 December 2020
Review	2	16 March 2017	31 December 2027
Rollover	3	25 August 2022	31 December 2027
Review	4	28 November 2024	31 December 2027

Consent and Moderation Requirements (CMR) reference	0003

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