Title	**Demonstrate knowledge of, and replace and test static seals in machinery**		
Level	**4**	**Credits**	**5**

Purpose	This unit standard is intended for mechanical engineering trainees who already have basic knowledge of dynamic and static seals and require recognition of competence in knowledge of, and applied skill, in replacement and testing of static seals. People credited with this unit standard are able to demonstrate knowledge of selection considerations for static seals; demonstrate knowledge of causes of failure and failure analysis for static seals; prepare for replacement; replace and test; and analyse failure of four different static seals.

Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering

Available grade	Achieved

Prerequisites	Unit 21912, *Apply safe working practices on an engineering worksite*, or demonstrate equivalent knowledge and skills.

Guidance Information

1 References
Health and Safety at Work Act 2015.
Culley, R (2003). *Fitting and Machining*. Melbourne, Australia, RMIT Publishing.

2 Definitions
Accepted industry practice – approved codes of practice and standardised procedures accepted by the wider mechanical engineering industry sectors as examples of best practice.
PTFE – polytetrafluoroethylene.
Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

3 Recommended for entry
Unit 30284, *Demonstrate and apply knowledge of the construction, function, and application of seals in mechanical engineering.*

4 Related unit standards
This unit standard is one of a set of unit standards covering seals used in mechanical engineering:
- Unit 30284, *Demonstrate and apply knowledge of the construction, function, and application of seals in mechanical engineering* (Level 3); an introductory standard for general use across mechanical engineering trades.
- Unit 30285, *Demonstrate knowledge of and replace and test dynamic seals in machines and equipment* (Level 4); a dynamic seal specific standard for those working in assembly and maintenance of components.
- Unit 30286, *Demonstrate knowledge of, and replace and test static seals in machines and equipment* (Level 4); a static seal specific standard for those working in assembly and maintenance of components.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of selection considerations for static seals.

Performance criteria

1.1 Static seal types and material attributes are explained in the context of common seal use and performance.

Range explanation includes – material hardness, temperature resistance, chemical resistance, fluid compatibility, resistance to deformation from force, durability;
materials – graphite, PTFE, rubber, cork, paper, compressed fibre, copper, silicone, teflon, sealing compounds.

1.2 The process of selecting static seals is explained in terms of determining and verifying requirements, accessing and evaluating information, and selecting and verifying seal selection.

1.3 Factors that require customised static seal selection and matching are explained in accordance with accepted industry practice.

Range factors – non-standard components; changes to component sealing surfaces due to wear, movement or deterioration.

1.4 Options for custom seal type and fitting are identified and explained in accordance with accepted industry practice.

Outcome 2

Demonstrate knowledge of causes of failure and failure analysis for static seals.

Performance criteria

2.1 Causes of static seal failure are identified and explained for common machinery seal types.

Range seal types – flat sheet and composite gaskets, sealing washers, O-rings, metal-to-metal joints, sealing compounds.

2.2 Seal failure analysis process is explained to identify causes and reduce future failures.

Outcome 3

Prepare for replacement of static seals.

Range four seals;
examples of static seals are – composite gaskets, sealing washers, O-rings, metal-to-metal joints, sealing compounds.

Performance criteria

3.1 Replacement seal parts are identified, selected, and prepared for fitting in accordance with accepted industry practice.

3.2 Tools and replacement method are determined relevant to seal assembly type.

Outcome 4

Replace and test different static seals.

Range four seals;
examples of static seals are – composite gaskets, sealing washers, O-rings; metal-to-metal joints, sealing compounds.

Performance criteria

4.1 Existing seals are removed in accordance with accepted industry practice.

4.2 Seal surfaces are inspected for damage and prepared in accordance with accepted industry practice.

4.3 Replacement seal fit is verified in accordance with actual sealing surface dimensions.

4.4 Replacement seals are fitted in accordance with accepted industry practice.

4.5 Replaced seals are tested for leaks in accordance with service requirements.

4.6 Records for seal replacement are completed in accordance with workplace procedures.

Outcome 5

Analyse failure of different static seals.

Range four seals;
examples of static seals are – composite gaskets, sealing washers, O-rings, metal-to-metal joints, sealing compounds.

Performance criteria

5.1 Analysis establishes causes of failure and findings are recorded to reduce or prevent future seal failures.

Replacement information	This unit standard replaced unit standard 2403.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 July 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013

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

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.