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| **Title** | **Assemble, fit and test precision components** | | |
| **Level** | **4** | **Credits** | **10** |

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| **Purpose** | This unit standard is for people engaged in assembly and fitting of mechanical engineering components to precision tolerances.<br><br>People credited with this standard are able to prepare to assemble and fit, inspect, assemble and fit precision components; and test precision component assembly. |

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| **Classification** | Mechanical Engineering > Mechanical Assembly |

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| **Available grade** | Achieved |

**Guidance Information**

1 References
Health and Safety at Work Act 2015.
SAA/SNZ HB1:1994 *Technical drawing for students*, Standards New Zealand.
Boundy, A; *Engineering Drawing, 8th edition.* McGraw-Hill Australia, 2011; ISBN 0071016767.

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.
*Assembly* – a group of components that fit together and require fits and tolerances to be applied.
*Precision components* – components that are fitted using fits and tolerances.
*Precision measuring equipment* – precise measuring equipment suitable for the application of fits and tolerances.
*Specifications* – detail that defines an object being made; commonly communicated by annotated and dimensioned drawings; by written description, or by other communication media. External references may also be used to specify objects such as tables or industry standards.
*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 Assessment information
This unit standard is one of a servicing and fitting set that is intended to be assessed in the following order:

- Unit 29676, *Demonstrate and apply knowledge of good work practices when servicing simple components under supervision* (Level 2), a basic introductory standard assessed under supervision.
- Unit 30438, *Dismantle, inspect, and assemble component parts within assemblies* (Level 3); covers dismantling and assembly for all engineering trades, typically using measuring equipment such as feeler gauges, vernier callipers, and dial indicators.
- Unit 4438, *Demonstrate knowledge of fits, limits, and tolerances in engineering* (Level 3); covers base knowledge of fits and tolerances that is required for application in unit standard 22914.
- Unit 30439, *Assemble, fit and test precision components* (Level 4); covers the application of fits and tolerances using precision measuring equipment.

4 Timeframe
All activities are expected to be completed within commercially acceptable timeframes.

## Outcomes and performance criteria

### Outcome 1

Prepare to assemble and fit precision components.

Range examples of assemblies are – tool and die, complex couplings, pumps, gearboxes, manifolds, fluid power assemblies.
evidence of four assemblies is required.

### Performance criteria

1.1 Tools and equipment, assembly documentation, and materials are determined and prepared in accordance with job requirements.

Range examples of documentation are – manufacturer's specifications, instructions, drawings, parts documentation.

1.2 Procedure for assembly is determined in accordance with manufacturer’s instructions or accepted industry practice.

1.3 Manufacturer’s instructions, or drawings are referenced to determine specified tolerance of geometry features.

1.4 Size tolerance of components is determined from tables of limits, fits and tolerances.

Range shaft basis or hole basis.

**Outcome 2**

Inspect, assemble and fit precision components.

Range assemblies from outcome 1.
geometry tolerance measurement examples are – flatness, straightness, perpendicularity, concentricity, parallelism, circularity, cylindricity, circular run out, total run out, position, symmetry, concentricity, coaxiality.
size tolerance – holes basis or shaft basis.
Examples of appropriate precision measuring equipment are – micrometers (external, internal, depth), ball gauge, telescopic gauge, dial test indicator, laser alignment equipment, torque wrench.

**Performance criteria**

2.1 Components are inspected, assembled and fitted in accordance with size and geometry tolerance specifications, using appropriate precision measuring equipment.

2.2 Any out of specification components are corrected or replaced in accordance with workplace procedures.

**Outcome 3**

Test precision component assembly.

**Performance criteria**

3.1 Component assemblies are tested, and adjusted where necessary, to confirm conformance with specification.

3.2 Assembly test records are documented in accordance with workplace procedures.

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| **Replacement information** | This unit standard replaced unit standard 22914. |

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| **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 |

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| **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.