



Australian Government

MEM48001 Test the mechanical properties of materials

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM301A Test the mechanical properties of materials.

Application

This unit of competency defines the skills and knowledge required to carry out mechanical destructive tests on materials and interpret the results.

It applies where a technician will be required to undertake a range of mechanical tests on samples of materials and to draw some conclusions from those tests with regard to the mechanical properties of the material.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil.

Competency Field

Metallurgy

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.4 Identify job requirements from work information
2. Select testing procedures and/or standards	2.1 Identify the relevant testing standard and specifications 2.2 Determine the need for testing using certified equipment 2.3 Select appropriate procedures and/or standards for the requirements of the test

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.4 Prepare sample according to procedures 2.5 Arrange for external testing to meet job requirements
3. Conduct tensile testing	3.1 Undertake tensile test to specifications, noting relevant data 3.2 Calculate tensile and/or compressive properties 3.3 Draw relevant conclusions from the tensile test
4. Conduct hardness testing	4.1 Identify appropriate method of hardness testing 4.2 Undertake hardness test to specifications, noting relevant data 4.3 Calculate hardness properties 4.4 Draw relevant conclusions from the hardness test
5. Conduct impact testing	5.1 Undertake impact test to specifications, noting relevant data 5.2 Determine impact properties 5.3 Draw relevant conclusions from the impact test
6. Conduct fatigue and/or flexing testing	6.1 Undertake fatigue and/or flexing testing to specifications noting relevant data 6.2 Interpret fatigue and/or flexing data 6.3 Draw relevant conclusions from the fatigue and/or flexing test
7. Conduct creep testing	7.1 Undertake creep testing to specifications, noting relevant data 7.2 Interpret creep data 7.3 Draw relevant conclusions from the creep test
8. Undertake strain measurements	8.1 Identify appropriate method of strain measurement 8.2 Undertake strain measurement and note relevant data 8.3 Interpret strain measurement results 8.4 Draw relevant conclusions from strain measurements
9. Conduct static shear and bend test	9.1 Identify appropriate method of static shear and bend test 9.2 Undertake static shear and bend tests to specifications, noting relevant data 9.3 Interpret static shear and bend test data 9.4 Draw relevant conclusions from static shear and bend tests

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
10. Report result of tests	10.1 Identify reporting requirements 10.2 Prepare report to meet requirements 10.3 Circulate and file report to procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Mechanical tests include:	- tensile - impact - hardness - fatigue and flexing - creep.
Materials include one or more of the following:	- metals - polymer-based materials - other solid materials on which mechanical testing is relevant.
Testing standards include one or more of the following:	- Australian/New Zealand Standards (ASNZ) - International Organization for Standardization (ISO) - ASTM International - Deutsches Institut für Normung (DIN).
Tensile and/or compressive properties include:	- tensile strength - compressive strength - elongation - reduction of area - yield stress - yield point - proof stress

	• Young's modulus • elastic and plastic region and deformation or viscoelastic deformation.
Impact test includes:	• Izod • Charpy • drop-weight tear • non-destructive tests (NDT).
Impact properties include:	• impact tensile test (ITT) • notch sensitivity.
Hardness test includes:	• Vickers • Brinell • Rockwell • durometer tests.
Strain measurements include:	• foil method • extensometer • destructive tests.

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>