



Australian Government

MEM48026 Analyse metallurgical failures of components and recommend preventative measures

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM515A Analyse metallurgical failures of components and recommend preventative measures.

Application

This unit of competency defines the skills and knowledge required to identify and analyse metallurgical failures in engineering components where the failure is suspected of being related to the production or composition of the component and recommend preventative measures.

It applies to technician level activities in manufacturing or engineering environments.

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

Pre-requisite Unit

MEM48004 Interpret basic binary phase diagrams

MEM48006 Prepare and examine metallographic samples

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 Identify job requirements from work information
2. Prepare failed component for failure analysis	2.1 Identify, clean and prepare inspection areas for testing using appropriate procedures and materials 2.2 Carry out preparation processes in accordance with the relevant procedures and statutory and work requirements

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.3 Assess inspection areas visually and identify any defects
3. Perform failure analysis	3.1 Select the most appropriate test for the material or application 3.2 Select and prepare test equipment in accordance with standards and/or procedures 3.3 Perform failure analysis on engineering components 3.4 Check test equipment for defects and maintain and store in accordance with procedures and manufacturer instructions
4. Interpret and report the results and recommend preventative action	4.1 Assess indications and classify defects that are detected in accordance with national and international codes and standards 4.2 Confirm defects in accordance with enterprise procedures and industry practices 4.3 Report test results in accordance with enterprise procedures, accepted industry practices and customer service requirements 4.4 Make recommendations to prevent future failures

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.

Preparation processes include:	• surface cleaning • surface drying • preservation of fracture surfaces.
Most appropriate tests include one or more of the following:	• non-destructive testing • mechanical testing • microscopic and microscopic preparation of metallographic

	sections • scanning electron microscopy (SEM) evaluation for fracture mode • energy dispersive spectroscopy (EDS) for chemical inconsistencies • chemical analysis • application of fracture mechanics • simulated service testing • analysing the evidence.
Report includes:	• accurate identification of cause of failure • recommendation of preventative measures.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM515A Analyse metallurgical failures of components and recommend preventative measures.

Links

Companion Volume implementation guides are found in VETNet -

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