



Australian Government

**Assessment Requirements for MEM48026
Analyse metallurgical failures of
components and recommend preventative
measures**

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Modification History

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

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, drawings and other applicable reference documents in analysing metallurgical failures of components and recommending preventative measures
- identifying inspection areas
- conducting visual inspections and identifying discontinuities and defects
- selecting and using appropriate testing techniques, procedures and equipment on at least two occasions
- performing appropriate measurements associated with the selected test on at least two occasions
- undertaking root cause analysis on at least two occasions
- reporting test results and making recommendations to prevent future failures.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- cleaning and preparation processes for different test surfaces
- procedural, statutory and work health and safety (WHS) requirements in relation to the preparation process
- established assessment procedures and techniques
- testing techniques, procedures, tools and equipment
- maintenance and storage procedures for test equipment
- common faults, damage and defects
- meaning and application of national and international codes and standards
- methods and procedures for reporting test results
- implications of test results for the particular material and/or application

- types of discontinuities and their effect on the material including:
 - plastic deformation including:
 - elastic and plastic strain, dislocations, pile-up and interaction
 - work hardening
 - changes in strength, ductility, yield point, hardness, conductivity and corrosion resistance
 - annealing including:
 - dislocation movement and realignment during heating
 - recovery, nucleation of strain free areas, recrystallisation and grain growth
 - accompanying changes in mechanical and physical properties
 - hot and cold working including:
 - changes in deformation mechanism with rising heat input
 - the effects of strain rate and temperature on work hardening
 - recrystallisation and dynamic recovery
 - resulting microstructure and properties
 - ductile and brittle fracture including:
 - crack theory and mechanism of fracture
 - factors affecting fracture modes
 - fatigue including:
 - mechanism of fatigue crack nucleation
 - mechanism of fatigue crack growth
 - engineering considerations of fatigue and metallurgical factors affecting fatigue
 - creep including:
 - creep mechanisms
 - metallurgical factors affecting creep.
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Assessment Conditions

- Assessors must:
 - have vocational competency in analysing metallurgical failures of components and recommending preventative measures at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.

- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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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>