



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MSATCM402A Monitor and test sands, cores and moulds**

**Revision Number: 1**

## MSATCM402A Monitor and test sands, cores and moulds

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit Descriptor</b>	This unit covers the knowledge and skills needed to analyse <i>mould/core</i> performance in terms of their design and sands used.
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### Application of the Unit

<b>Application of the unit</b>	In a typical scenario, a technician will be required to draw conclusions as to the appropriateness of mould/core design and sand type chosen, and make recommendations as to design of mould/cores and selection of sands.
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### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

<b>Pre-requisite Units</b>		

## Employability Skills Information

<b>Employability Skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Not applicable.

## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1. Control hazards	1.1. Identify hazards in the sand/mould/core making process 1.2. Assess the risks arising from those hazards 1.3. Implement procedures to control those hazards in line with procedures and duty of care.
2. Select appropriate sand characteristics for job and process	2.1. Determine requirements of the casting 2.2. Identify types of sand appropriate for the type of mould/core 2.3. Identify types of binders appropriate for the job 2.4. Select sand/binder mix appropriate for the job
3. Prepare, test and evaluate moulding sand to desired characteristics	3.1. Monitor preparation of bonded sand mix 3.2. Test materials prepared 3.3. Evaluate test results and report as appropriate
4. Evaluate finished casting for defects related to sand characteristics.	4.1. Examine casting for sand related defects such as wash, expansion, scabbing, rat-tails etc. 4.2. Determine cause of sand related defects 4.3. Recommend improvements to sand type and/or preparation
5. Report results	5.1. Identify reporting requirements 5.2. Prepare report to meet requirements 5.3. Circulate and file report to procedures

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- take samples
- prepare standard samples
- use test equipment
- use and calibrate mixing machines

#### Required knowledge:

Competency includes sufficient knowledge of:

- Sources of sands and their characteristics
- green sand, resin and silicate bond moulds , shell moulds
- relationship of moulding sand properties and characteristics to casting defects.
- expansion, scabbing, rat-tails, hardness.
- sand grain shape and distribution, permeability, gas evolution, blow holes.
- mould properties, green strength, shatter.
- refractoriness
- mould dilation
- definition of clay bonded sand
- testing clay bonded sand
- A.F.S. standard compression sample
- moisture content
- clay content
- green compression
- green permeability
- mould hardness
- shatter index
- sieve analysis
- loss of ignition (LOI)
- A.F.S. fineness number
- other tests as appropriate
- organic and inorganic bonded and core sands
  - drying oils: stoving, characteristics
  - cold setting oils: characteristics
  - synthetic resins, characteristics and applications
  - shell moulding
  - sodium silicate binders, characteristics
  - phenolic urethanes

**REQUIRED SKILLS AND KNOWLEDGE**

- furfuryl alcohol
- phenolic esters
- alkaline phenolics
- testing hardened sands: tensile
- compression hardness
- choice of binder.

## Evidence Guide

### EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

A person who demonstrates competency in this unit must be able to monitor and test sands, cores and moulds. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- Prepare and test sand samples
- Monitor and interpret results
- Apply corrections to the sand system as dictated by the sand testing results
- Relate sand-related casting defects to sand properties and recommend corrective actions

#### Relationship to other units

This unit may be assessed concurrently with other relevant units.

#### Assessment method and context

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment.

Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit.

The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace.

The method of assessment should be discussed and agreed with the assessee prior to the commencement of

**EVIDENCE GUIDE**

<b>Resource implications</b>	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an organisation using sand casting. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
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**Range Statement**

<b>RANGE STATEMENT</b>	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
<b>Codes of practice/standards</b>	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
<b>Hazards</b>	Hazards to be identified by standard techniques such as Material Safety Data Sheets (MSDS) and controlled according to the hierarchy of control.
<b>Mould/core</b>	Mould/core means sand mould/core
<b>Bonded</b>	Bonding materials for sand include clay, organic and inorganic binders

**Unit Sector(s)**

<b>Unit Sector</b>	Metallurgy
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## Competency field

Competency Field	
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## Co-requisite units

Co-requisite Units		