



Australian Government

Department of Education, Employment and Workplace Relations

MSATCM305A Demonstrate basic knowledge of casting operations

Revision Number: 1

MSATCM305A Demonstrate basic knowledge of casting operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit describes the skills to discuss basic job requirements with a tradesperson, members of a team, production manager or customer
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Application of the Unit

Application of the unit	This unit covers a basic understanding of the principles and commercial metal casting practices. The unit will enable a person to be able to safely access areas of a metal casting business and to identify and explain casting processes. The unit is suitable as a VET in Schools unit and for introductory training in metallurgy where the person does not have any prior casting work experience. All work is carried out under supervision and in consultation with others.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

Employability Skills Information

Employability Skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate basic knowledge of casting processes	<ul style="list-style-type: none">1.1. Identify the major areas and activities of foundry work including melting, casting, heat treatment, pattern and mould making, finishing and despatch1.2. Identify the major items of equipment and their purpose in each foundry area1.3. Describe the most common metals and alloys used in casting processes1.4. Describe in the correct order the flow of metal through the foundry
2. Demonstrate knowledge of foundry terminology	<ul style="list-style-type: none">2.1. Correct names are used for foundry processes and equipment2.2. Metals and alloys are properly identified including their chemical composition
3. Identify basic understanding of commercial aspects of foundry operations	<ul style="list-style-type: none">3.1. Major advantages and disadvantages of casting over other metal manufacturing processes are identified3.2. Key cost factors are identified including energy, material, labour3.3. A basic understanding of OHS and environmental obligations of foundries is demonstrated

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:

- Explain basic metal casting processes
- Identify basic items of casting equipment
- Identify product flow through a foundry or other casting operation
- Analyse mould materials and casting processes
- Identify casting defects
- Identify and control hazards

Required knowledge:

Competency includes sufficient knowledge of:

- Classification of casting processes
 - Sand casting, investment casting, die casting, lost foam, vacuum process and protective atmospheres, ingot casting
- Preparation of a mould
 - types of mould, shell moulds, dies
 - pattern types, materials, construction, design
 - raw materials: sand, bonds, other additives
 - sand moulding processes, manual moulding, machine moulding
 - moulding equipment, machines and applications, safety around machinery
 - cores, basic coremaking procedures, equipment&machines
 - mould assembly and handling
 - ancillary equipment, sand handling, mould handling and processing
- Preparation of molten alloys
 - ferrous alloys
 - cast irons, white, grey, malleable and SG cast irons
 - cast steels, carbon steels and alloy steels
 - non-ferrous alloys
 - cast aluminium alloys
 - Al-Si alloys
 - cast copper, magnesium, titanium and zinc alloys
- Melting
 - type of furnaces with applications
 - electric-arc furnace, induction furnace
 - structure and melting principles
- Pouring

REQUIRED SKILLS AND KNOWLEDGE

- pouring and molten metal safety
- pouring equipment
- running and gating systems
- solidification process (including grain growth, effects of super heat, mould geometry, chill)
- feeding: risers outline of basic principles
- Cleaning of castings
 - shakeout
 - cleaning room practices: methods and equipment
 - removing the mould materials
 - removing gate and risers
 - finish cleaning
- Inspection of castings
 - visual examination
 - magnetic, penetrant methods,
 - radiographic, ultrasonic methods
 - chemical, metallographic, mechanical testing
- Repair of casting
 - aligning, welding, filling

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 demonstrate basic knowledge of casting operations. 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:

- Correctly identify casting processes and equipment
- Demonstrate knowledge of casting principles and practices. Evidence should be provided that knowledge can be applied to a number of castings using different alloys and or different moulds.

Relationship to other units

This unit may be assessed concurrently with other relevant metallurgy 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 assessment.

EVIDENCE GUIDE**Resource implications**

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 where casting is done. 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.

Range Statement**RANGE STATEMENT**

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.

Codes or practice/standards

Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.

Casting processes

Includes melting, pouring, casting, patternmaking, mould preparation including sand moulds, dies, metal moulds, lost wax and lost foam casting, heat treatment, finishing, despatch and testing

Equipment

Includes equipment associated with the processes listed above

Unit Sector(s)

Unit Sector	Metallurgy
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Competency field

Competency Field	
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Co-requisite units

Co-requisite Units		