



Australian Government

MEM48005 Apply basic knowledge of casting operations

Release: 1

MEM48005 Apply basic knowledge of casting operations

Modification History

Release 1. Supersedes and is equivalent to MSATCM305A Demonstrate basic knowledge of casting operations.

Application

This unit of competency defines the knowledge and skills required to convey basic job requirements with a tradesperson, members of a team, production manager or customer.

It covers a basic understanding of the principles and commercial metal casting practices and will enable a person to be able to safely access areas of a metal casting business and to identify and explain casting processes.

This unit is for introductory training in metallurgy where a person does not have any prior casting work experience. All work is carried out under supervision and in consultation with others.

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 Identify job requirements from work information
2. Apply basic knowledge of casting processes	2.1 Identify the major areas and activities of foundry work including melting, casting, heat treatment, pattern and mould making, finishing and despatch 2.2 Identify the major items of equipment and their purpose in each

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	foundry area 2.3 Identify the most common metals and alloys used in casting processes 2.4 Observe and monitor the flow of metal through the foundry in the correct order
3. Demonstrate knowledge of foundry terminology	3.1 Use correct names for foundry processes and equipment 3.2 Identify properly metals and alloys including their chemical composition
4. Identify basic understanding of commercial aspects of foundry operations	4.1 Identify major advantages and disadvantages of casting over other metal manufacturing processes 4.2 Identify key cost factors including energy, material and labour 4.3 Observe a basic WHS and environmental requirements of foundries

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.

Casting processes includes one or more of the following:	• melting • pouring • casting • patternmaking • mould preparation including sand moulds • dies • metal moulds • lost wax and lost foam casting • heat treatment
--	---

	• finishing • despatch and testing.
--	---

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM305A Demonstrate basic knowledge of casting operations.

Links

Companion Volume Implementation Guides are available on VETNet -

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

Assessment Requirements for MEM48005 Apply basic knowledge of casting operations

Modification History

Release 1. Supersedes and is equivalent to MSATCM305A Demonstrate basic knowledge of casting operations.

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, safety procedures and codes of practice and/or standards
- observing and monitoring product flow through a foundry for at least two metals or alloys
- identifying basic items of casting equipment
- analysing mould materials and casting processes on at least two occasions
- identifying casting defects
- identifying and controlling hazards.

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
- classification of casting processes including:
 - sand casting
 - investment casting
 - die casting
 - lost foam
 - vacuum process and protective atmospheres
 - ingot casting
- preparation of a mould including:
 - types of mould, shell moulds and dies
 - pattern types, materials, construction and design
 - raw materials including sand and bonds
 - sand moulding processes, manual moulding and machine moulding
 - moulding equipment, machines and applications and safety around machinery

- cores, basic core making procedures, equipment and machines
- mould assembly and handling
- ancillary equipment, sand handling, mould handling and processing
- preparation of molten alloys including:
 - ferrous alloys
 - cast irons, white, grey, malleable and SG cast irons
 - cast steels, carbon steels and alloy steels
 - nonferrous alloys
 - cast aluminium alloys
 - aluminium silicon (Al-Si) alloys
 - cast copper, magnesium, titanium and zinc alloys
- melting including:
 - type of furnaces with applications
 - electric-arc furnace and induction furnace
 - structure and melting principles
 - pouring including:
 - pouring and molten metal safety
 - pouring equipment
 - running and gating systems
 - solidification process including grain growth, effects of super heat, mould geometry and chill
- feeding risers outline of basic principles
 - cleaning of castings including:
 - shakeout
 - cleaning room practices including methods and equipment
 - removing the mould materials
 - removing gate and risers
 - finish cleaning
- inspection of castings including:
 - visual examination
 - magnetic and penetrant methods
 - radiographic and ultrasonic methods
 - chemical, metallographic and mechanical testing
- repair of casting including:
 - aligning
 - welding
 - filling.

Assessment Conditions

- Assessors must:
 - have vocational competency in applying basic knowledge of casting operations 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.

Links

Companion Volume Implementation Guides are available on VETNet -

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