



Australian Government

MEM48008 Evaluate mould design and gating

Release: 1

MEM48008 Evaluate mould design and gating

Modification History

Release 1. Supersedes and is equivalent to MSATCM403A Evaluate mould design and gating.

Application

This unit of competency defines the knowledge and skills required to evaluate mould design, gating, running and feeding of castings (known as methoding) including understanding the solidification process and techniques to eliminate defects to meet specified quality requirements.

It applies where a technician will be required to examine a mould design and draw some conclusions as to the appropriateness of gating, running and feeding design, or alternatively make some recommendations as to design.

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

Pre-requisite Unit

MEM48004 Interpret basic binary phase diagrams

MEM48005 Apply basic knowledge of casting operations

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. Identify specification requirements for required casting	2.1 Obtain all relevant job requirements and design specifications in accordance with workplace procedures 2.2 Identify and interpret drawing requirements and specifications

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
3. Evaluate proposed mould design for causes of potential defects	3.1 Select running, gating and feeding principles and techniques relevant to the particular casting 3.2 Apply relevant scientific principles and techniques 3.3 Review placement and sizing of feeder heads 3.4 Calculate the size and number of feeder heads and gating for castings
4. Report results	4.1 Identify reporting requirements 4.2 Prepare report to meet requirements 4.3 Circulate and file report to procedures

Foundation Skills

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.

Calculation of size and number of feeder heads and gating includes one or more of the following:	- ferrous or nonferrous alloys - pressurised or unpressurised gating systems - solidification rate of the material - thermal centre of the casting.
--	--

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM403A Evaluate mould design and gating.

Links

The MEM Metal and Engineering Training Package Companion Volume Implementation Guide is available from VETNet -

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

Assessment Requirements for MEM48008 Evaluate mould design and gating

Modification History

Release 1. Supersedes and is equivalent to MSATCM403A Evaluate mould design and gating

Performance Evidence

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

- Following work instructions, standard operating procedures and safe work practices
- Identifying and interpreting design specifications, drawings, safety procedures and codes of practice/standards for evaluating mould design and gating
- Applying scientific principles to foundry mould design
- Evaluating mould design to suit specific applications
- Calculating mould runner and feeding systems using manual calculations and the use of computer programs
- Selecting appropriate techniques and associated software and hardware technologies to suit specific applications in foundry mould design
- Presenting solutions and any associated limitations referring to the original aim of the application

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
- Solidification including:
 - nucleation
 - growth mechanisms (crystal and interfacial)
 - dendrite coherency
 - constitutional undercooling
 - superheat
 - eutectic and peritectic solidification
 - grain structure
- Running, gating and feeding including:
 - terminology
 - runner and gating principles (ratios)
 - pouring basin or cup
 - sprue design
 - runner design

- ingate design
- inclusion control (slag and erosion)
- metal flow (lamellar and turbulent), velocity and temperature
- modulus principle (calculation of feeder size)
- location of feeders (end and feed zones, neighbourhood effect, feeding distances)
- exothermic and insulating feeding aids (sleeves and topping)
- feeding mechanisms (liquid, mass, interdendritic, burst & solid)
- computer packages (runner and feeder calculations, mould simulations)
- yield calculations
- Defect formation including:
 - shrinkage
 - porosity
 - segregation
 - hot tearing
 - shear

Assessment Conditions

- Assessors must:
 - have vocational competency in evaluating mould design and gating 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 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 suitable access to an operating plant or equipment that allows for appropriate and realistic simulation and documentation including relevant workplace procedures, industry codes and standards.
- 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 found in VETNet -

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