



Australian Government

**MEM07042 Undertake corrections and
basic maintenance to aluminium extrusion
dies and die support systems**

Release: 1

MEM07042 Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems

Modification History

Release 1. Supersedes and is equivalent to MEM07042A Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems

Application

This unit of competency defines the skills and knowledge required to undertake corrections to aluminium extrusion solid and hollow dies and die support systems after faulty extrusions have been examined and causes of faults identified.

Where the use of mobile load shifting equipment is required unit MEM11010 Operate mobile load shifting equipment should also be selected.

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

Band: A

Unit Weight: 4

Pre-requisite Unit

MEM07001	Perform operational maintenance of machines/equipment
MEM07003	Perform routine machine setting
MEM07004	Perform complex machine setting
MEM07024	Operate and monitor machine and process
MEM07025	Perform advanced machine and process operation
MEM07032	Use workshop machines for basic operations
MEM07043	Identify causes of faulty aluminium extrusions
MEM07044	Test a new aluminium extrusion die
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements
MEM12024	Perform computations

MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18003	Use tools for precision work
MEM18055	Dismantle, replace and assemble engineering components

Competency Field

Machine and process operations

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, drawings, job sheets or work instructions
2	Prepare for die correction	2.1	Identify regulatory requirements and risk management procedures relevant to die access and handling, extruder operation and die correcting procedures
		2.2	Identify extrusion specifications, extruder operating procedures and other information relevant to die correction task
		2.3	Consult with die designer on intended correction, where required
		2.4	Select appropriate hand tools, hand held power tools, or

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

workshop machines to carry out die corrections

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|---|--|---|
| 3 | Correct solid dies | 3.1 Calculate intended change in extrusion flow or speed |
| | | 3.2 Determine bearing choke angles or length of bearing shortening as appropriate for required correction |
| | | 3.3 Speed up flow through appropriate shortening of bearing |
| | | 3.4 Slow down flow through appropriate choking of bearing |
| | | 3.5 Relieve clearances |
| | | 3.6 Supervise or run trial extrusions to test corrections |
| | | |
| 4 | Correct hollow dies | 4.1 Assess if shortening or choking of mandrel bearings is required and select bearings to be corrected |
| | | 4.2 Determine choke angles and length of shortening as appropriate for required corrections |
| | | 4.3 Undercut mandrel to widen chambers |
| | | 4.4 Increase depth of chamber back into bridge |
| | | 4.5 Adjust mandrel stems |
| | | 4.6 Adjust weld bridges |
| | | 4.7 Speed up flow through appropriate shortening of bearing |
| | | 4.8 Slow down flow through appropriate choking of bearing |
| | | |
| 5 | Undertake basic maintenance of dies | 5.1 Monitor case and assess when re-nitriding is required |
| | | 5.2 Prepare die for re-nitriding |
| | | 5.3 Clean and polish dies |
| | | 5.4 Repair fine bearing damage |
| | | 5.5 Maintain bearing angle and flatness during polishing and |

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

repairs

5.6 Monitor fittings and devices for lifting die and die support components and arrange replacement or repair as necessary

6 **Adjust die support system and components**

6.1 Ensure toolstack components are flat and square with die and specified toolstack dimensions that will support dies, according to the force the extruder can exert are used

6.2 Check for and replace any coined bolsters

6.3 Check die slide alignment is within tolerance and re-align if necessary

6.4 Report persistent die support related faults after adjustment and recommend redesign or stiffening as appropriate

7 **Maintain die records**

7.1 Record details of all die corrections, including trial extrusions

7.2 Recommend any simple die design changes that increase productivity and recovery

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM07042A Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MEM07042 Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems

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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 (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- complying with work health and safety (WHS), regulatory requirements and risk management associated with extruder operation and die handling
- relating intended changes to bearings, apertures, other die components and toolstack components to particular extrusion faults
- adjusting metal flow using workshop machines, hand tools and hand held power tools to correct bearings
- maintaining bearings and other die components to specification
- identifying situations where die or other components must be either scrapped or returned to die manufacturer
- supervising or conducting trial extrusions to verify corrections
- reporting and documenting results of corrections.

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)
- die technology:
 - construction:
 - solid dies
 - hollow dies
 - die support components
 - composition and characteristics of various die steels
 - die manufacturing process
 - nitriding process and purpose
 - extrusion design process and behaviour of typical shapes during extrusion

- bearings:
 - shape and definition
 - bearing deflections
 - bearing wash
 - bearing choke where entrance to die aperture is wider than the exit angle
 - negative bearing (entrance is narrower than the exit angle) increases speed of flow
- die support technology and common faults:
 - bolsters:
 - matching of dies to bolsters
 - typical faults in extrusions related to poor bolster selection or fit
 - backers:
 - softening
 - dishing
 - feeder plates:
 - tolerances too close can cause heat related surface defects on extrusions
 - tolerances not matched to bearings in die can cause shape loss
- extrusion process:
 - shape behaviour of typical extrusion products
 - channel shapes and tongue movement faults and typical distortions and corrections
 - runout length variations and possible causes:
 - recycled and unevenly cooled billets
 - out of alignment die slides
 - bearings worn or polished unevenly
 - operator variables:
 - incorrect heat settings
 - incorrect selection of bolster for die
 - poor breakthrough management
 - principles of flow:
 - variation of flow speed through local details and thicknesses
 - variation across container diameter
 - variation due to length of bearing
 - speed of metal through die along with temperature determines how metal flow fills die
 - source and purpose of heating of:
 - billet
 - die
 - extrusion and extrusion created heat
- surface defects and their causes:
 - die lines caused by roughness at surface edges, damaged bearing edges, bearing wash or flaking of nitriding

- pick up (surface tearing)
- streaking
- blisters
- inclusions in billets
- nitriding flaking off die face
- effects of incorrect heat:
 - collapsing of thin walled sections due to over heating
 - blocking of the die
 - surface breakdown and faults:
 - roughness
 - streaking
 - tearing
- dangers of welding extrusion dies
- die efficiency considerations:
 - monitor die performance over time using examine die and extrusion records
 - balance die correction against tonnage, speed and recovery rates
- when to recommend new die or major re-work by die manufacturer where required.

Assessment Conditions

- Assessors must:
 - have vocational competency in undertaking corrections and basic maintenance to aluminium extrusion dies and die support systems 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. This must 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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