



Australian Government

Department of Education, Employment and Workplace Relations

TLIW3015A Weld rail using aluminothermic welding process

Release: 1

TLIW3015A Weld rail using aluminothermic welding process

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to weld rail using the aluminothermic welding process in accordance with safeworking and regulatory requirements and workplace procedures. It includes preparing and planning the welding method, preparing the rail for aluminothermic welding, carrying out the welding process in accordance with workplace requirements, checking weld conformance, and completing all required documentation. Licensing or certification requirements may be applicable to this unit.

Application of the Unit

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Persons achieving competence in this unit will need to fulfil the applicable legislated rail safety requirements including acts and regulations from each state and territory together with any nationally approved compliance codes and/or guidelines.

Work is performed under some supervision, generally within a team environment. It involves the application of routine operational principles and procedures to weld rail using the aluminothermic welding technique as part of workplace activities across a variety of operational contexts within the Australian rail system.

Operators of mechanised equipment must have undertaken training and, where appropriate, hold the relevant licence, permit or certificate and be recognised as competent for the class of machinery being used.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare and plan welding method	1.1 Work requirements are determined to identify scope of work and resources required 1.2 Welding equipment and consumables are prepared and checked for serviceability 1.3 Site is cleared of obstructions and combustible material to minimise risk of accidents and fire 1.4 Fire fighting and other safety equipment is organised, checked and located in accordance with required regulations 1.5 Personnel are briefed about safety precautions specific to aluminothermic welding as required to minimise risk of injury
2 Prepare rail for welding	2.1 Location of weld is identified and assessed in accordance with standards and procedures 2.2 Track is prepared for welding in accordance with workplace standards and procedures 2.3 Rail is prepared for welding in accordance with workplace standards and procedures
3 Carry out welding process	3.1 Moulds are fitted and luted to standard to prevent leakage of the molten reaction 3.2 Rails are pre-heated to standard to prevent heat loss 3.3 Rails are welded using aluminothermic method in accordance with approved procedures 3.4 Welding equipment is removed according to approved procedures 3.5 Excess material is removed from weld in accordance with workplace procedures 3.6 Rail profile is restored to standard using rail profile grinder in accordance with workplace procedures 3.7 Arrangements are made for track to be restored
4 Check weld conformance	4.1 Finish ground weld area is visually inspected for surface finish and defects 4.2 Finish ground weld area is checked for conformance to rail profile and geometry acceptance standards
5 Complete documentation	5.1 Required documentation and/or records are completed in accordance with workplace requirements

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

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

Required knowledge:

- Relevant safety, OH&S and environmental procedures and regulations
- Workplace procedures for the welding of rail using the aluminothermic technique
- Problems that may occur during the welding of rail using the aluminothermic technique, and action that can be taken to report or resolve the problems
- Hazards that may exist during the welding of rail using the aluminothermic technique, and ways of controlling the risks involved
- Contents of relevant workplace technical manuals and instructions
- Characteristics of plant and equipment, hardware and components used in welding activities
- Impact on work activities of regulatory requirements
- Impact of other work activities on welding integrity
- Workplace documentation requirements
- Site inspection techniques

Required skills:

- Communicate effectively with others when welding rail using the aluminothermic process
- Read and interpret technical data, drawings, instructions and manuals relevant to the welding of rail using the aluminothermic process
- Interpret and follow operational instructions and prioritise work when welding rail using the aluminothermic process
- Complete documentation related to the welding of rail using the aluminothermic process
- Operate electronic communication equipment to required protocol
- Work collaboratively with others when welding rail using the aluminothermic process
- Promptly report and/or rectify any identified problems, faults or malfunctions that may occur when welding rail using the aluminothermic process in accordance with regulatory requirements and workplace procedures
- Plan own work including predicting consequences and identifying improvements
- Apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
- Monitor work activities in terms of planned schedule
- Modify activities depending on differing operational contingencies, risk situations and environments
- Work systematically with required attention to detail without injury to self or others, or damage to equipment
- Carry out required welding operations

Required skills:

- Operate and adapt to differences in equipment in accordance with standard operating procedures
- Check compliance between work and job specifications
- Implement fire control procedures
- Select and use required personal protective equipment
- Identify, select and use hand and portable power tools

Evidence Guide**EVIDENCE GUIDE**

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

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

- The evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
 - the underpinning knowledge and skills
 - relevant legislation and workplace procedures
 - other relevant aspects of the range statement
- Assessment must include exercises which demonstrate competent performance of the following in a range of situations:
 - planning and preparing for welding method
 - preparing rail for welding
 - using appropriate type or types of welding processes
 - checking weld for conformance
 - completing documentation correctly
 - successfully performing a minimum of 10 welds

Context of and specific resources for assessment

- Performance is demonstrated consistently over a period of time and in a suitable range of contexts
- Resources for assessment include:
 - a range of relevant exercises, case studies and/or other simulated practical and knowledge assessment, and/or
 - access to an appropriate range of relevant operational situations in the workplace

EVIDENCE GUIDE

- In both real and simulated environments, access is required to:
 - relevant and appropriate materials and equipment, and
 - applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- Method of assessment**
 - Assessment of this unit must be undertaken by a registered training organisation
 - As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests
 - Practical assessment must occur:
 - in an appropriate range of situations in the workplace

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.

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|------------------------------|--|
| Operations may be conducted: | <ul style="list-style-type: none">• by day or night• in all weather conditions |
| Work may be conducted in: | <ul style="list-style-type: none">• restricted spaces• exposed conditions• controlled or open environments |
| Work may involve: | <ul style="list-style-type: none">• hazards to eyes• heat hazards• exposure to chemicals, and dangerous or hazardous substances• movements of equipment, goods and vehicles |
| Resources may include: | <ul style="list-style-type: none">• rail tensor• hand tools (hot axe, hammer)• wedges• straight edge• rail shears• rail friction saw• rail profile grinder, angle grinder• welding equipment• electric generator |

RANGE STATEMENT

- Welding processes may include:
 - gas heating/cutting equipment
 - Thermit Australia welding processes (i.e. SkV-Elite, SKVF, SMWF, SKVL)
 - Railtech welding processes (i.e. PLK CJ, WG68 X CJ)
 - other approved welding processes
- Weld types may include:
 - standard gap (short preheat)
 - standard gap (long preheat)
 - wide gap
 - junction
- Consumables may include:
 - welding materials as required
 - rail jewellery (plates, dogspikes, etc.)
 - gases (oxy, acetylene, propane)
 - closure rails
- Safety hazards may include:
 - fire risk
 - poor weather
 - eye damage
 - burns
 - rail tensor failure (broken pins etc.)
 - welding rail in electrified territory
- Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:
 - company procedures
 - enterprise procedures
 - organisational procedures
 - established procedures
- Liaison may include:
 - internal or external personnel from other work areas (e.g. train controllers, other track gangs)
- Communications systems may include:
 - two-way radios
 - telephones/mobile phones
 - agreed audible or hand signals
- Depending on the work context, safety and personal protective equipment may include:
 - high visibility clothing
 - fire retardant overalls or long sleeved shirts and long pants
 - hearing protection
 - gauntlet type gloves
 - sunscreen
 - sunglasses
 - welding goggles
 - safety glasses
 - insect repellent
 - safety headwear
 - safety footwear

RANGE STATEMENT

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| Information may be provided: | <ul style="list-style-type: none">• portable radios/mobile phones• hand lamps• flags• safety devices• electronically• in writing, via forms/documents• orally, via face-to-face communications |
| Information/documents may include: | <ul style="list-style-type: none">• operational instructions, policies and workplace procedures• local authority regulations and procedures• welding records• track inspection reports• timekeeping records• incident reporting data• maintenance specifications• technical instructions• manufacturers or workplace equipment instructions and operation manuals• emergency procedure manuals• two-way radio/mobile phone operation procedures• QA plans, data and document control• conditions of service, legislation and industrial agreements including workplace agreements and awards |
| Applicable procedures and codes may include: | <ul style="list-style-type: none">• legislated rail safety requirements including acts and regulations from each applicable state and territory together with any nationally approved compliance codes and/or guidelines• relevant Australian Standards and related requirements, including AS 4292• relevant state/territory OH&S legislation• relevant state/territory environmental protection legislation• electrified territory regulations• relevant fire regulations |

Unit Sector(s)

Not Applicable

Competency Field

Competency Field

W - Equipment and Systems Operations