

NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA		Ref: 14/4754
<p>Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).</p>		
1	<p>Equipment or System to be approved *</p> <p>Thermit Aluminothermic Head Repair Welding with Single Use Crucible</p>	
2	<p>Originator *</p> <p>Name: Paul Radmann (PaulRadmann@thermit.com.au)</p> <p>Company: Thermit Australia</p>	
3	<p>Introduction *</p> <p>Whilst the head repair weld has been used for some years with the long life crucible system, welders generally prefer the single use crucible system. The head repair welds were not included in earlier versions of AS1085. Testing has been completed on welds made with the single use crucible based on the requirements laid out in the update of AS1085.20.</p>	
4	<p>Determination of Need *</p> <p>The update of the existing head repair process to the single use crucible system (HRWSU) has been requested from a number of ARTC and other customers. The process allows the aluminothermic repair of defects to the head of the rail such as squats and wheel burns. The process is quicker than electric weld repair of larger defects and staff can be trained for implementation by existing maintenance crews skilled in aluminothermic welding.</p> <p>Differences from the long life crucible process are preheat times and mould dimensions to improve metal flow and assist shearing after welding. Also the initial defect is cut from the rail using a gas cutting burner and cutting guide for consistent removal of metal prior to welding.</p>	
5	<p>Significant Change or Not (as determined by the Manager Standards) *</p> <p>This change in equipment or system is assessed as MINOR</p>	
6	<p>Review Panel (as determined by the Manager Standards) *</p> <ul style="list-style-type: none"> • John Furness - Manager Standards • Ricky Tiedeman - Team Manager Taree • Heath Campbell - Project Delivery Manager Coffs Harbour • Denis Snowden - Work Health and Safety Advisor • Trevor Reedman - Team Manager Casino • David Ogucha - Track and Civil Standards Engineer 	
7	<p>Safety</p> <p>The process complies with AS1085.20 and is an improvement on the existing head repair welding process which uses a long life crucible. The single use crucible is lighter and easier to carry than the long life crucible which removes the risks associated with carrying heavy (and sometimes hot) equipment over the ballast.</p>	
8	<p>Performance and Suitability</p> <p>See attached reports from ALS and Bureau Veritas demonstrating testing in accordance with the new draft version of AS1085.20. Thermit advises that this product meets the revised version AS1085.20-2012 which was published after these reports were completed.</p> <p>This process is available for 60kg/m, 53kg/m and 47kg/m rail profiles.</p> <p>See attached documents:</p> <ul style="list-style-type: none"> • Qualification of Aluminothermic Head Repair weld – 60kg/m Rail Profile • Qualification of Aluminothermic Head Repair weld – 53kg/m Rail Profile • Qualification of Aluminothermic Head Repair weld – 47kg/m Rail Profile • The Ultrasonic inspection of Thermit welds report. Report Number: 3612-1337/01 (47kg) • The Ultrasonic inspection of Thermit welds report. Report Number: 3612-1227/01 (53 & 60kg/m) • The surface hardness testing of Thermit welds report. Report Number 3612-1337/02 Revision A 	
(i)	<p>Use in other rail networks</p> <p>The head repair weld using a long life crucible is already approved by ARTC, RailCorp and Queensland Rail. Using the</p>	

Single Use Crucible the process is approved by Network Rail in England, MAV in Hungary and is undergoing testing by Deutsche Bahn. A similar process is approved for use by the Class 1 railroads of the USA such as BNSF.

(ii) **Use in the ARTC network**

Aluminothermic head repair welding using the long life crucible process has been used in the ARTC network including the Hunter Valley.

(iii) **Issues arising from usage of the equipment/system**

No issues are anticipated with use of the system by properly trained welders.

(iv) **Changes required to infrastructure or systems for use of the equipment**

For standard carbon rails, the initial defect is cut from the rail using a gas cutting burner and cutting guide. Samples for head hardened rail will be prepared the same way as it is believed that the subsequent welding will not cause any martensite or undesired microstructures in the weld. A hydraulically driven system is being developed for customers who prefer not to use a gas torch to cut-out the head defect.

9 **Reliability**

Thermit Australia is a proven supplier with an excellent quality assurance record.

10 **Maintainability**

The process should only be used by trained welders with the correct equipment.

11 **Approval ***

The Thermit Aluminothermic Head Repair Weld with Single Use Crucible is approved for use on the entire ARTC network. Please see the attached list of process specific item numbers for equipment and consumables.

12 **Is the supplier accredited to ISO 9001 specifically for this product? ***

Certificate No.: 94035CC7-2011-AQ-GER-TGA (on file)

Yes No

13 **Conditions of Approval ***

1. A documented instruction approved by the Manager Standards that includes competent people doing the MPI and the recording of all defects found using MPI shall be in place prior to start of using the process.
2. Welding must be carried out by trained welders using the correct equipment as per sections 4.4 Job Document and 4.5 Welding Procedure as outlined in AS 1085.20-2012.
3. Welding must be carried out in accordance with manufacturer's instructions.
4. Welding must be in accordance with ARTC Standard ETM-01-01, in particular the geometric limits for finished and semi-finished welds.
5. When welding is being carried out in total fire ban conditions, a hot work permit is required.
6. The crucible is to be disposed of at a location where it cannot contaminate the ballast or block drains.
7. The cut surface must be ground for Magnetic Particle Testing. The grinding process must remove all oxide.
8. The prepared area shall be tested with an AC yoke (AC Magnet) and it is to be defect free.
9. If a defect is present, a closure must be installed.
10. **The process will be reviewed in June 2015 after one year of application to assess the need for Magnetic Particle Testing.**

14 **Does the Originator accept the additional Conditions of Approval as set by the Review Panel:**

Yes No N/A

15 **Sign off**

ARTC office use only

Review Panel:

John Furness	<u>On file</u>	Date: <u>13/03/2014</u>
Ricky Tiedeman	<u>On file</u>	Date: <u>21/02/2014</u>
Heath Campbell	<u>On file</u>	Date: <u>4/03/2014</u>
Denis Snowden	<u>On file</u>	Date: <u>24/02/2014</u>
Trevor Reedman	<u>On file</u>	Date: <u>21/02/2014</u>
David Ogucha	<u>On file</u>	Date: <u>20/02/2014</u>

16	Sign off (for additional condition of approval added April 2014 – refer condition 1)	<i>ARTC office use only</i>
Review Panel:		
John Furness	<u>On file</u>	Date: <u>5/06/2014</u>
Ricky Tiedeman	<u>On file</u>	Date: <u>15/04/2014</u>
Heath Campbell	<u>On file</u>	Date: <u>18/07/2014</u>
Denis Snowden	<u>On file</u>	Date: <u>22/04/2014</u>
Trevor Reedman	<u>On file</u>	Date: <u>6/06/2014</u>
David Ogucha	<u>On file</u>	Date: <u>18/07/2014</u>