NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: 09/18544

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 (*).

1 **Equipment or System to be approved** *

Degradable Sand Crucible for SkV-Elite Single Use (SU) aluminothermic welding process

2 **Originator** *

Name: Paul Radmann Company: Thermit Australia Pty Ltd.

3 **Introduction** *

The steel bucket crucible design has been well accepted by welders performing the SkV-Elite SU welding process however, some welders prefer a sand crucible which breaks down after use and is easily discarded. To meet the requirements of these welders Thermit Australia has developed a container-less degredable single use crucible. The change to the crucible does not affect the main component (silica sand) but rather the chemicals used to bond the sand.

4 **Determination of Need** *

Currently there is no approval for a degradable sand crucible for use with the SkV-Elite welding system.

The degradable sand crucible is much lighter than the steel bucket design so has OH&S benefits and the fact that it is degradable means that it is easily discarded.

5 **Significant Change or Not** *(as determined by the Manager Standards)* *

This change in equipment or system is assessed as MINOR

6 **Review Panel** *(as determined by the Manager Standards)* *

- John Furness - Manager Standards
- Tim Calver - Civil Standards and Technical Services Engineer
- Abbie Thomas - Track and Civil Standards Engineer
- Rodney Reinertsen – Transfield Services (by email)

7 **Safety**

Using a degradable sand crucible compared to a Standard Crucible reduces the risk of the welding personnel incurring injuries since the weight of the crucible is only 9kg + Portion. A Standard Crucible (new) complete with hardware is 35kg + Portion. When we consider the average weight of a portion is 18kg then it is clear there are advantages.

The Crucible does not require preheating and therefore the welder is handling a cold crucible for most of the procedure.

8 **Performance and Suitability**

In paragraph N4.2 of AS 1085.20-2006 the testing requirements for changes in the main component of the crucible are stated, and detailed in Table N6. As the change to the crucible does not affect the main component (silica sand) but rather the chemicals used to bond the sand, testing for these limited changes was required and the results were not to be worse than those obtained during the testing of the original crucible.

All samples tested met the requirements for the chemical analysis and slow bend test in AS 1085.20-2006.

(i) **Use in other rail networks**

The degradable sand crucible has been approved by both QR and RailCorp.

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

While Thermit weld portions have been used for many years this degradable sand crucible is new to ARTC.

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

The use of a new type of resin to bond the silica sand means that slight changes in reaction chemistry can occur and is reflected in the higher silicon and lower aluminium contents of the weld metal when compared to the existing steel bucket crucible. Despite the change in silicon and aluminium content the weld metal compositions for the new Degradable Sand Crucible are still compliant to AS 1085.20-2006 requirements.

Care needs to be taken to avoid the crucible being damaged during transport.

9 **Reliability**

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

10	**Approval** *						
	The following weld portions have been approved for use in the ARTC Network: AS60 SkV-Elite Z90 SU AS60 SkV-Elite Z110 SU AS53 SkV-Elite Z90 SU AS50 SkV-Elite Z110 SU AS50 SkV-Elite Z90 SU AS47 SkV-Elite Z90 SU AS41 SkV-Elite Z90 SU AS53/60 SkV-Elite Z90 SU JN						
11	**Conditions of Approval** *						
	1. The crucible is to be disposed of at a location where it cannot contaminate the ballast or block drains. ***<<NOTE: Review Panel may add additional Conditions of Approval>>***						
12	**Does the Originator accept the additional Conditions of Approval as set by the Review Panel:**	Yes	☐	No	☐	N/A	☐

13	**Sign off**		***ARTC office use only***
	Review Panel:		
	John Furness	Date:	10/9/09
	Tim Calver	Date:	8/9/09
	Abbie Thomas	Date:	08/09/2009
	Rodney Reinertsen see email of 8/9/09 attached		

Attachments:

- Test results for Thermit SkV-Elite Welding Process with a Degradable Sand Crucible, dated July 2009.
- Email comments (dated 8/9/09) from Rodney Reinertsen, Transfield Services.