



## INSTITUTE OF MATERIAL, MALAYSIA

### IMM Welding Certification Scheme

## Certified Thermit Welding Practitioner (Level 1)

Code: TWP

*HRDF claimable*

This specialised competency program on Thermit Welding Practitioner Level 1 has been developed to fulfill the requirement of competency skills for track workers in performing the maintenance activities for achieving optimum operation.

Upon completion of this competency participants will be able to:

- Identify thermit welding components
- Identify thermit welding equipment and tools to carry out the process.
- Understanding the operational flows in order to carry out the process in a safe and efficient manner
- Prepare thermit welding works
- Enhance in technical maintenance skill
- Perform thermit welding
- Understand the job scope of a practitioner

### Reference standards (reference used shall refer to the latest published document):

- TBA

### Who should apply

- Fresh graduates with technical background, trainer, rail technician/operator and supervisor involved in rail maintenance
- Track works for maintenance personnel
- Maintenance supervisor
- Engineer

### Objectives

Certified personnel should be able to:

- Professionally perform the thermit welding task as required by the industry.
- Monitor and supervise the works related to the thermit welding and has the criteria of a competent practitioner.

### Examination topics

- Introduction to thermit welding
  - » Equipment (familiarization)
  - » General usage
- Safety awareness
  - » Safety precautions
  - » Safe work practices (do n don't)
  - » Safety with gases
  - » Safety apparel and equipment
- Rail cutting setting
  - » Dismantle old rail and insert new rail
  - » Rail fixing
- Rail end preparation and rail alignment
- Installation
  - » Install universal mounting
  - » Fixing the mould

- » Luting the mould
- » Install slag bowl
- Preheat
  - » Preheat rail end and mould
  - » Placing crucible
  - » Ignition
  - » Shearing
- Clearing
  - » 7.1 Clearing the riser
  - » 7.2 Grind smooth the welding
  - » 7.3 Finishing

### **Examination format**

The exam/assessment consist of the following format:

- a) Theory paper – to complete answering knowledge assessment (includes 13 multiple choice and seven subjective questions) within 1 hour 30 minutes.
- b) Practical (hands-on) assessment 1 – Rail alignment – Demonstrate the correct procedure for rail alignment using Steel Wedges and A Frames Shearing Machine
- c) Practical (hands-on) assessment 2 – Cutting and welding gap process – Using gas or saw
- d) Practical (hands-on) assessment 3 – General welds set up procedures – Demonstrate weld set up procedures.
- e) Practical (hands-on) assessment 4 – Rail end preparation – Identify oxygen/fuel gas cylinders safety precautions, using oxygen/fuel gas and rail disc saw, cutting rail cleaning the rail ends and demonstrate the four uses of weld setting gauge.
- f) Practical (hands-on) assessment 5 – Complete weld set up working steps – Carry out preheating process and set up crucible components and loading of the Thermit Welding portion.
- g) Practical (hands-on) assessment 6 – Demonstrate Instruction Preliminary and Final grinding – Install Thermit cast weld metal and implement correct procedures for removal of equipment
- h) Practical (hands-on) assessment 7 – Profile grinding & weld finish – Carry out weld profile grinding operations to specified tolerances

### **Examination duration**

Theory examination – 1 hour 30 minutes

Practical assessment – 1 day

### **Examination fee**

As specified on the IMM website.

### **Candidate's criteria**

Candidate should have

- Minimum academic qualification - SPM or equivalent\* AND
- Minimum 5 years working experience at the site in a job that related to rail changing/joining AND
- Fit-for work for Track network site AND
- Able to read and understand in English

\*Candidate fulfills the minimum academic qualification but without field experience in thermit welding is considered as a candidate without experience.

### **Pre-requisite training**

A candidate without experience is required to attend IMM approved/recognized training course which prepares and provides comprehensive guidance and practice aligned to the topics covered in the examination.

A candidate with experience is encouraged to attend IMM approved/recognized training course

### **Criteria for certification**

Successful in all the following below parts,

- a) Theory test – achieve minimum 80% marks, paper to be marked by the assessor.
- b) Practical (hands-on) assessment – passed as competent.
- c) Practical on-site job – complete 15 times joining job performing without fail (passed as competent by the assessor)

### **Certificate awarded**

IMM Certified Thermit Welding Practitioner (Level 1)

### **Validity period of certificate**

3 years

### **Re-sit of examination**

A candidate who had failed in one or more of the examination parts can apply to re-sit for the failed component(s) of the examination within a year from the date of the first examination. The candidate shall have to pay the full examination fee for the re-sit and without the need to attend any pre-requisite training course.

### **Information on re-certification**

6 months prior to the expiry of certification (at the end of the 3<sup>rd</sup> year of certification), the candidate can apply for re-certification for another 3 years by

- sitting for an examination (theory paper only)
- providing proof to IMM that he/she has been employed in handling the thermit welding job routine (testified by the project manager or human resource/training/learning manager of the candidate) for at least 15 times joining without fail in the last 3 years; and

Prior to the expiry of the 3-year re-certification (at the end of the 6<sup>th</sup> year of certification), the candidate can continue to be certified for a further 3-year period by

- sitting for the exam/assessment, as follows;
  - (a) Examination paper – Achieve minimum 80% mark
  - (b) Practical (hands-on) assessment – Passed as competent

The candidate must re-sit the certification examination if he/she has been out of the profession for more than 12 months continuously during the 3-year certification or re-certification period.