Guidance Notes for Welding Companies Using Thoriated Tungsten Electrodes
What are Thoriated Tungsten Electrodes?

Thoriated tungsten electrodes (TTEs) are used in the welding industry. Thorium, in the form of thorium oxide, is added to tungsten welding electrodes which are used in Tungsten Inert Gas (TIG) arc welding. The addition of thorium improves arc starting and stability, reduces weld contamination and gives longer electrode life. However, thorium is a naturally occurring radioactive element and as such poses a radiation hazard.

What are the risks from the use of thorium in TIG welding?

Thorium is very mildly radioactive and therefore the radiation hazards associated with the distribution, use, storage and disposal of TTEs are low. The radiation hazard from using TTE is limited to the welder and the hazard to other workers in welding companies and to members of the public are negligible.

How can welders be exposed to radiation?

Welders may inadvertently be exposed to radiation during welding and grinding operations with TTEs. Inhalation of dust particles during grinding is the main concern. The radiation hazard from grinding can be greatly reduced by wearing a dust mask and any other personal protective equipment suitable for such operations, the use of an effective exhaust system and, whenever possible, the use of pre-ground TTEs.

How should TTEs be disposed of?

Disused TTEs and dust, generated during welding and grinding operations, should not be accumulated but should be frequently dispersed in waste intended for landfill. This method of disposal of disused TTEs need not be subject to regulatory control.

Can other materials be used in place of thorium in TTEs?

The small radiation hazard from the use of TTEs can be eliminated by replacing them with electrodes made from tungsten alloyed with oxides such as those of lanthanum, cerium or zirconium. These non-radioactive electrodes are now as effective as TTEs in a wide range of welding applications and should be used wherever possible.

If TTEs must be used, following best practice will ensure that the radiation hazard is significantly reduced.
Best Practice in the Distribution, Use and Disposal of TTEs

While the risks from the distribution, use and disposal of TTEs are extremely low, it is still advisable to follow best practice at all times. Those who may need to handle or work with TTEs should adopt the following practices:

- Keep the number of TTEs in stock to the minimum necessary for those welding applications that require that type of electrode.
- Store TTEs that are not in use in their boxes in a secure location that is accessible only to authorised persons.
- Avoid carrying TTEs on your person.
- Be familiar with safety procedures governing welding operations including those relating to grinding tips of TTEs.
- Keep non-essential personnel clear of welding and grinding operations at all times.
- Wear a dust mask while carrying out grinding operations.
- Work in a dedicated and well ventilated area that is fitted with a dust extraction system or local exhaust ventilation wherever possible.
- Use a dedicated grinding wheel, fitted with a protective viewing screen, for grinding TTEs.
- Grinding of TTEs should be done by each individual welder whenever it is feasible to do so.
- Clean up and remove deposited TTE dust particles with a vacuum system. If a vacuum system is not practical, dampen the dust prior to collection.
- Disused TTEs and dust resulting from welding and grinding operation should be collected on a daily basis and dispersed in waste intended for landfill.
- Do not dispose of disused TTEs and dust with scrap metal destined for recycling.
- Where possible, replace TTEs by non-radioactive electrodes incorporating oxides such as cerium or lanthanum oxide.
Mission Statement

“To protect people from the harmful effects of ionising radiation, both natural and man-made, through effective regulation, monitoring of the environment and the provision of accurate and timely advice to the public and to Government”