

WELDING WITH NON-CONSUMABLE THORIATED TUNGSTEN ELECTRODES

IIW/CVIII Statement

HEALTH AND SAFETY

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Thorium oxide is found in thoriated electrodes in a proportion equal to a maximum of 4.20% in mass (see International Standard ISO 6848 - VVT 40 electrode).

Thorium oxide is radioactive.

Thorium studies carried out on these electrodes have shown that external radiation exposure caused by beta and gamma radiation during storage, welding and grinding under normal working conditions is negligible (far below the natural radiation exposure). These exposures are much below the ICRP limit dose for workers classified as "non-exposed workers."

During grinding of electrode tips, radioactive dust is released connected with a potential hazard of internal radiation exposure by inhalation of (alpha- and beta-emitting) particles. Hence health risks though small - do exist. Consequently, it is necessary to exhaust dusts at the grinding station.

In contrast, the hazard of internal exposure (radiation) during welding is negligible in most circumstances since the thoriated electrode is consumed at a very slow rate. Measurement programmes, however, show that even though the radiation exposure is much lower in welding than in grinding, when exceptionally, aluminium is welded with thoriated electrodes without using extraction systems (e.g. local ventilation), exposure may exceed the limit values based on ICRP recommendations.

The following protective measures are recommended:

- Use of thorium-free electrodes, if possible. Thorium-free electrodes with different specifications (e.g. containing cerium or lanthanum) are available.
- If the use of thoriated electrodes cannot be avoided;

a) Thorium emission shall be minimised, by selecting appropriate welding parameters;

b) A proven effective ventilation and collection system is necessary. This may require measurements of the exposure of individual welders.

If measures a) and b) fail to control exposure adequately, personal respiratory protective equipment shall be used.

- Regular removal and safe disposal of deposited dust from grinding and welding.