

# Substitution of thoriated tungsten electrodes in Switzerland



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## Brief Introduction

- └ TIG = **T**ungsten **I**ncert **G**as
- └ in Germany TIG-welding was established around 1940
- └ thoriated tungsten electrodes contain 1 to 4%  $\text{ThO}_2$
- └ Th-nat/Electrode typically → 0,8 – 4 kBq
- └ Advantages:
  - good ignition
  - low electrode consumption
  - high temperature operating
  - high quality welding
- └ Widely spread



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## Legal Basis I

- ↳ **Legal regulation:**
  - Swiss Radiological Protection Act (StSG)
  - Swiss Radiological Protection Ordinance (StSV)
  - various technical prescriptions
- ↳ **Licensing Authority:**
  - Swiss Federal Office of Public Health (SFOPH)
- ↳ **Regulatory Agency (Industry):**
  - Swiss National Accident Insurance Fund (Suva)

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## Legal Basis II

- ↳ The activity of one thoriated tungsten electrode (WT) exceeds the authorisation threshold of the Swiss Radiological Protection Ordinance
- ↳ every application of WT would have to be authorised
- ↳ The Swiss Federal Office of Public Health (SFOPH) can issue approvals

Exemption limit LE	Authorisation threshold LA
6 Bq/kg and/or $LE_{abs}$	20 Bq

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## Legal Basis III

- └ Approvals for thoriated tungsten electrodes (WT) have been issued by SFOPH
  - by consideration of various terms such as:
    - Justification = no alternative available
    - Optimisation = different solutions compared with each other
  - Approvals are limited in time (= 10 years)
  - they have to be adjusted to the technical development

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## Health Aspects, Doses

- └ Investigations\* at workplaces showed that:
  - use of WT- electrodes can lead to doses > **1 mSv/year**
  - under certain conditions it is possible to accumulate doses up to **20 mSv/year**

\*BG Feinmechanik und Elektrotechnik, T. Ludwig, 1999

\*BSLU, München, A. Reichelt, K.-H. Lehmann, 1993

- └ These facts were initial for the following steps



Tungsten electrode grinder

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## Clarification

### ↳ Activities 1998 – 2000:

- verification of thorium free products with comparable results such as  $\text{LanthanO}_2 = \text{WL}$  and  $\text{CerO}_2 = \text{CL}$
- inquiries: experts, welding- institutes and –shops
- sales-figures: percentage WT (<30%) to WL, CL
- Meetings with producers, trade- and professional associations

### ? introduction of the substitution strategy

our ambition:

to achieve the substitution of the thoriated tungsten electrodes until December 31<sup>th</sup> 2003

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## Information I

### ↳ Activities 2001 - 2003

- written notice to all trading companies and WT producers in Germany and Austria :  
SFOPH will terminate all approvals in force for WT until Dec. 31<sup>th</sup> 2003 which means that from Jan. 1<sup>th</sup> 2004 on, WT-users have to comply with the compulsory licensing requirements
- distribution of information leaflets via trading companies announcing this substantial change to the WT-users
- Publishing of technical papers in professional journals, on the internet etc.
- Formation centres for welding promote substitutes

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## Information II

### Compulsory licensing procedure

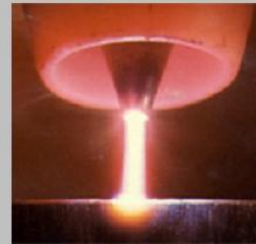


#### Requirements for trading Companies after Dec 31.2003 :

- recognized qualification in radiation protection
- presentation of radiation protection instructions
- duty of care => delivery of WT only to license holders
- suitable storage room for WT

#### Additional requirements for WT users:

- Justification of the use of WT for the specific work by presentation of a formal questionnaire
- set up of separate workplaces for WT welding
- dosimetrie => analysis of urine once a year
- workplace monitoring => airfilter and contamination



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## Current situation

- ↪ no more WT on the market
- ↪ remainder of stock to be used (pragmatical solution)
- ↪ number of enquiries until now: 10
- ↪ Number of requests for licence: 0
- ↪ SFOPH offers the possibility to dispose WT

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## Perspective

- └ in the future, thoriated products have to be substituted
- └ close contact to the producers
- └ monitoring of the market
- └ publishing of relevant facts
  
- └ are there any other known products?



electrodes for metal-coating