



**MATERIAL  
SAFETY  
DATA SHEET**

# IDENTIFICATION OF TUNGSTEN ELECTRODES

Composition	Name	Colour	General Use	Application
99.8% Tungsten	Pure	Green	AC	Aluminium, Magnesium
0.80 – 1.20% ThO <sub>2</sub>	1% Thoriated	Yellow	DC	Steel, Stainless Steel, Titanium
1.70-2.20% ThO <sub>2</sub>	2% Thoriated	Red	DC	Steel, Stainless Steel, Titanium
0.70-0.90% ZrO <sub>2</sub>	Zirconiated	White	AC	Aluminium, Magnesium
1.80-2.20% CeO <sub>2</sub>	Ceriated	Grey	AC + DC	Steel, Stainless Steel, Titanium, Aluminium, Magnesium
1% La <sub>2</sub>	Lanthanated	Black	AC + DC	Steel, Stainless Steel, Titanium, Aluminium, Magnesium

## Pure Tungsten Electrodes

The current carrying capacity of pure tungsten electrodes is lower than that of alloyed electrodes. They are typically used with AC for welding aluminium and magnesium. The tip of pure tungsten electrodes maintains a clean balled end and provides good arc stability. But the life time is poor relative to other types.

## Thoriated Tungsten Electrodes

Two types of thoriated electrodes are available containing 1% and 2% thorium oxide (ThO<sub>2</sub>) dispersed evenly throughout the length of the electrode.

Thoriated electrodes are superior to pure electrodes in several respects. The thorium provides approximately 20% higher current carrying capacity, generally they have extended life and a greater resistance to contamination of the weld. Arc initiation is generally easier and the arc more stable than pure or zirconiated electrodes.

Thorium has a low level of radio active material and care must be maintained when grinding to prevent inhalation of the dust.

## **Ceriated Tungsten Electrodes**

Ceriated electrodes contain 2% cerium oxide ( $CeO_2$ ). These electrodes were developed as a replacement for thoriated electrodes. Cerium unlike Thorium is non-radioactive. Ceriated electrodes operate successfully with AC or DC.

## **Lanthanium Tungsten Electrodes**

Lanthanium electrodes contain 1% Lanthanium Oxide ( $La_2O_3$ ). These electrodes were developed at the same time as ceriated electrodes and the operating characteristics are very similar.

## **Zirconiated Tungsten Electrodes**

Zirconiated electrodes contain a small amount of zirconium oxide ( $ZrO_2$ ).

Zirconiated tungsten electrodes are the electrode of choice for AC welding because they combine the desirable arc stability characteristics and lifetime. They have a higher resistance to weld contamination than pure tungsten