



SPI Lasers
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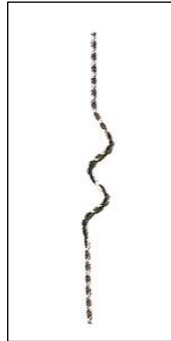
Laser Cutting of Tungsten

Material

Tungsten (W) - 160µ thick strip



Tungsten Electron Emitter



Tungsten Filament

Introduction

Tungsten is a very hard metal with great tensile strength and an extremely high melting point. It is often alloyed with other metals but in its purest form, it is commonly used in electronics applications – for example as interconnect material in integrator circuits, electron emitters and light bulb filaments.

Set-up:

Laser: SPI 200W water cooled Fiber Laser
Machining head: Laser Mechanisms, Finekerf
Focal length: 50 mm, X2 beam expander
Process gas: Argon 0.8 MPa

Experimental Procedure:

A series of rectangular slots were made at various laser parameters. Speeds up to 6 m/min were made using oxygen, argon and nitrogen as assist gases.

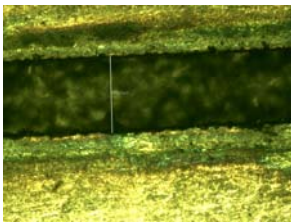


Figure 1: 600 micron wide slot cut at 4.5m/min with Oxygen

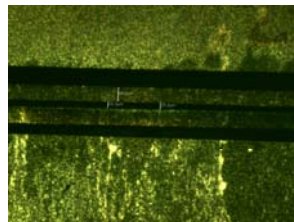


Figure 2 – 2 lines cut, 25 micron wide, at 2m/min, 1500 Hz, 0.5ms with Argon

Results

Processing parameters:

Laser Power: 200W, 150W Average Power

Pulse Width: 0.5ms

Repetition Rate: 1500Hz

Nozzle Stand off: 0.2mm

Nozzle diameter: 0.5mm

Using oxygen as an assist gas, a significant HAZ was observed.

When nitrogen or argon were used as an assist gas, cut speeds were slower but much cleaner with far less heat affected zone. Cut width was 25 microns.

Conclusions:

Clean cuts can be made on Tungsten using argon assist gas at high speed using the SPI 200W Fiber Laser.

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200W Water Cooled SPI Laser

For further information, please contact:

Louise Partridge: Benelux, France, Italy, Nordics, Spain, UK, and Western Europe
Louise.Partridge@spilasers.com +44 (0) 1788 832 020

Michael Duka: Austria, Eastern/South Eastern Europe, Germany, and Switzerland
Michael.Duka@spilasers.com +49 (0) 8171-911167

Nicholas Monteiro: Australia, Malaysia, Singapore, Taiwan, Thailand, Vietnam
Nicholas.Monteiro@spilasers.com +65 97 11 82 29

Audrey Bourriez: Asia Pacific
Audrey.Bourriez@spilasers.com +44 (0) 7787 570 995

Ken Dzurko: USA & Canada
Ken.Dzurko@spilasers.com +1 408 292 4214

Lu Ming: China
Lu.Ming@spilasers.com +86 755 3395 5767