

# Laser-Induced Damage Threshold (LIDT) Measurement Report

## ISO 21254-2: S-on-1 Test Procedure

Sample: 2-CPW-LO-L/2-1030

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Tester/date: E. Pupka / 2015-01-14

### **Specimen**

Name of sample: 2-CPW-LO-L/2-1030  
Type of specimen: Crystal, AR Coating  
Storage, cleaning: Plastic box, dust blow off by compressed air

### **Test specification**

First harmonic of pulsed Nd:YAG InnoLas Laser: SpitLight Hybrid laser ( $\lambda = 1064$  nm, linear polarization, pulse duration 10 ns),  $\lambda/2$  plate combined with additional polarizer attenuator, online scattered light damage detection, offline inspection of damage detection using Nomarski microscopy (100x).

### **Laser parameters**

Wavelength: 1064 nm  
Angle of incidence: 0 deg.  
Polarization state: linear  
Pulse repetition frequency: 100 Hz  
Spatial beam profile in target plane: TEM<sub>00</sub>  
Longitudinal beam profile: Single mode (SLM)  
Beam diameter in target plane ( $1/e^2$ ): 235.5  $\mu\text{m}$  (average from 64 pulses)  
Pulse duration: 10 ns

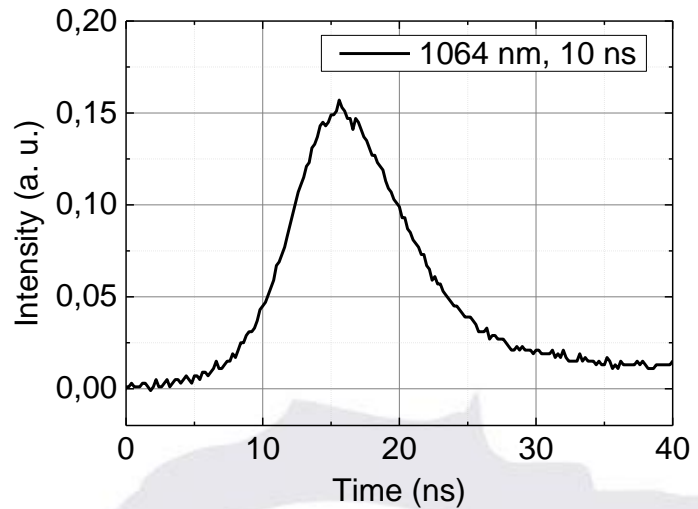
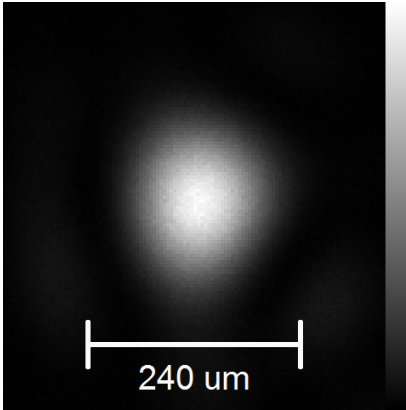


Fig. 1 Spatial beam profile in target plane (left) and oscilloscope trace (right)

**Test procedure:**

Number of sites per specimen:  
Arrangement of test sites:  
Minimum distance between sites:  
Damage detection:  
Storage of the specimen:  
Test environment:  
Cleaning:  
Definition of LIDT:

**S-on-1 test**

411  
Equally spaced  
744 μm  
Scattered light diode  
Plastic box  
Industrial environment  
Compressed air  
Nonlinear fit to 0% of damage probability

**Test result:**

Table 1 Summarized LIDT's for 2-CPW-LO-L/2-1030

Test mode	Threshold, J/cm <sup>2</sup>
1-on-1	54.50 ≤ 60.59 ≤ 67.01
1000-on-1	21.56 ≤ 24.85 ≤ 27.85

Measured at LIDARIS 2015-01-14

www.lidarisis.com

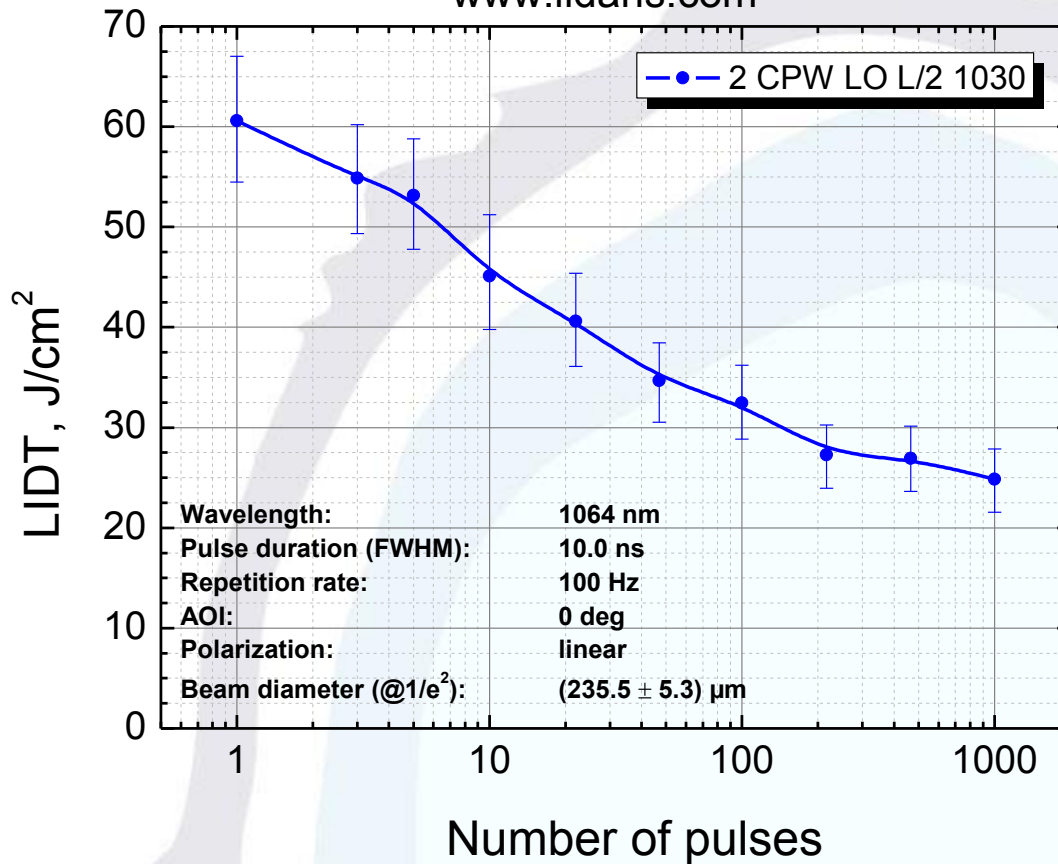
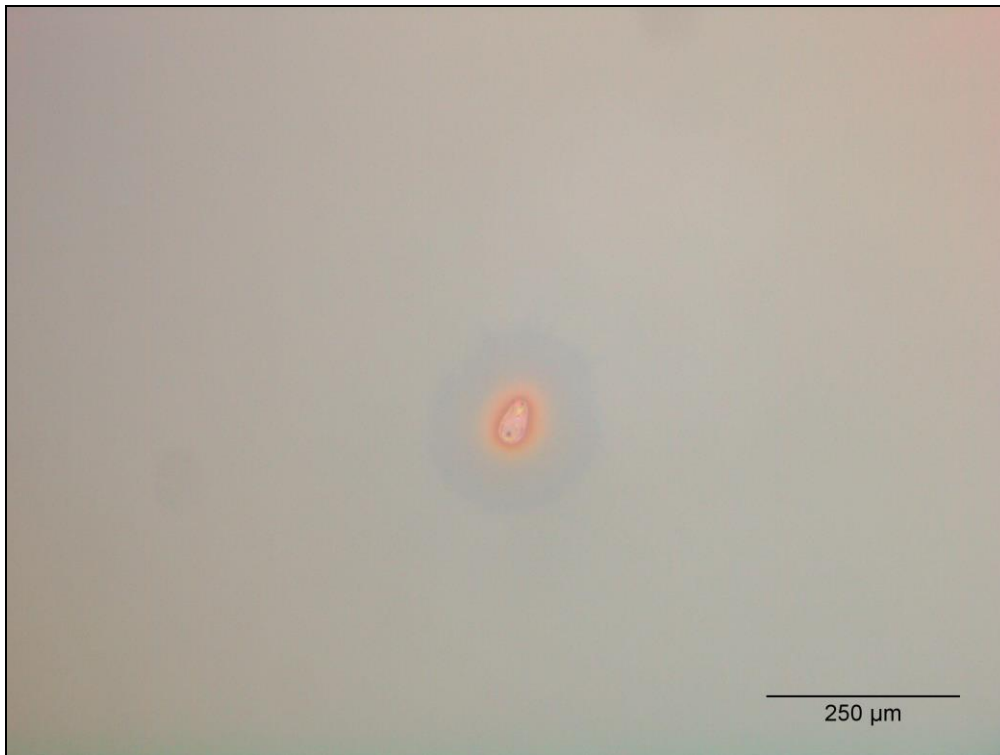


Fig. 2 Characteristic damage curve.

**Typical damage morphology:**



**Fig. 3 Typical in volume damage morphology  
(Energy density 62.39 J/cm<sup>2</sup>, damage after 1 pulse)**



**Fig. 4 Typical front surface damage morphology  
(Energy density 25.98 J/cm<sup>2</sup>, damage after 1000 pulses)**