

# Assurance of energy handling capability in accordance with ISO 21254-3

## Measurement Report

Sample: R16075-2

**Request from:** Central Laser Facility  
STFC Rutherford Appleton Laboratory  
Chilton, Didcot, OX11 0QX,  
United Kingdom

Contact person: Mariastefania De Vido

**Testing institute:** Lidaris Ltd.  
Saulėtekio al. 10,  
LT-10223, Vilnius,  
Lithuania, EU

Tester/date: L. Vigricitė / 2017-05-08

**Specimen**

Name of sample: R16075-2  
Type of specimen: Glass  
Storage, cleaning: Plastic box, wrapped in paper for optics

**Test specification**

Fundamental harmonic of pulsed Nd:YAG InnoLas Laser: SpitLight Hybrid laser ( $\lambda = 1064$  nm, linear polarization, pulse duration 10.0 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 used for testing**

Wavelength: 1064 nm  
Angle of incidence: 0 deg.  
Polarisation state: linear  
Pulse repetition frequency: 100 Hz  
Spatial beam profile in target plane: TEM<sub>00</sub>  
Longitudinal beam profile: Single longitudinal mode (SLM)  
Beam diameter in target plane ( $1/e^2$ ):  $(976.4 \pm 42.7) \mu\text{m}$  (average from 500 pulses)  
Pulse duration (FWHM):  $(10.0 \pm 0.4) \text{ ns}$  (average from 1000 pulses)

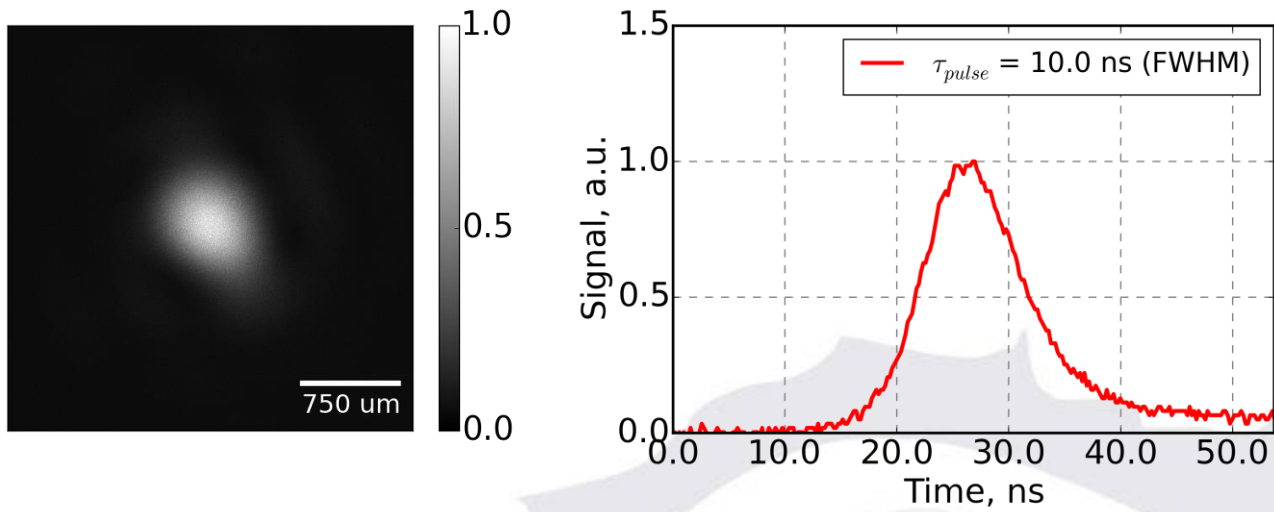


Fig. 1. Spatial beam profile in target plane (left) and temporal pulse profile (right).

**Test procedure:**

Assurance levels:

Number of sites per assurance level:

Number of shots per site:

Tested area:

Arrangement of test sites:

Damage detection:

Storage of the specimen:

Test environment:

Cleaning:

**Assurance of energy handling capability**

3.5, 5, 7.5, 10 J/cm<sup>2</sup>

449

1000

1 cm<sup>2</sup>

Hexagon, equally spaced, 50% overlap (Fig 2.)

Post-test inspection, Nomarski microscopy

Manufacturer's packaging,  
normal laboratory conditions

Industrial environment

Dust blown off with clean air

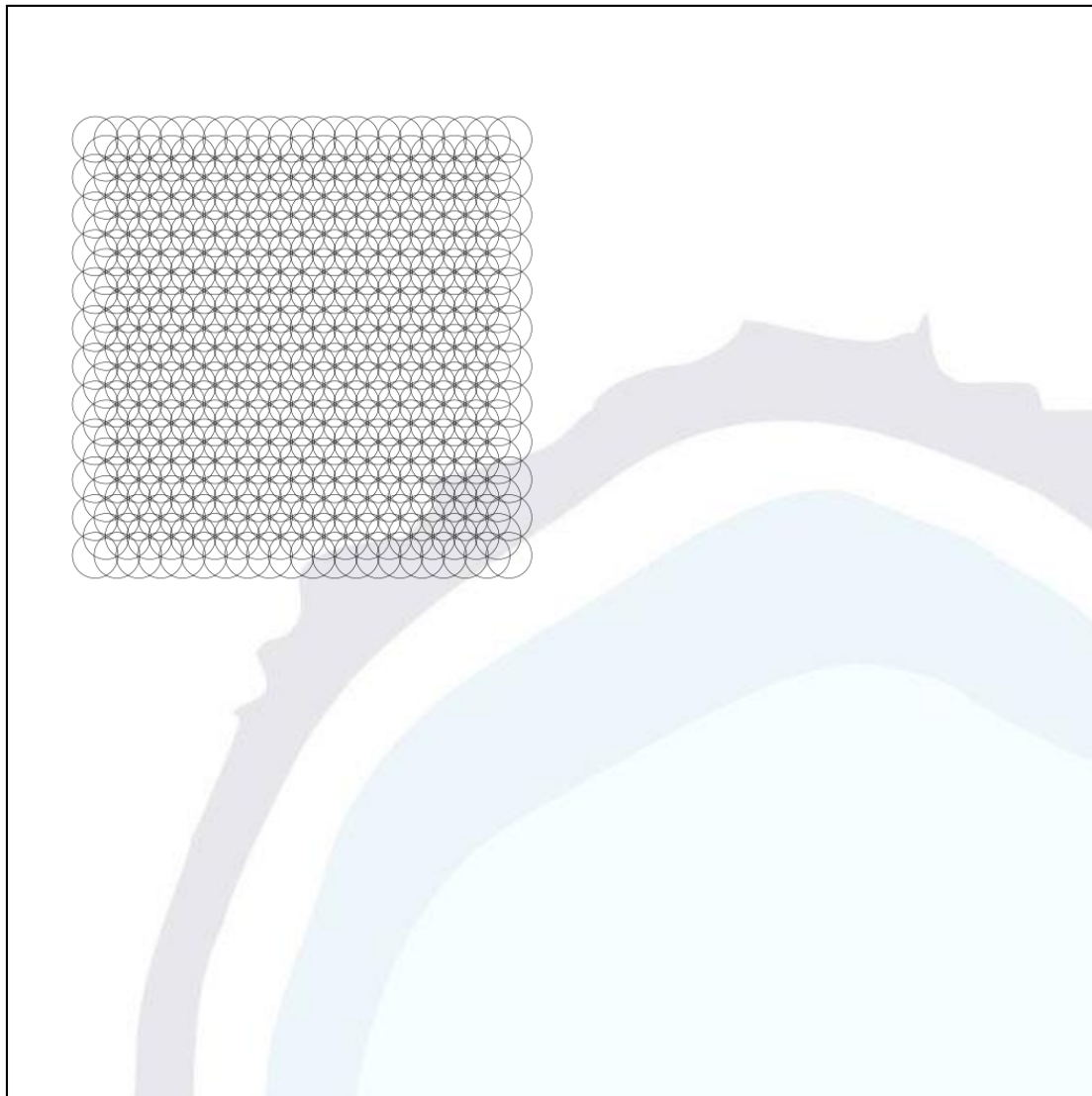


Fig. 2. Arrangement of test sites

**Test result:**

Table 1. Test results for sample R16075-2.

Assurance level	Result
$3.5 \pm 0.6 \text{ J/cm}^2$	Passed
$5.0 \pm 0.9 \text{ J/cm}^2$	Passed
$7.5 \pm 1.1 \text{ J/cm}^2$	Passed
$10.0 \pm 1.4 \text{ J/cm}^2$	Failed

**Typical damage morphology:**

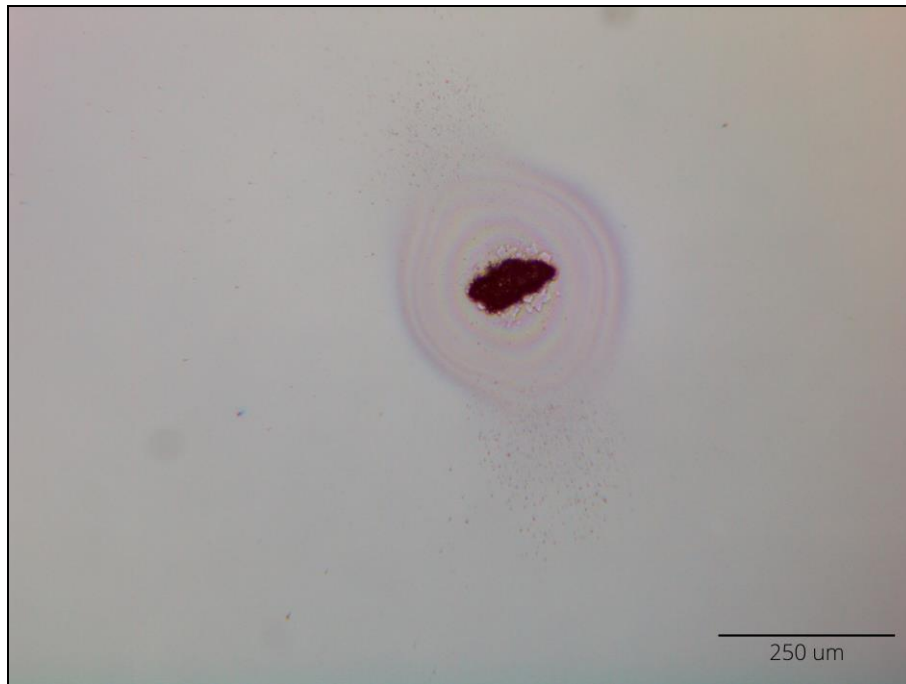


Fig. 3. Typical front surface damage morphology.



Fig. 4. Typical front surface damage morphology.