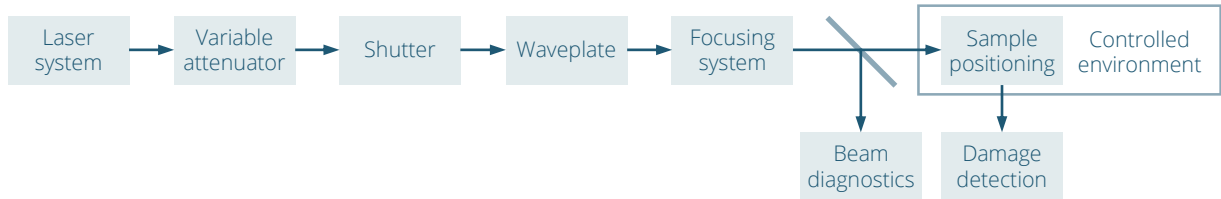


# TEST EQUIPMENT

## Test setup



## Laser and its parameters

Type	Q-switched, seeded Nd:YAG
Manufacturer	Ekspla
Model	NL940-100
Central wavelength	1535.0 nm
Angle of incidence	0.0 deg
Polarization state	Linear
Pulse repetition frequency	100 Hz
Spatial beam profile in target plane	Near Gaussian
Beam diameter in target plane (1/e <sup>2</sup> )	(182.6 ± 2.7) μm
Longitudinal pulse profile	Single longitudinal mode
Pulse duration (FWHM)	(3.7 ± 0.3) ns
Pulse to pulse energy stability (SD)	1.4 %

## Energy/power meter

Manufacturer	Ophir
Model	PE50-DIF-C
Calibration due date	2023-04-01

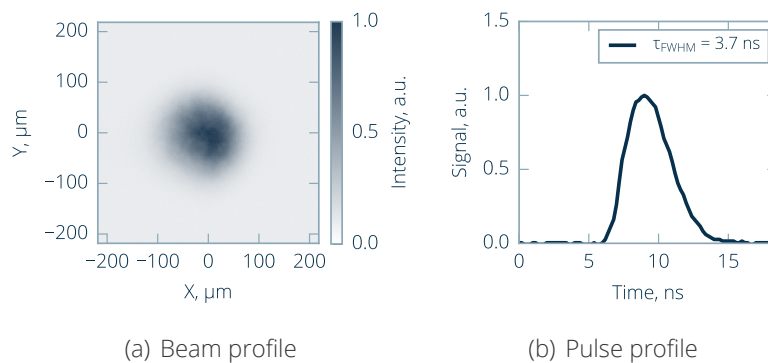


Figure 1. Laser parameters used for measurements.

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# TEST SPECIFICATION

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## Definitions and test description

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Laser-induced damage (LID) is defined as any permanent laser radiation induced change in the characteristics of the surface/bulk of the specimen which can be observed by an inspection technique and at a sensitivity related to the intended operation of the product concerned. Laser-induced damage threshold (LIDT) is defined as the highest quantity of laser radiation incident upon the optical component for which the extrapolated probability of damage is zero.<sup>1</sup>

LID of the sample is investigated by performing a standardized S-on-1 test procedure.<sup>2</sup> LIDT value is determined by taking the average of the highest fluence value before which no damage was observed and the lowest fluence value at which damage was first observed.

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## Test sites

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Number of sites	186
Arrangement of sites	Hexagonal
Minimum distance between sites	650 µm
Maximum pulses per site	1000

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## Analysis information

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Online detection	Scattered light diode
Offline detection	Nomarski microscope
Software version	9bd286d

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## Test environment

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Environment	Air
Cleanroom class (ISO 14644-1)	ISO7
Pressure	1 bar
Temperature	21.1 - 21.5 C
Humidity	49.9 - 54.3 %

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## Sample preparation

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Storage before test	Normal laboratory conditions
Dust blow-off	Canned air
Cleaning	Isopropanol

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<sup>1</sup>ISO 21254-1:2011: Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 1: Definitions and general principles, International Organization for Standardization, Geneva, Switzerland (2011)

<sup>2</sup>ISO 21254-2:2011: Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 2: Threshold determination, International Organization for Standardization, Geneva, Switzerland (2011)

# LIDT TEST RESULTS

## LIDT VALUES

Table 1: Estimated LIDTs from fitting model for sample M0001948 LOT0085960 ID 77520.

Test mode	Threshold (Offline detection - microscopy)
10 <sup>3</sup> -on-1	43.8 $\pm$ <sub>-3.8</sub> <sup>+3.9</sup> J/cm <sup>2</sup>

## DAMAGE PROBABILITY

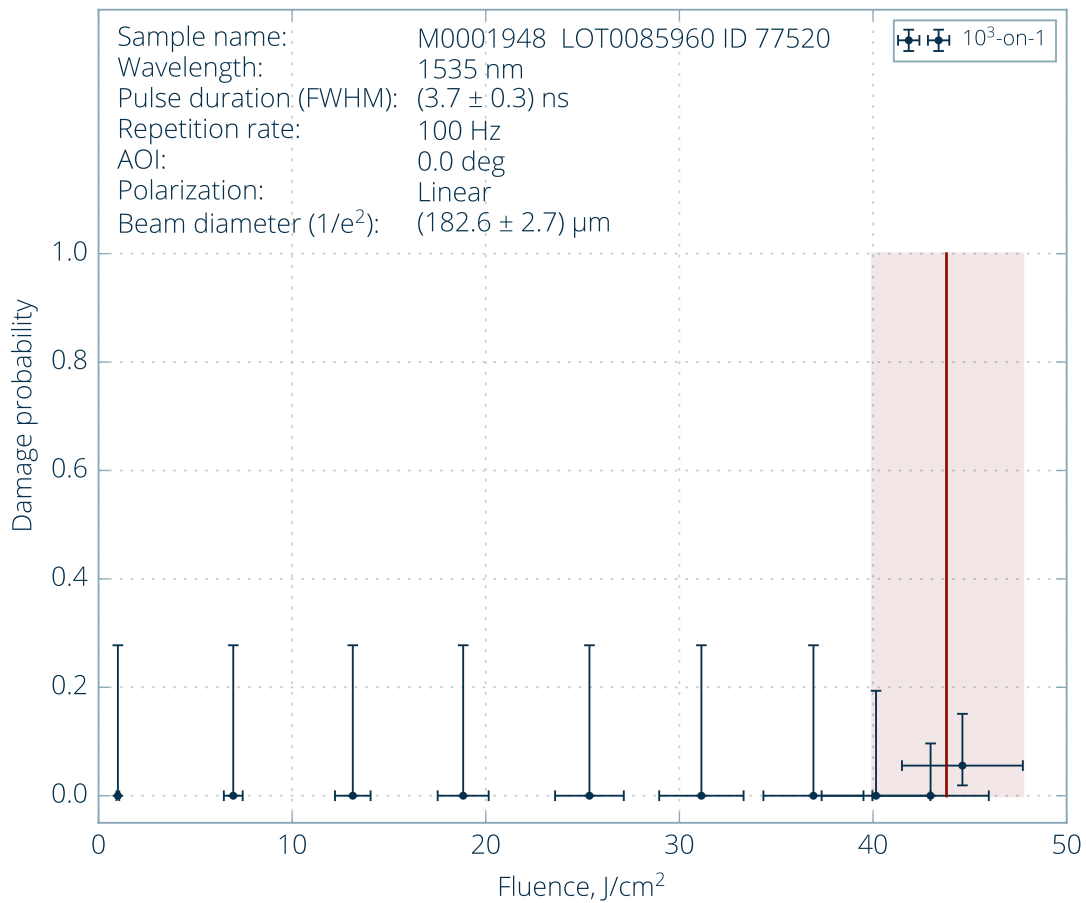


Figure 2. Damage probability plot.

## TYPICAL DAMAGE MORPHOLOGY

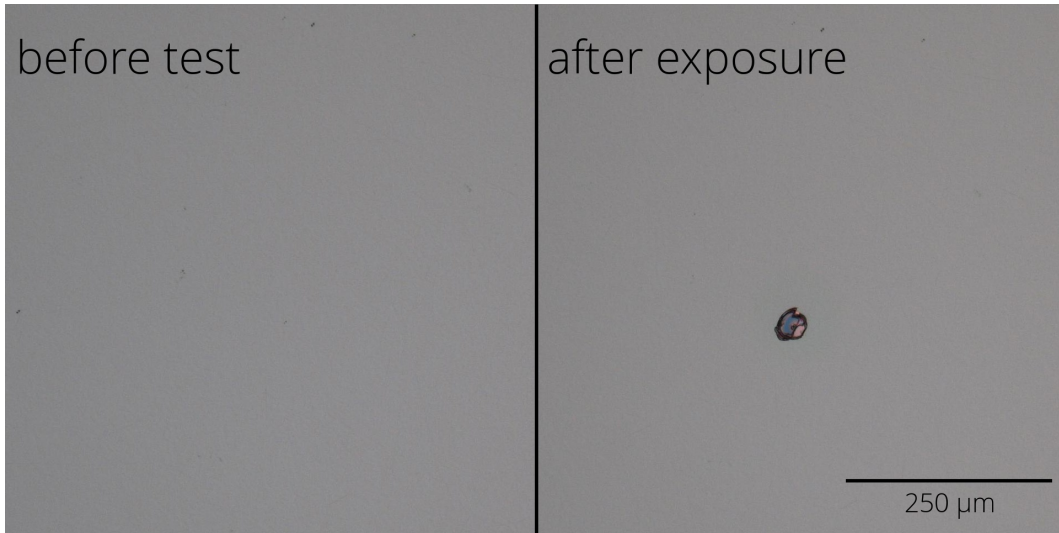


Figure 3. Typical damage morphology: fluence  $43.6 \text{ J/cm}^2$ , damage after 2 pulse(s).

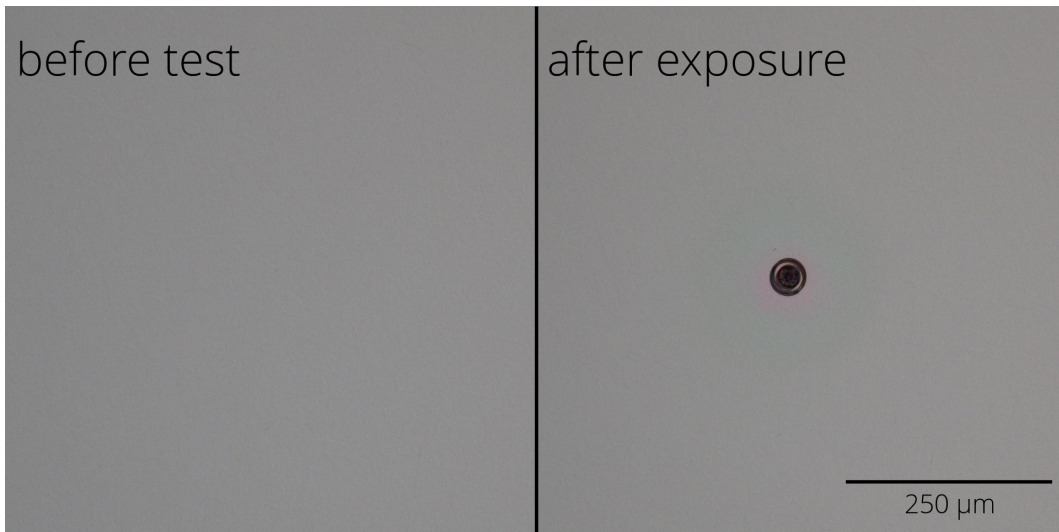


Figure 4. Typical damage morphology: fluence  $45.6 \text{ J/cm}^2$ , damage after 2 pulse(s).