LIDARIS
LIDT Service

LASER-INDUCED DAMAGE THRESHOLD (LIDT) MEASUREMENT REPORT

1-ON-1 (ISO 21254-1) TEST PROCEDURE

Sample: Sample

Request from

Address	Company Address Line 1 Address Line 2 Country
Contact person	Name Surname
Inquiry ID	Inquiry ID: 0001
Purchase order	-

Testing institute

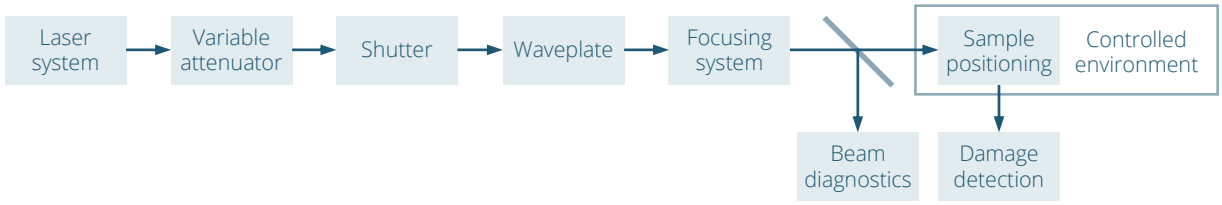
Address	UAB Lidaris Saulėtekio al. 10 10223 Vilnius Lithuania
Tester	Name Surname
Test date	01/01/2021
Sale order	SO0001
Test ID	-

Specimen

Name	Sample
Type	AR Coating (R(abs)<0.5% 370-550nm)
Dimensions	Ø12.7 x 1.5 mm
Packaging	Plastic box

TEST EQUIPMENT

Test setup

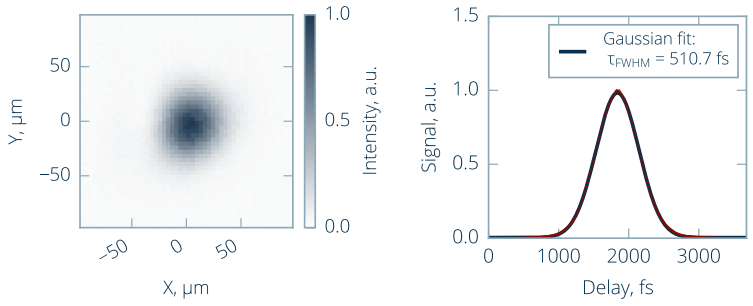


Laser and its parameters

Type	Mode-locked Yb:KGW
Manufacturer	Light Conversion
Model	Pharos SP
Central wavelength	515.0 nm
Angle of incidence	0.0 deg
Polarization state	Linear
Pulse repetition frequency	100 Hz
Spatial beam profile in target plane	TEM00
Beam diameter in target plane ($1/e^2$)	(79.7 ± 0.6) µm
Longitudinal pulse profile	Single longitudinal mode
Pulse duration (FWHM)	510.7 fs (assuming Gaussian pulse shape)
Pulse to pulse energy stability (SD)	0.3 %

Energy/power meter

Manufacturer	Ophir
Model	12A-P
Calibration due date	2021-06-01



(a) Beam profile (b) Pulse profile

Figure 1. Laser parameters used for measurements.

LIDARIS
LIDT Service

TEST SPECIFICATION

Definitions and test description

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. [1]

LID of the sample is investigated by performing a standardized 1-on-1 test procedure.[2]
LIDT value is determined by fitting experimental damage probability data with a model derived for a Poisson damage process assuming degenerate defect ensemble. [3]

Test sites

Number of sites	225
Arrangement of sites	Hexagonal
Minimum distance between sites	350 µm
Maximum pulses per site	1

Analysis information

Online detection	Scattered light diode
Offline detection	Nomarski microscope
Software version	d8e8d53 - b70360c

Test environment

Environment	Air
Cleanroom class (ISO 14644-1)	ISO8
Pressure	1 bar
Temperature	22 C
Humidity	20 %

Sample preparation

Storage before test	Normal laboratory conditions
Dust blow-off	Canned air
Cleaning	None

[1] 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)

[2] 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)

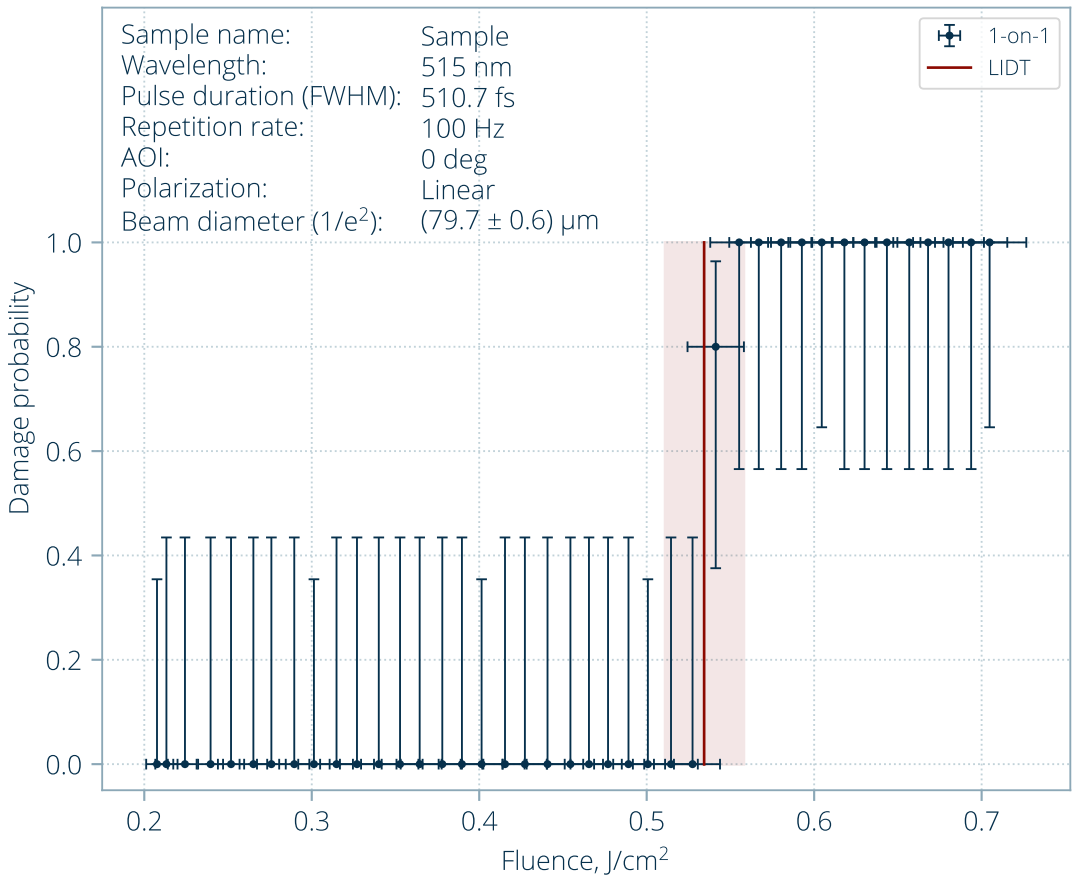
LIDT TEST RESULTS

LIDT VALUES

Table 1: Estimated LIDTs from fiting model for sample Sample.

Test mode	Threshold (Offline detection - microscopy)
1-on-1	$0.534\ ^{+0.024}_{-0.023}$ J/cm^2

DAMAGE PROBABILITY



(a) 1-on-1

Figure 2. Damage probability plot.

TYPICAL DAMAGE MORPHOLOGY

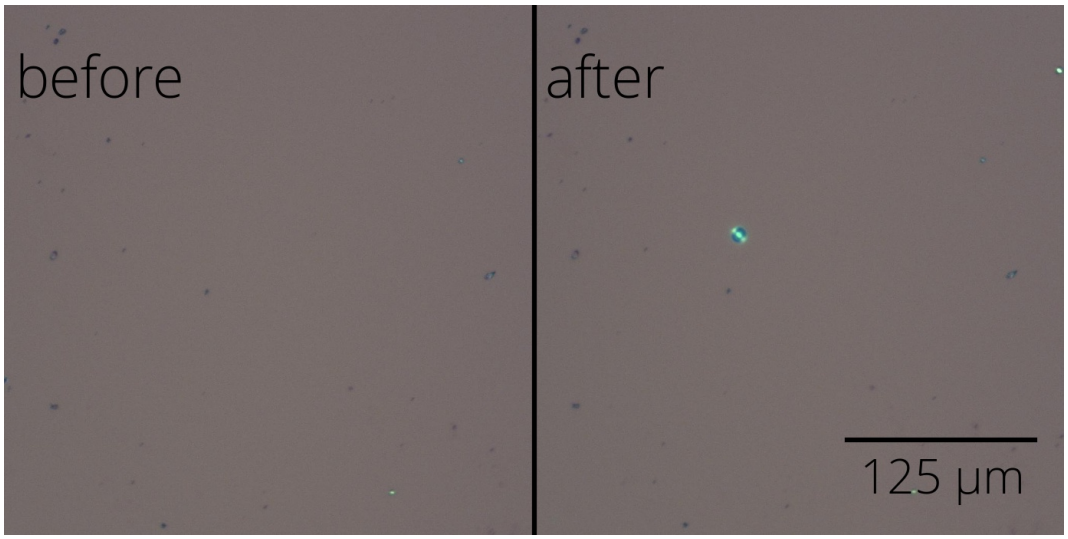


Figure 3. Typical damage morphology: fluence 0.606 J/cm^2, damage after 1 pulse(s).

Figure 4. Typical damage morphology: fluence 0.668 J/cm^2, damage after 1 pulse(s).