LASER-INDUCED DAMAGE THRESHOLD (LIDT) MEASUREMENT REPORT

DAMAGE CERTIFICATION (ISO 21254-3) TEST PROCEDURE

SAMPLE: SU012564 M0074798 LOT0056696_1

Request from	
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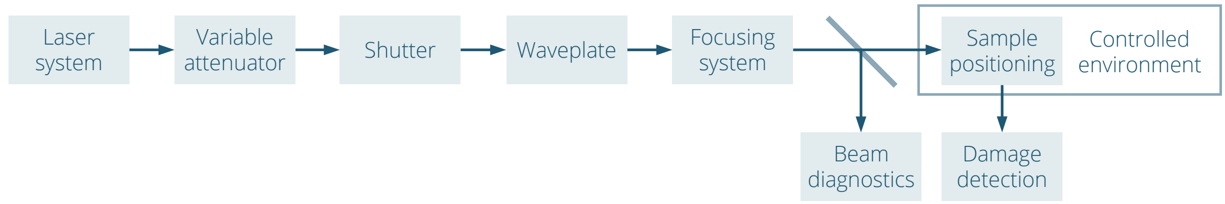
Contact person	Aurelija Vasiljeva
Purchase order	PU0015184-AVA

Testing institute	
Address	UAB Lidaris Saulėtekio al. 10 10223 Vilnius Lithuania
Tester	Egidijus Pupka
Test date	2019-10-24
Sale order	SO1513
Test ID	E618MK

Specimen	
Name	SU012564 M0074798 LOT0056696_1
Type	AR Coating (Rs>98% @2075nm + Rp<70% @ 2075-2105 nm + R<7% @ 1903nm, AOI 45°)
Packaging	Plastic box

TEST EQUIPMENT

Test setup

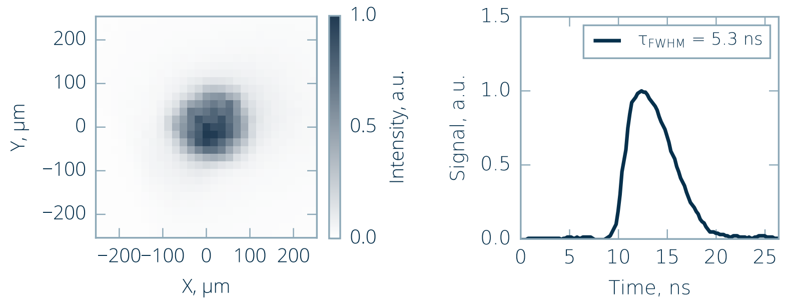


Laser and its parameters

Type	Q-switched, seeded Nd:YAG
Manufacturer	InnoLas Laser II
Model	SpitLight Hybrid with OPO
Central wavelength	2090.0 nm
Angle of incidence	45.0 deg
Polarization state	Linear S
Pulse repetition frequency	100 Hz
Spatial beam profile in target plane	Near Gaussian
Beam diameter in target plane ($1/e^2$)	(169.7 ± 0.9) μm
Longitudinal pulse profile	Single longitudinal mode
Pulse duration (FWHM)	(5.3 ± 0.4) ns
Pulse to pulse energy stability (SD)	3.1 %

Energy/power meter

Manufacturer	Ophir
Model	PE50-DIF-C
Calibration due date	2020-07-01



(a) Beam profile (b) Pulse profile

Figure 1. Laser parameters used for measurements.

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]

Fluence handling capability of the sample is investigated by performing a standardized test procedure.[2]

Test sites

Assurance value	J/cm^2
Number of sites	119
Arrangement of sites	Hexagonal
Minimum distance between sites	600 µm
Maximum pulses per site	1000

Damage detection

Online	Scattered light diode
Offline	Nomarski microscope

Test environment

Environment	Air
Cleanroom class (ISO 14644-1)	ISO7
Pressure	1 bar
Temperature	24 C
Humidity	36 %

Sample preparation

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

[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 21254-3:2011: Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 3: Assurance of laser power (energy) handling capabilities, International Organization for Standardization, Geneva, Switzerland (2011)

LIDT TEST RESULTS

FLUENCE HANDLING CAPABILITY

Table 1: Fluence handling capability of sample SU012564 M0074798 LOT0056696_1.

Fluence	Pulses	Result
(17.2 ± 1.2) J/cm^2	1000	Passed
(23.6 ± 1.6) J/cm^2 (scaled to 10 ns)	1000	Passed

LIDARIS
LIDT Service

TECHNICAL NOTES

TECHNICAL NOTE 1: Oblique incidence

According to the ISO 21254-2:2011 standard, for spatial beam profiling perpendicular to the direction of beam propagation and angles of incidence differing from 0 degrees, the cosine of the angle of incidence is included in the calculation of the effective area, which leads to correct evaluation of laser fluence at different angles of incidence (Figure 2).

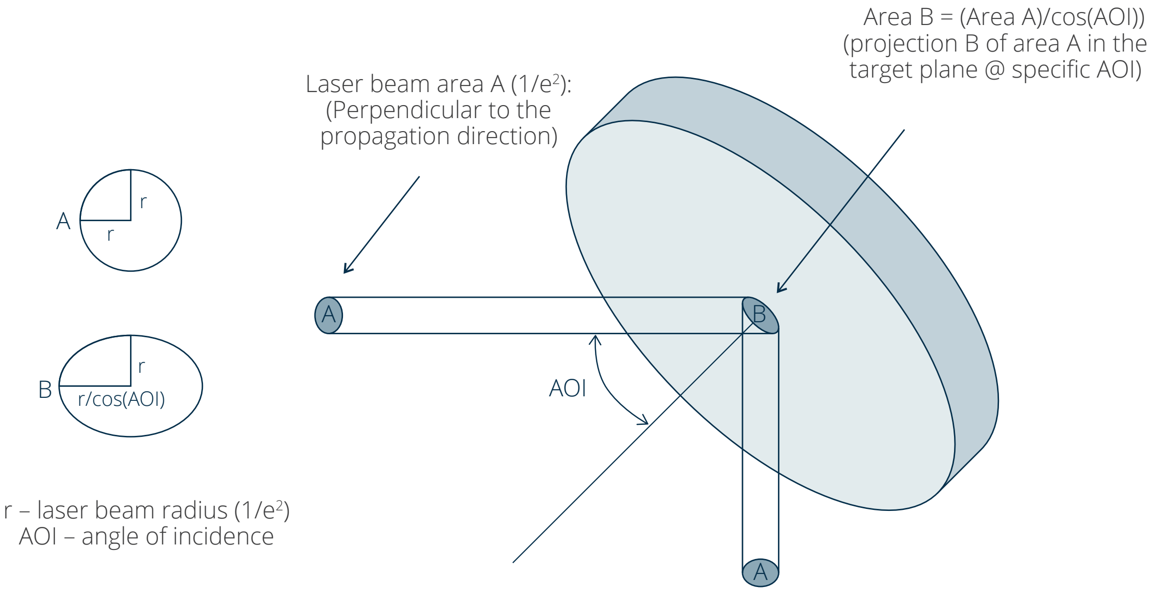


Figure 2. Oblique incidence.