Laser Induced Damage Threshold (LIDT):
(S-on-1 test procedure: ISO 11254 – 2)

Customer/contact person: UAB Altechna/Aurimas Galinis

Testing institute

Testing institute: Vilnius University,
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Vilnius, Lithuania

Tester/date: J. Mirauskas / 2010-07-08

Specimen

Name of sample: fs1030_band A;
Storage, cleaning: No cleaning.

Test specification

First harmonic of pulsed Kerr lens mode locked Yb:KGW "Pharos" laser (λ = 1030 nm, linear polarization P, pulse duration 320 fs), $\lambda/2$ plate combined with additional polarizer attenuator, online scattered light damage detection, offline inspection of damage detection using Nomarski microscopy (100x).

Laser parameters

Wavelength: 1030 nm;
Angle of incidence: 0 deg;
Polarisation state: linear;
Pulse repetition frequency: 50 kHz;
Spatial beam profile in target plane: TEM_{00};
Longitudinal beam profile: Multimode;
Beam diameter in target plane$_{(1/e^2)}$: 96 µm (average from 30 pulses);
Pulse duration: 320 fs;

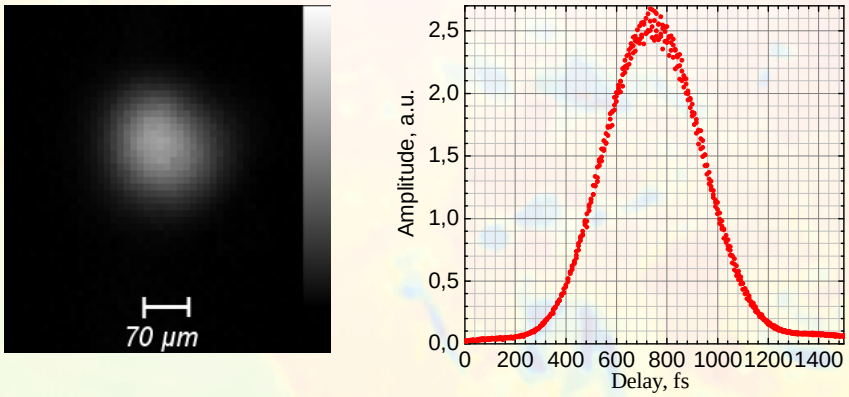

Fig. 1. Spatial beam profile in target plane and pulse autocorrelation function.

Test procedure: S-on-1 test

Number of sites per specimen:	703;
Arrangement of test sites:	Equally spaced;
Minimum distance between sites:	300 μm;
Damage detection:	Scattered light diode;
Storage of the specimen:	Plastic container;
Test environment:	Industrial environment;
Cleaning:	No;
Definition of LIDT:	Linear fit to 0% of damage probability;

Test result of fs1030_bandA

LIDT $_{1\text{-on-}1}$ = 1.66 ± 0.2 J/cm^2
LIDT $_{100000\text{-on-}1}$ = 0.59 ± 0.06 J/cm^2

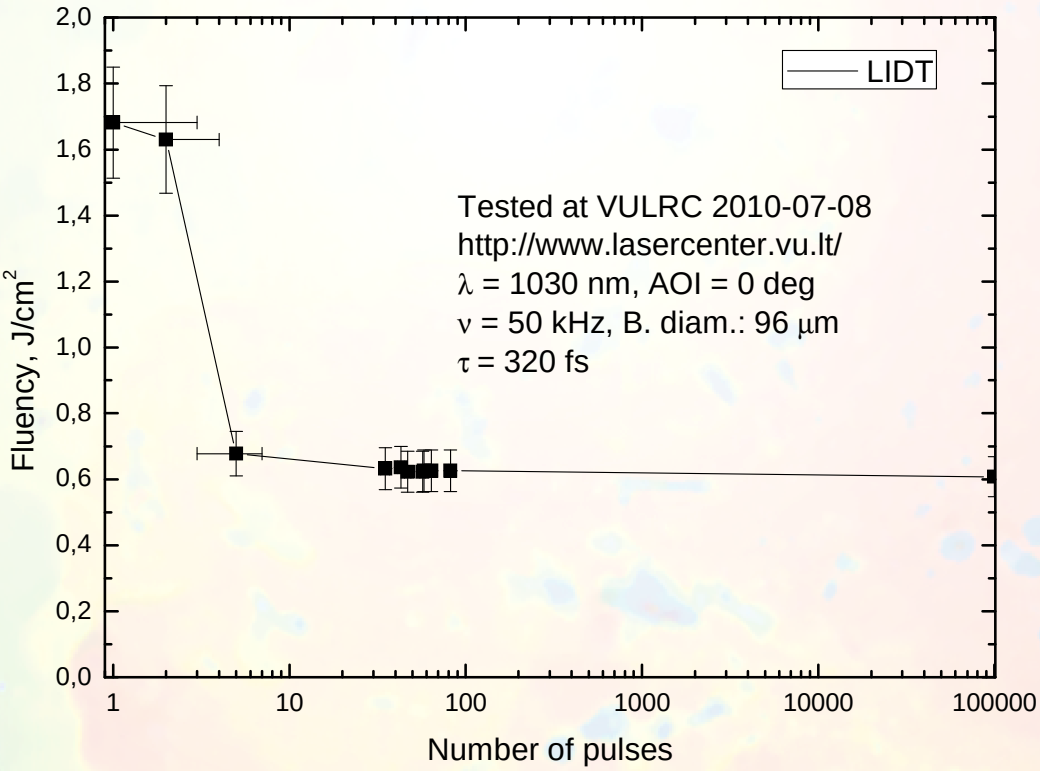

Fig. 6. Characteristic damage curve.

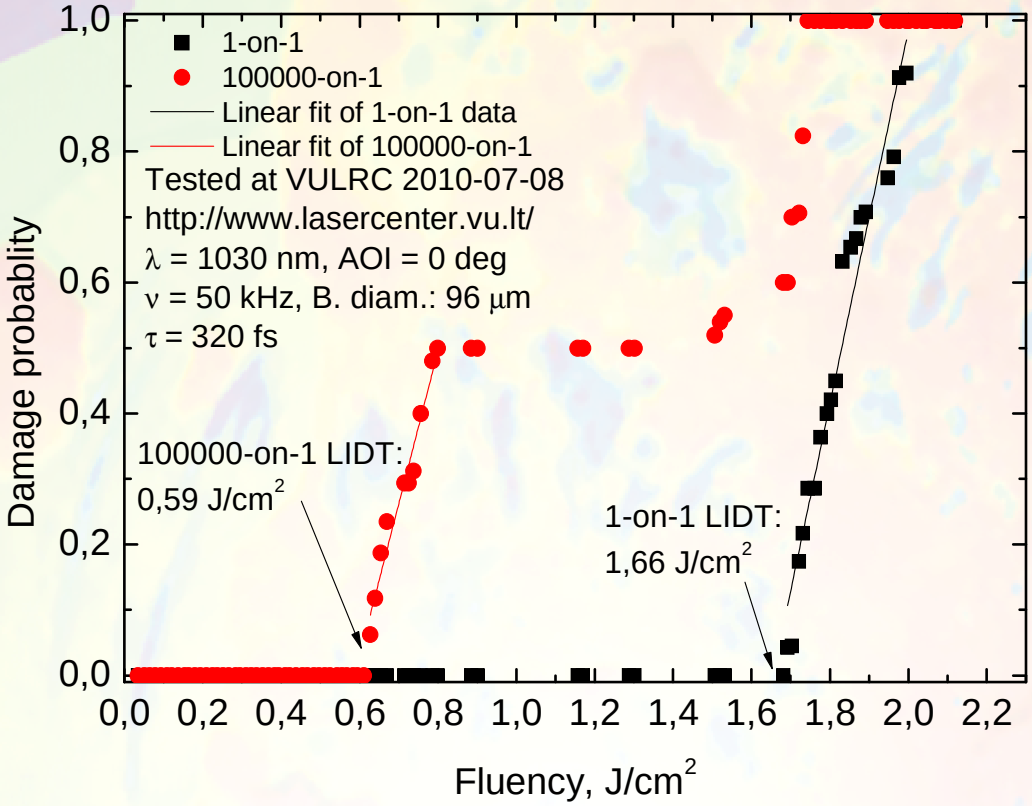

Fig. 7. Damage probability.

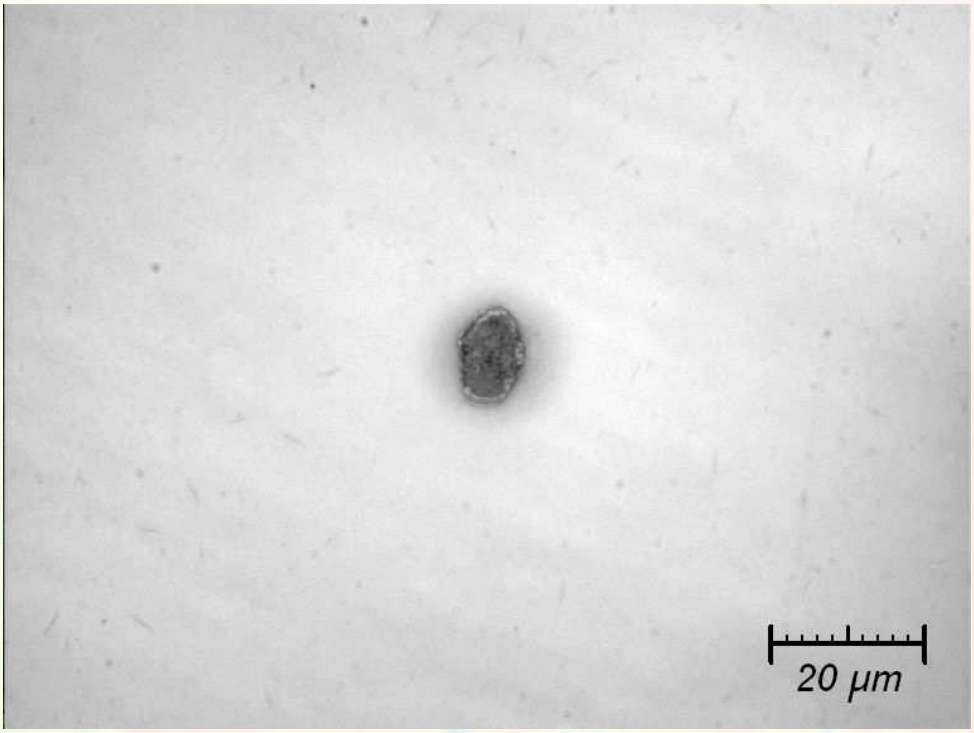

Fig. 8. Typical damage morphology
(Energy density 1,79 J/cm^2, damage after 2 pulses)

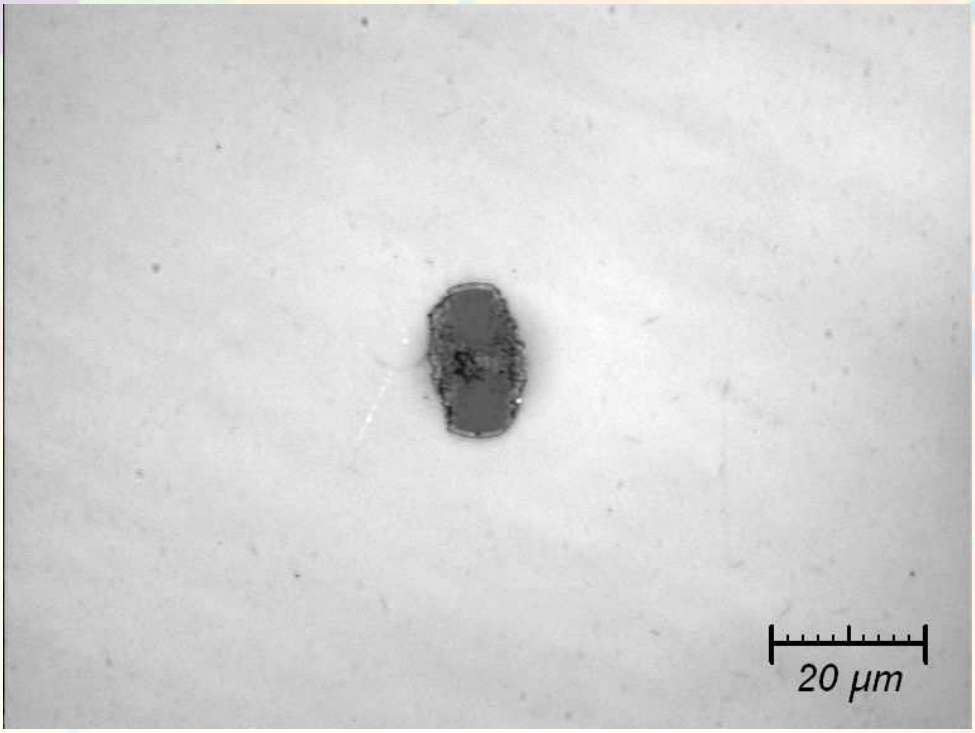

Fig. 8. Typical damage morphology
(Energy density 1,8 J/cm^2, damage after 1 pulse)