

DIN EN ISO 21254-1:2026-02 (E)

Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 1: Definitions and general principles (ISO 21254-1:2025)

| Contents | | Page |
|---------------------|---|-------------|
| Foreword | | v |
| Introduction | | vi |
| 1 | Scope | 1 |
| 2 | Normative references | 1 |
| 3 | Terms and definitions | 1 |
| 3.1 | Terms and definitions | 2 |
| 3.2 | Symbols and units of measurement | 3 |
| 4 | Units of laser irradiation, LIDT and pertinent units | 4 |
| 5 | Laser damage, damage threshold and associated criteria | 4 |
| 5.1 | General laser damage criteria | 4 |
| 5.1.1 | General | 4 |
| 5.1.2 | Classical criterion of laser-induced damage | 5 |
| 5.1.3 | Functional criterion of laser-induced damage | 5 |
| 5.1.4 | Failure mode | 5 |
| 5.1.5 | Laser-induced damage threshold (LIDT) | 5 |
| 5.1.6 | Functional laser-induced damage threshold (F-LIDT) | 5 |
| 5.1.7 | Method of damage threshold calculation | 5 |
| 5.2 | Techniques of laser damage interrogation and related terms | 5 |
| 5.2.1 | General | 5 |
| 5.2.2 | Classical 1-on-1 test | 6 |
| 5.2.3 | Classical S-on-1 test | 6 |
| 5.2.4 | Functional R(S)-on-1 test | 6 |
| 5.2.5 | Functional raster scan test | 6 |
| 5.2.6 | Acceptance test "pass-fail" | 6 |
| 5.2.7 | Laser-induced fatigue | 6 |
| 5.2.8 | Characteristic damage curve or fatigue curve | 6 |
| 5.2.9 | Laser-induced conditioning | 6 |
| 5.2.10 | Conditioning curve | 7 |
| 5.3 | Parameters of testing, sampling and reporting | 7 |
| 5.3.1 | Typical pulse | 7 |
| 5.3.2 | Laser irradiation level, L | 7 |
| 5.3.3 | Maximum irradiation dose | 7 |
| 5.3.4 | Applied irradiation dose | 7 |
| 5.3.5 | Target plane | 7 |
| 6 | Sampling | 7 |
| 7 | Test methods | 8 |
| 7.1 | Principle | 8 |
| 7.2 | Apparatus | 9 |
| 7.2.1 | Laser | 9 |
| 7.2.2 | Variable attenuator and beam delivery system | 9 |
| 7.2.3 | Focusing system | 9 |
| 7.2.4 | Specimen holder | 10 |
| 7.2.5 | Damage detection and inspection systems | 10 |
| 7.2.6 | Beam diagnostic unit | 10 |
| 7.3 | Preparation of specimens for testing | 13 |
| 7.4 | Procedure | 14 |

| | | |
|--|---|-----------|
| 8 | Accuracy of peak irradiation level | 15 |
| 8.1 | General..... | 15 |
| 8.2 | Relative standard deviation of peak fluence | 15 |
| 8.3 | Relative standard deviation of peak irradiance | 15 |
| 8.4 | Relative standard deviation of linear power density..... | 16 |
| 8.5 | Relative standard deviation of average peak irradiance..... | 16 |
| 9 | Test report | 17 |
| Annex A (normative) General usage notes | | 19 |
| Bibliography | | 29 |