

VINCENT ASSOCIATES

LASER APPLICATION REFERENCE SHEET

This document is provided to be used as a reference guide for the Laser Application Worksheet, which is seen as a sample on page 2. The part number of the related worksheet is 11-0010 and its filename is "laser.xls", which is an Excel file. A working version of the worksheet, which performs calculations, can be obtained from Vincent Associates by contacting a technical representative or downloading it from the "resources" section of the website at "<http://www.uniblitz.com/resources.cfm>".

The Laser Application Worksheet of page 2 is intended to help define a customer's laser characteristics. The power and/or energy density levels of an applicable laser beam need to be known in order to determine if the damage thresholds of our shutter blades are exceeded. The blades of a Uniblitz shutter are comprised of thin metal substrates and are not able to withstand high amounts of laser power and/or energy. The main purpose of the worksheet is to compare our known shutter blade damage thresholds with the calculated Irradiance and Fluence values of a customer's laser. All calculated laser densities, if applicable, must be less than the known shutter blade damage thresholds in order for a shutter to be able to reliably operate.

The section under the column "CONTACT INFORMATION" is provided for customers and/or end-users. This information is required for those that wish to receive a sample of an applicable shutter blade. It is recommended to provide information for each row of this column.

The section under the column "SAMPLE INFORMATION" is intended for use by a technical representative of Vincent Associates. This information is used to identify an appropriate shutter blade for a laser application. The available shutter blade samples are listed underneath the row "Blade Type". Each different blade type (denoted S, T, Z, ZM, G, W or M) has different properties as related to wavelength and damage threshold.

The section contained in the 3 x 7 chart is where the specifications of an applicable laser are entered and calculations are automatically performed. This chart will also display the damage thresholds associated with a specific shutter blade at a certain wavelength. Damage thresholds are also calculated based upon interpolation with the user-provided wavelength. The calculations of Irradiance and Fluence are used to compare with the calculated damage thresholds in the adjacent column cells. Each field of the chart is referenced by letters A, B and C for the columns and numbers 1 to 7 for the rows.

The following fields are required to be entered with data and an explanation of each is provided:

- A1 LASER TYPE - choose either CW (continuous wave) or Pulsed; text information only.
- A2 BEAM SIZE - enter the laser beam diameter or cross-sectional dimensions (if not round).
- A3 WAVELENGTH - enter the laser's operational wavelength (or shortest wavelength if multiple).
- A4 CW POWER - if a CW laser, enter the rated or maximum power in units of Watts.
- A5 PULSE ENERGY - if a Pulsed laser, enter the energy per pulse in units of Joules.
- A6 PULSE WIDTH - if a Pulsed laser, enter the laser beams pulse width in units of seconds.
- A7 PULSE FREQUENCY - if a Pulsed laser, enter the laser's pulse repetition frequency in Hertz.

The section defined as "COMMENTS" is provided for users to record any pertinent information. This section can also be used for additional notes or conclusions from test results.

The section defined as "NOTES" provides reference information related to the Laser Application Worksheet.

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LASER APPLICATION WORKSHEET

CONTACT INFORMATION

Name : _____
Title : _____
Company : _____
Address : _____

e-mail : _____
phone1 : _____
phone2 : _____
Fax : _____

SAMPLE INFORMATION

Date : _____
Issued by : _____
QTY : _____
Series : _____
Blade type : _____
S = polished stainless-steel
T = TEFLON over stainless-steel
Z = AISiO over BeCu (Aluminum)
ZM = AlMgF₂ over BeCu (Aluminum)
G = AuMgF₂ over BeCu (Gold)
W = AgMgF₂ over BeCu (Silver)
M = polished BeCu (Copper)

| | A | B | C |
|---|-------------------------------|---|--|
| 1 | LASER TYPE (CW or Pulsed) | CALCULATIONS | DAMAGE THRESHOLDS |
| 2 | BEAM SIZE - diam. or LxH (mm) | AREA - cross sectional (mm ²) | PULSED THRESHOLD (mJ/mm ²) |
| 3 | WAVELENGTH (nm) | RATIO (nm/nm) | PULSED THRESHOLD (kW/mm ²) |
| 4 | CW POWER (Watts) | CW IRRADIANCE (W/mm ²) | CW THRESHOLD (W/mm ²) |
| 5 | PULSE ENERGY (Joules) | FLUENCE (mJ/mm ²) | DAMAGE THRESHOLD (mJ/mm ²) |
| 6 | PULSE WIDTH (seconds) | PEAK IRRADIANCE (kW/mm ²) | DAMAGE THRESHOLD (kW/mm ²) |
| 7 | PULSE FREQUENCY (Hz) | AVERAGE IRRADIANCE (W/mm ²) | DAMAGE THRESHOLD (W/mm ²) |

Comments : _____

- NOTES:**
1. Refer to document #11-0011 for information on how to use this worksheet.
 2. CW is a designation for Continuous Wave.