

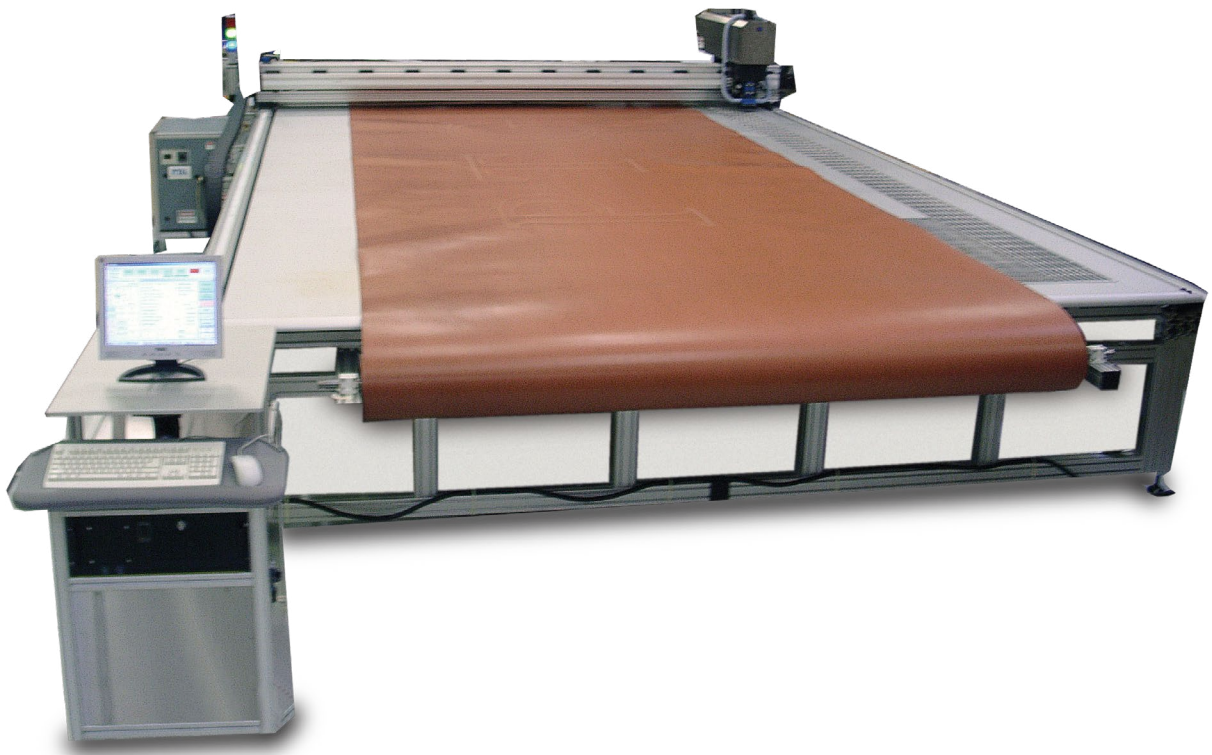
***SBM*2800**

LARGE FORMAT LASER PATTERN CUTTING SYSTEM

Overview

Process Material – The system is designed to cut Template Paper or Fabric (flat or rolled 120" wide), Wood, Cypress Board, Acrylic and Foam. Automatic feeding and take-up function for paper rolls is optional.

- **XY Speed:** 3m/sec 2 acceleration to 800mm/sec velocity
- **Z-axis** controlled by computer to accommodate the different thickness of template materials with 60 mm stroke.
- **Mechanical construction:** A solid, stable, light extruded frame; horizontally stiff gantry, precision linear servo-drives, Ultra Smooth Motion, THK Linear Bearings.
- **Cutting area** –broken down to accommodate the different template sizes and materials: paper, board, wood, acrylic, foam and fabric
- **Cutting area** is equipped with:
 - **Vacuum table** material holding device for thin or flexible materials, with feed and take-up rollers for manual loading of stock rolls
 - **Honeycomb** structure for board and wood, acrylic and foam
- **Controller:** Galil 4 axis
- **Flatbed Laser Cutting System** can provide highly accurate cutting.
- **Ease of installation** gives the system "plug-n-play" characteristics and quick startup times.



SBM 2800 Large Format Laser Pattern Cutting Machine Specifications

- Maintenance free sealed CO₂ laser system
- Industrial grade computer
- Remote operation
- Touch screen interface
- Sealed, maintenance free optical path
- SBM 2800 Cutting™ software

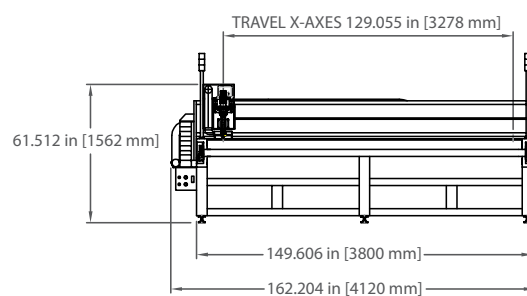
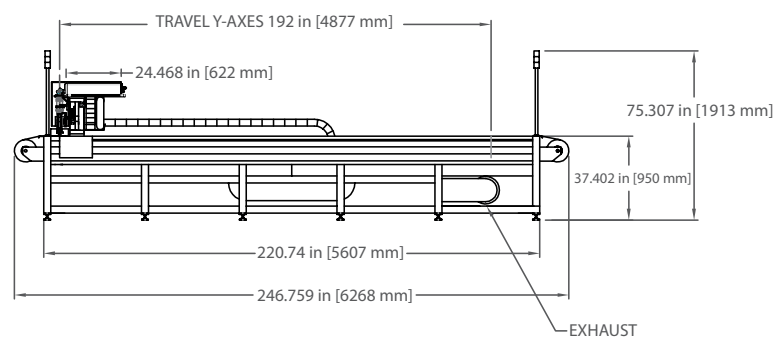
Laser Equipment (Standard)	Sealed CO ₂ Laser
Laser Power	400 Watt Pulsed
Wave Length	10.6 µm
Polarization	45°
MTBF Of Laser Source	20,000 hour
Cooling Systems	External closed loop laser cooling system (stand alone)
Chilled Water	Max input temperature 20° +/- 1° C Min input water pressure 2 Bars; 6 lit/min
Battery Back Up	1.4 KVA APC® UPS (For computer Operations)
Computer	Industrial grade computer
Cutting Area Size	120 in x 120 in [3048 mm x 3048 mm]
Cutting speed	10-800 mm/s
Minimum Addressable Resolution	0.01 mm
Repeatability	+/- 0.020 mm
Assist Gas	Nitrogen or Carbon dioxide

SBM2800 Mechanical Specifications

Machine Height	75.3 in (1913 mm) with safety lights
Weight	20,000 lbs (9072 kG)
Motion system	Direct Drive linear servo motor
Travel X-axis	20 ft (6096 mm)
Travel Y-axis	10 ft" (3048 mm)
Travel Z-axis	2 in (50mm)
Encoder resolution	10 mkm
Chilled Water	Max input temperature 20 o +/-1° C Min input water pressure 2 Bars; 6 lit/min
Cooling Systems	External closed loop laser cooling system (stand alone)

Technical drawing of the Red Template Paper (Figure 10) showing dimensions and cutting areas. The drawing includes the following dimensions and labels:

- CUTTING AREA** (top left)
- CUTTING AREA** (middle left)
- 120 in [3048 mm]** (vertical dimension on the left)
- 96 in [2438 mm]** (vertical dimension on the left)
- 48 in [1219 mm]** (horizontal dimension at the bottom left)
- 192 in [4877 mm]** (horizontal dimension at the bottom center)
- 220.74 in [5607 mm]** (total horizontal dimension at the bottom)
- 7.48 in [190 mm]** (horizontal dimension at the top right)
- 6.732 in [171 mm]** (horizontal dimension at the top right)
- 140.157 in [3560 mm]** (vertical dimension on the right)
- 120 in [3048 mm]** (vertical dimension on the right)
- CUTTING AREA FOR RED TEMPLATE PAPER** (bottom right)



SBM 2800 Facility Specifications

Recommended Facility Specifications and Description

Reinforced Concrete Slab

The floor on which the system stands must be free from movement caused by actual cracking, or even "breathing" caused by expansion and contraction of cracked floors. This movement could alter the alignment of the Beam delivery and motion systems, requiring shut down for realignment. The floor (Slab) contains two covered channels or "hawse pipes" for power and control cables (on one side) and power, control, cooling and gas (air) ducting (on the other). The slab should be rated to support the weight of the system 20,000 lbs (9072 kG)

Room / System Layout

The Laser Pattern Cutter is centered in the work room with power, controls, cooling and assist gas (air) supplied from covered floor channels. An air handler (supplied) provides Table vacuum and air bearing pressure directly to the cutting table for material hold-down and "float" positioning. Fume extraction from the laser head is vented (via Tube Hangars) to a larger tube from the cutting table, and then vented together through a ceiling vent (to an extraction system supplying 300 CFM). Overhead explosion proof light fixtures are required for Table illumination. Fire suppressant is required from overhead sprinklers. Wall and ceiling coverings should be fire resistant and antistatic. Fire resistant roller doors with interlocks allow pattern material loading and unloading. A Local Area Network connection is required on the wall below the observation window for the Control Console.

Power

460v 3phase Y, 5 wire, 50A 60 hz Power connection is located between the door and the Observation Window. Laser Photonics will supply all system cabling and connections from this connection point, including spare outlets on the Laser Cutter and Control Console.

Assist Gas

Assist Gas Consumption. Diameter: 1.5 mm²; Pressure 0.5 atm; N₂ ~ 110 cubic foot/hour.

Ventilation

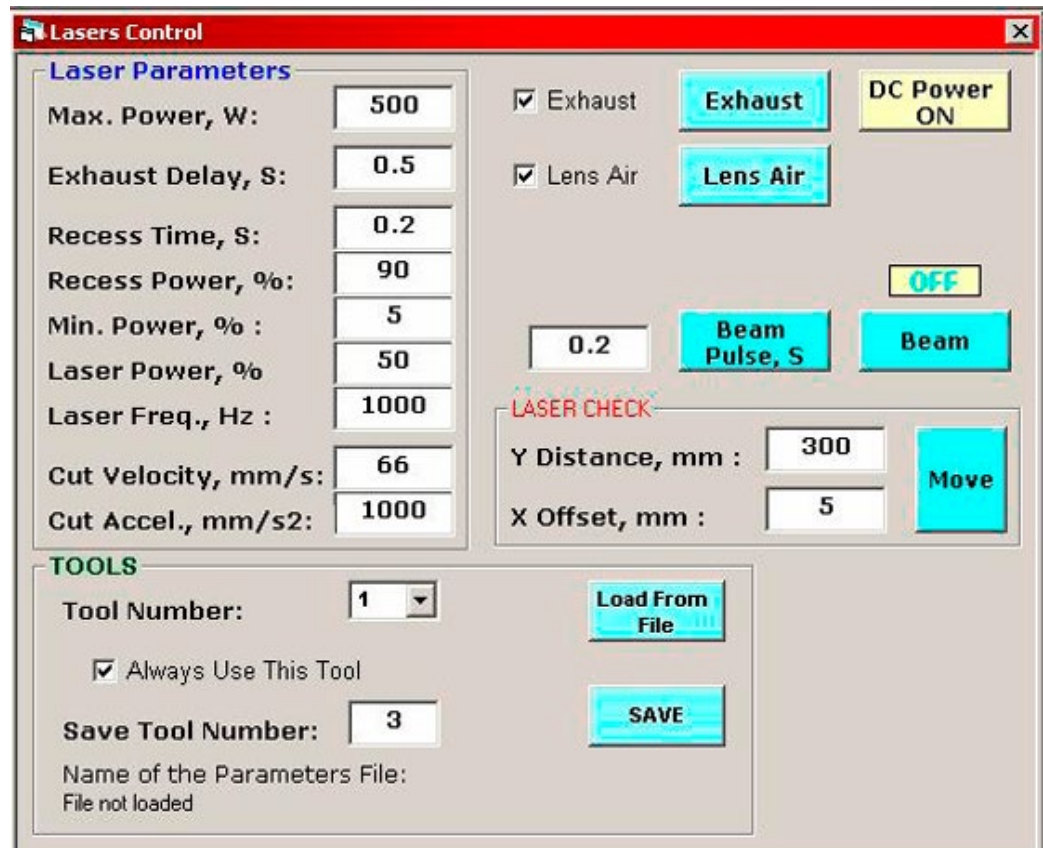
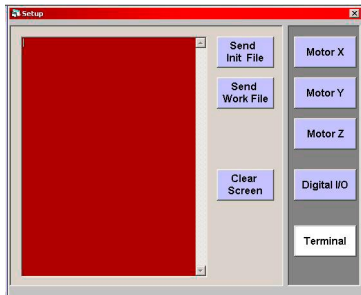
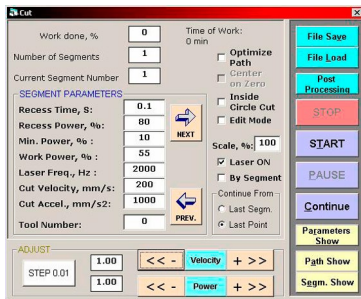
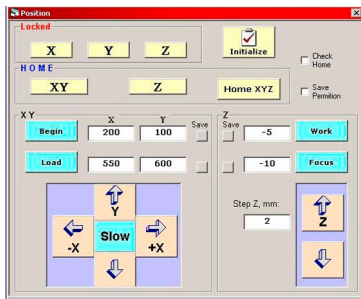
Room ventilation is required to deliver and extract total room volume 3 times per hour. Separate overhead exhaust ventilation is also required to extract fumes at 500 CFM.

Material-In / Material-Out Work Flow

With roll-doors open, pattern material is manually placed and aligned on appropriate sections of the Laser Cutting Table with the aid of air bearings generated through the table. Each section of the cutting table is designed to handle material of a specific type and dimension. The load operator(s) leave the room and with the doors closed, the operator now activates through the keyboard a CAD drawing previously downloaded to the Control Console from a secure remote network. The table air now creates a partial vacuum, holding the material in place while the laser cuts the material according to the design and dimensions on the drawing and returns to its starting location. Positive flow from the assist gas eliminates uncontrolled oxidization of the material and reduces smoke and fumes. What fumes remain are extracted and vented up through the ceiling and out. The doors are opened, the finished patterns and excess material are unloaded and removed from the second doorway, and new material is loaded from the opposite door.

Operating Temperature	+18 to +25° C
Relative Humidity	40 80% non-condensing
Electrical Requirements	460 Volts 5 wire "Y", 60 Hz, 50 A
Clean Dry Air	8 ATM @ 2 CFM, <20% humidity
Chilled Water	Max input temperature 20 o +/1° C Min input water pressure 2 Bars; 6 lit/min
Cooling Systems	External closed loop laser cooling system (stand alone)





SBM 2800 Cutting™ Software

SBM 2800 Cutting™ software is specifically designed to handle LASER machine tool cutting applications. We have worked extensively with manufactures and machine tool operators to create a state-of-the-art PC cutting control software package utilizing up-to-date, controllers and PC Interfaces.

The software package consists of 3 main parts:

1. User interface
2. Motion control
3. Postprocessor

The SBM 2800 is equipped with the latest generation of multi-axis motion controllers, PCI bus and the CAD package are specifically tailored for this application. Programs such as the SBM 2800 post processing software and our exclusive motion software are integrated on the operator's controller PC in SBM 2800 Cut™ (provides user interface between 6x-Motion controls, Laser control, sensor controls and etc. and post processing system).

SBM 2800 Cut™ Features

SBM 2800 Cut™ is a complete PC control software solution that can be quickly configured to individual automation applications. It supports motion control and HMI functions using a set of easy to use graphical editors and configuration screens. SBM2800M Cut™ integrates control logic and graphical user interface functions in one package. This allows faster, lower cost application and ready customization by the user.

Software Components

The PCI bus is part of the latest generation of multi-axis motion controllers. Designed to fit in a single PCI slot of a PC, the controllers accommodate 1-through 8-axis formats and allow control of step or servomotors on any combination of axis. Any mode of motion can be programmed including linear and circular interpolation, contouring, electronic gearing and eCam. Programming is simplified with two-letter, intuitive commands and a full set of software tools such as WSDK for servo tuning and analysis, ActiveX Tool Kit for Visual Basic users and a C-Programmers Tool Kit.

Communication Utilities

This free software package provides all the drivers needed for establishing communication with Galil controllers. The utilities include DMCDOS for communicating with the controller in a DOS environment; and DMCWIN which has drivers for all current versions of Windows. DMCDOS and DMCWIN include terminal programs for sending and receiving commands to and from the controller and utilities for downloading programs, updating flash firmware, and compressing controller programs.

C-Programmers Tool Kit

DMCWIN is useful for working with C/C++. DMCWIN includes extensive DLLs with subroutines written in C/C++ for performing communication functions with the controller. These subroutines enable the designer to develop a variety of motion control applications with a wide range of C/C++ functions.

WSDK Servo Design Kit

WSDK is Servo Design Kit software, a powerful tool for system setup and tuning. WSDK has an automatic servo tuning function that adjusts the PID filter parameters for optimum performance and displays the resulting system step response. A four-channel storage scope provides a real-time display of the actual position, velocity, error and torque. WSDK also includes impulse, step and frequency response tests, which are useful for analyzing system stability, bandwidth and resonance.

- Four-channel storage scope for displaying real-time position, velocity, error and torque
- Displays X versus Y position for viewing actual 2D motion path
- Terminal editor and program editor for easy communication with the controller

- Automatic tuning for optimizing controller PID filter parameters
- Provides impulse, step and frequency response tests of actual hardware

ActiveX Toolkit

ActiveX custom controls are an extensive set of prebuilt objects pertaining to the Galil controller are loaded right into the Visual Basic environment. Built-in dialog boxes are provided for quick selection of color, size, location and text. The toolkit will operate with any VBX/OCX ActiveX aware development platform. The most common environment is Visual Basic but Galil has also tested Visual C++, Wonderware, LabView and HPVEE.

Built-In ActiveX Objects:

- Terminal for sending commands and editing programs
- Polling window for displaying responses from the controller such as position and speed
- Send file for sending DMC files
- Coordinate transformation
- Graphical display of 2D motion path
- Diagnostics for capturing current configurations
- Display of input and output status
- Vector motion tools for slowdown around corners and tool offsets

CAD-to-DMC Translator

CAD-to-DMC is a software tool that translates AutoCAD or equivalent DXF files into motion controller commands. The designer draws the two-dimensional motion path using AutoCAD software and then uses the translator to obtain a DMC command file. Text macros, which call for specific operations along the path, can be incorporated in the drawing.

- Translates 2-D contours including lines and arcs
- Can specify continuous or stop-start motion along motion path
- Translates motion dependent I/O events
- Tool-offset feature
- Optimized path selection for maximizing cut time
- Axis correcting – moves the drawings back to the X and Y axis origin

HPGL Translator

This software tool takes the output from a plotter file and turns it into a series of commands suitable for motion controllers. The software translates PLT files into proper digital motion control commands. These commands are then executed by the controller, which, in turn, produces motion. HPGL-to-DMC is best suited for applications where the DMC controller is connected to a device that emulates a plotter.

Powerful Cutting and Production Features

- Store material preferences such as intensity and velocity settings for specific jobs or materials
- Cut by color or selected object with a full-color preview of each color or object in the design
- Optimized cutting order – Designs are cut in closest order to minimize travel time
- Reduce material waste with automatic material optimization
- Integrated Job Manager allows cutting or re-cutting in the background while designing in AutoCAD and CorelDraw

Easy Installation and User Friendly Set-Up

- Includes a comprehensive manual with step-by-step instructions

Operation

The facility will allow material to be loaded conveniently, processed quickly, safely and remotely by an operator, and then unloaded. Individual patterns are downloaded to the Operator Console (from a secure remote network) and processed automatically by the laser cutter.

Material-In / Material-Out Work Flow

With roll-doors open, pattern material is manually placed and aligned on appropriate sections of the Laser Cutting Table with the aid of air bearings generated through the table. Each section of the cutting table is designed to handle material of a specific type and dimension. The load operator(s) leave the room and with the doors closed, the operator now activates through the keyboard a CAD drawing previously downloaded to the Control Console from a secure remote network. The table air now creates a partial vacuum, holding the material in place while the laser cuts the material according to the design and dimensions on the drawing and returns to its starting location. Positive flow from the assist gas eliminates uncontrolled oxidization of the material and reduces smoke and fumes. What fumes remain are extracted and vented up through the ceiling and out. The doors are opened, the finished patterns and excess material are unloaded and removed from the second doorway, and new material is loaded from the opposite door.

Laser Cutting Operational Description

Laser beam cutting is a thermal cutting process that severs material by locally melting or vaporizing the material using a laser beam. The process is used with or without assist gas to aid the removal of molten and vaporized material. Depending on the material, a jet of reactive gas such as oxygen can be applied coaxially with the beam, improving process speed and cut edge.

The CO₂ laser is a powerful and reliable general use laser. The CO₂ laser is a gas-discharge device that operates by sending an electric current through a gas. A

high-power CO₂ laser can cut up to 2.5 cm (1 in.) thick carbon steel. However, good quality cuts on steel are typically made on metal thinner than 0.9 cm (0.375 in.) because of the limited depth of focus of the laser beam. Typical cutting speed for 0.9 cm (0.375 in.) carbon steel is 1.3 m/min (50 ipm) with a power consumption of 1500 W. However, these rates assume the cut quality is of importance. For simple sizing operations, "raw" processing capabilities will need to be investigated to determine the processing rate.

Laser cutting results are highly reproducible, and laser systems have achieved operating uptimes greater than 95%. Relative movement between the beam and work piece can be easily programmed. Lasers also have the flexibility for power and timesharing so that cost effectiveness of fulltime beam operation can be maximized.

Input Streams:

The laser can cut an extremely wide range of materials (metals, ceramics, in-organics, organics, and composites) without regard to their hardness or electrical conductivity. Inorganic materials, as a class, have low vapor pressures and poor thermal conductivities making them good candidates for laser cutting. Unfortunately, many common varieties have high melting points and poor thermal shock resistance that tends to make them harder to process than metals. Organic materials generally decompose by laser light, which enables cutting to be done at higher speeds or with lower power lasers. Output Streams consist of smaller pieces of input material.

Advantages:

Laser cutting has the advantages of (1) high cutting speeds, (2) narrow cut (kerf) widths, (3) high-quality edges, (4) low-heat input, (5) minimal work distortion, (6) easily automated, (7) cut geometry can be changed without the major rework required with mechanical tools, (8) no tool wear, (9) finishing operations are not usually required, (10) minimal job setup time, (11) no mechanical contact between the cutting device and the work piece, (12) can cut aluminum without leaving any dross, (13) eliminates secondary wastes, and (14) noise, vibration, and fume levels involved are quite low compared to most conventional processes.



Technological Advancements

Due to the rapid advance of technology, Laser Photonics reserves the right to make changes, at its sole discretion; that it believes will enhance the product's performance, reliability, and/or technical superiority. These changes may be made, from time to time, with or without customer notification. Laser Photonics will not be obligated, under any circumstances, to retrofit or upgrade systems already deployed in the field.

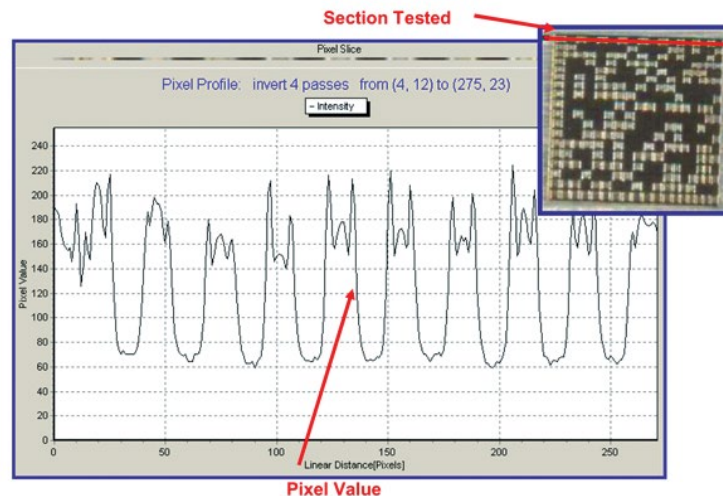
Application Research Center

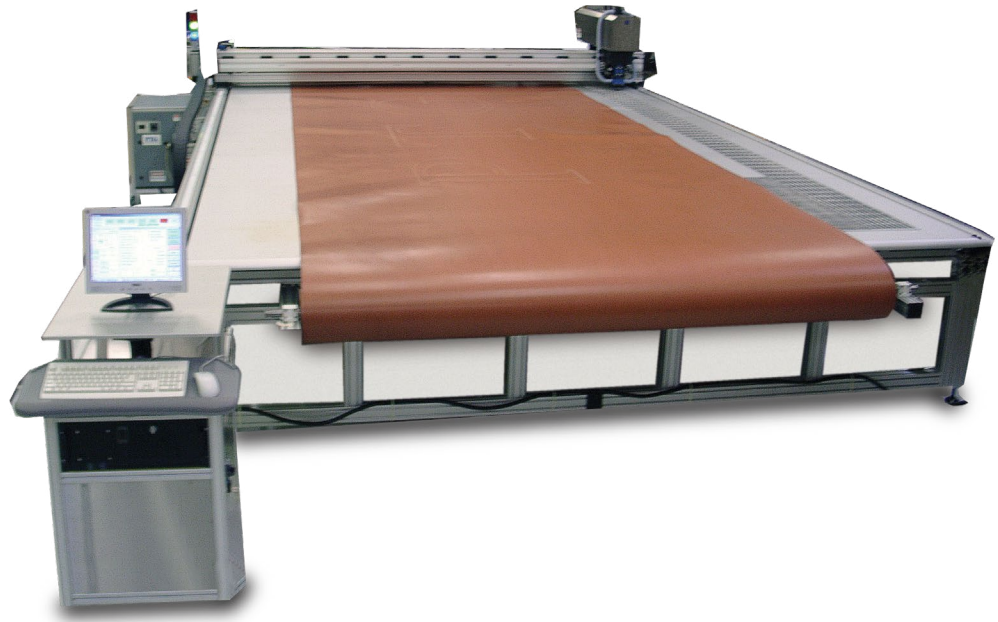
Laser Photonics maintains an applications lab for processing customer samples and assisting with process development. Our applications lab has the latest testing equipment to analyze all of your application needs.

For marking applications, we provide the highest quality analysis of each and every mark using our Mark Quality Assessment™ (MQA™) software. With our MQA™ software, we have the ability to guarantee and verify the accuracy and quality of our marks.

The screen shot below demonstrates how the MQA™ software reads the level of pixels in the material marked. The section in red has been analyzed with the MQA™ software. The high and low pixel values demonstrate the overall contrast of the mark.

This procedure can be applied to various different marking processes and types generated by our Fiber Laser marking systems. We will prepare and research all applications within a matter of two to three weeks and provide a detailed report free of charge.





Safety Considerations During Operation

10.6 μm wavelength laser light emitted from this laser system is invisible and may be harmful to the human eye. Proper laser safety eyewear must be worn during operation.

21 CFR 1040.10 Compliance

This product is designed for OEM integration into other equipment.

The product is a Class 4 laser as designated by the CDRH and it does NOT MEET the full requirements for a stand-alone laser system as defined by 21 CFR 1040.10 under the Radiation Control for Health and Safety Act of 1968. It is the responsibility of the equipment manufacturer to meet all of the regulatory requirements for the final system.



IMPORTANT NOTICE: ALL SPECIFICATIONS, TECHNICAL DATA AND OTHER INFORMATION CONTAINED IN THIS DOCUMENT, AND ALL STATEMENTS ABOUT THE PRODUCT(S) IDENTIFIED IN THIS DOCUMENT, ARE PRELIMINARY IN NATURE AND ARE PROVIDED "AS IS," WITHOUT WARRANTY OR ASSURANCE OF ANY KIND. LASER PHOTONICS MAKES NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE PRODUCT(S) OR THEIR SPECIFICATIONS. ALL INFORMATION IS SUBJECT TO CHANGE. PLEASE CONTACT LASER PHOTONICS FOR MORE INFORMATION. LASER PHOTONICS AND THE LASER PHOTONICS LOGO ARE TRADEMARKS OF LASER PHOTONICS CORPORATION. OTHER TRADEMARKS ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS. COPYRIGHT LASER PHOTONICS CORPORATION. ALL RIGHTS RESERVED.

Laser Safety

The equipment described herein is equipped with the safety devices stated. Laser Photonics does not warrant or hold forth that such devices comply with any State, Federal, or Local laws or requirements. It is up to the customer to determine the applicability of those laws and equip the machine accordingly.

1.1 Safety – The system and enclosed facility allow operation to the standards of the following organizations:

1.21 American National Standard for Safe Use of Lasers, Sections 4.74.9. (8CCR 1801(d)) Ventilation (General Industry)

1.22 OSHA (Occupational Safety & Health Administration) Regulations

1.23 (Standards 29 CFR)
§5150. Ventilation and Personal Protective Equipment Requirements for Welding, Brazing and Cutting

1.24 NFPA25 sprinkler system

Laser Radiation Safety System

The SBM 2800 comes with a fully integrated laser radiation safety system. The first phase of the safety system is an assortment of safety labels that alert users to potential safety issues. In addition, the machine is equipped with color-coded indicator light towers installed on each corner that alert users to certain system operational modes.

Illuminate Lens Color	Mode Description
Red	Problem or malfunction
Yellow	Maintenance or special operation
Green	All systems functioning
Blue	Laser power on

As an added level of security, a redundantly switched safety interlock system helps prevent accidental exposure to excess laser radiation. Plus, the system is equipped with an electrical power manual reset, a key-locked laser power switch and a remote interlock connector. Finally, the system has audible and visible emission indicators with five (5) second emission delay settings. All these features, in combination, constitute the laser radiation safety system, which allows the SBM 2800 to be used in a safe and secure manner.

Advanced Support

- Remote laser diagnostics through TCP/IP protocol
- Remote diagnostics and upgrades
- Remote systems restore
- Multilingual software
- World wide support
- Built in help index
- Remote training

**2 year warranty
on laser components
with 5 year optional program**

International Support

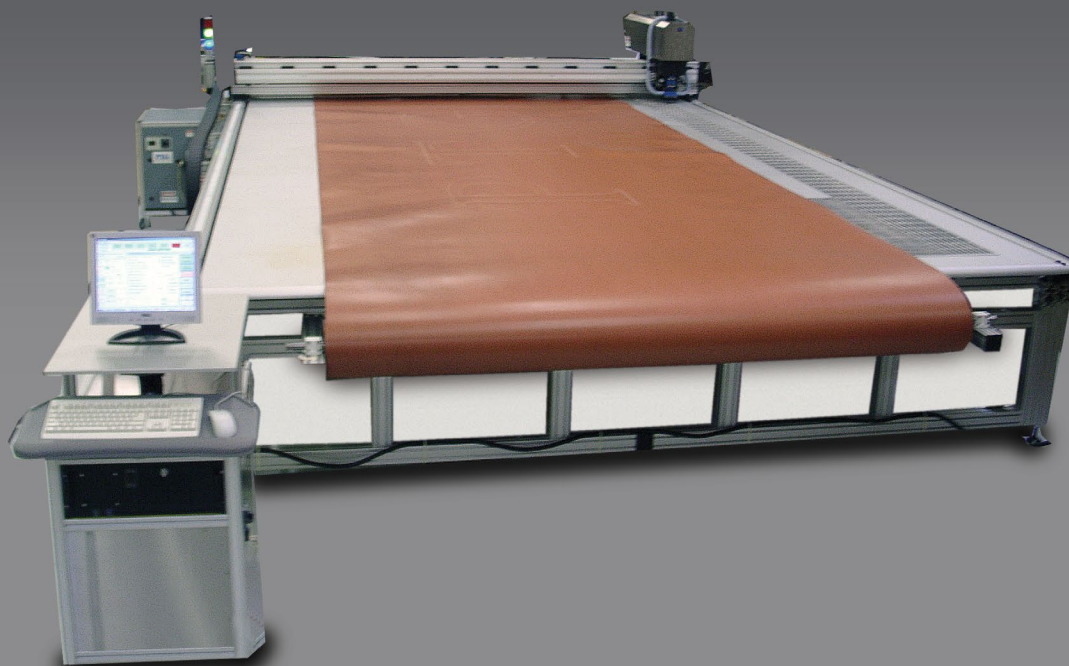
*Multilingual software with
worldwide support*

- Australia
- Brazil
- Canada
- China/Hong Kong
- India
- Malaysia
- Mexico
- Philippines
- Qatar
- Russia
- Singapore
- Taiwan
- Thailand
- Turkey
- and more



Laser Photonics - Product Range

SBM 2800



Laser Cleaning



Marking & Engraving



Laser Cutting



3D Metal Printing

Laser Photonics is the industry leader in developing high-tech Fiber and CO₂ laser systems. Laser Photonics exclusively specializes in advanced, innovative, latest generation laser systems, processes and technologies. We focus on cutting edge Fiber Laser technology for material processing. We have delivered hundreds of Fiber Laser cutting and engraving machines to countries worldwide. Contact us to learn more about our marking, cutting and engraving systems.



Submit An Inquiry

Tel: 407.804.1000 • Toll Free: 844.44.LASER •
www.laserphotonics.com • fiber@laserphotonics.com