# Laser basic Operator/Setup Training

**Duration:** 4 Days
**Start Time**: 8:00am
**Finish Time:** 4:00pm
*Lunch provided for all training days

**Prerequisites**
Basic Rhino knowledge

**Training Overview**

- Proper operation and programming of laser machines

**Target Audience**

- Current or new Laser Operators

**Course Overview**

- Understanding the Laser process
- Major software/concepts
    - Software
    - Rhino
    - Data conversion
    - Organization
    - Methods
    - Posting
    - Unfold 3D
    - What is UV mapping / Texture coordinates
    - Limitations
    - Photoshop graphics (Raster vs vector)
    - Why resolution matters/ relationship with hatching distance
    - Grayscale vs B&W / relationship with slicing
    - Converting vector graphics to raster
    - Documents and repeats, scaling
- LaserDesign / LaserCam
    - Resolution VS Hatching Distance
    - Patching
    - Smartpatch
    - Constraints
    - Mesh testing
    - Patch settings
    - Toolpath
    - Slicing
    - Laserblasting
    - Machine maintenance

- Meshing
  - Inside Rhino
  - Advanced
  - Simulator
  - Toolpath viewer
  - Troubleshooting & workarounds

- Hardware concepts
  - Calibration and setup
  - Offsets and ORs
  - ZA probing
  - OR probing
  - Parameters
  - Power
  - Frequency
  - Speed
  - Removal Rate
  - Marking fields
  - Focal length

**Course Content**

- **Day 1**
  - Objectives of the course
  - Creation of an E-catalogue account
  - Installation of the HMI on the laptop [Optional]
  - Presentation of the documentation
  - Contextual Help
  - Schematic of the laser' software
  - Presentation of the documentation
  - Technology of Laser process
  - Security instruction
  - General safety
  - Description of the machine
  - Machine and remote control
  - LCMS presentation
  - LMCS machine interface overview
- **Day 2**
  - LaserControl presentation
  - Creation of a technology
  - Machine maintenance
  - Cleaning protective glass
  - Changing protective glass→ calibration
  - Changing filters purging / Lubrication
  - 2D contour engraving LaserControl (*.dxf)

- Create a toolpath (CAD)
- Create a machining parameter
- Launch the machining, Chose the type of application
- 2D & 3D STL surface etching with LaserCAM
- Rhino & Main functions of Rhino
- Load a geometry *.3dm
- LaserCam presentation
- Machine configuration
- Parameter page / Machining strategy
- Assign parameters to geometry
- Machine functions & option descriptions
- Visualization of the toolpaths
- Create object reference (OR)
- Measuring cycle
- Launch the machining

- **Day 3**
  - Machining 3-axis texturing with LaserDesign
  - Grey level
  - Resolution /  pixels scanning
  - Manipulation and resizing of images
  - Parameters page / Machining strategy
  - Import curves from Rhino
  - Export STL (Rhino) ▶ Import STL
  - Mosaic filling
  - Machine configuration
  - Patch configuration  (3 Axis)
  - Option descriptions
  - Layers analysis
  - « Auto. Brightness » function
  - Visualization of the toolpaths
  - Machine - Launch the machining
- **Day 4**
  - LaserDesign texture machining on cylinder
  - Calculation of the image dimension
  - Number of pixels / hatching distance
  - Gimp Software
  - Texturing edition
  - Patch configuration (4 Axis / cylinder)
  - Parameter page / Machining strategy
  - Visualization of the toolpaths
  - Create a measuring cycle & Offset
  - Object reference (OR) “No Angle”
  - Optical calibration (on request)
  - Change of focal length / Calibration