AMADA WELD TECH

Excellence through superior design, technology and innovation

Integrated Systems

- Laser Welding
- Laser Cutting
- Laser Marking
- Micromachining
- Resistance Welding
- Seam Sealing
- Gloveboxes
- Reflow Soldering & Bonding
Table of Contents

About AMADA WELD TECH
Company profile ............................................. 3
Key markets .................................................. 4-5
The Customer Journey: Define - Design - Deliver ............ 6
Facilities ....................................................... 7
In-house capabilities ........................................ 8-9

Laser Welding Systems
Overview and typical applications ........................ 10
Laser welding capabilities .................................... 11

Laser Marking Systems
Overview and typical applications ........................ 12
Laser marking capabilities .................................... 13

Resistance Welding, Bonding and Reflow Soldering Systems
Overview and typical applications ........................ 14
Resistance welding capabilities ............................ 15

Laser Tube Cutting
Overview and typical applications ........................ 16
Laser tube cutting capabilities .............................. 17

Laser Micromachining
Overview and typical applications ........................ 18
Laser micromachining capabilities ........................ 19

Hermetic Sealing and Glovebox Systems
Overview and typical applications ........................ 20
Hermetic sealing and glovebox capabilities ................. 21

Additional Systems
Overview .......................................................... 22

As of July 2020
AMADA WELD TECH  Company Profile

AMADA WELD TECH is a leading manufacturer of equipment and systems for resistance welding, laser welding, laser marking, laser cutting, laser micromachining, hermetic sealing, projection welding, and hot bar soldering and bonding. The company provides products to a wide range of markets, including the medical device, battery, electric vehicle and solar industries, as well as global electronics, automotive and general industrial markets.

Since 1948, AMADA WELD TECH has worked to achieve one goal: to solve our customer's manufacturing challenges. Knowing there is no one solution that fits all, we strive to provide our customers with innovative and reliable manufacturing technology solutions so that we may be their single source provider.

Our headquarters is located in Monrovia, California with state-of-the-art facilities for developing, producing and servicing the solutions offered to our worldwide customer base. A global company, AMADA WELD TECH also has sales offices and applications laboratories located in Detroit, Michigan; El Paso, Texas; and Sao Paulo, Brazil.

Company timeline

1948  Unitek Corporation founded in Pasadena, CA to manufacture orthodontic appliances.
1950  Weldmatic Division organized; produced a complete line of electronically operated resistance welders for missile, aircraft, electronics, and metal working industries.
1965  Moved into current Headquarters location in Monrovia, CA.
1971  Unitek Equipment Division established.
1978  Unitek Corporation acquired by Bristol Myers Squibb. Development and patent of force firing systems critical to small parts welding.
1987  Unitek Corporation acquired by 3M.
1988  Divested from 3M as Unitek Equipment Division of KVA Holdings Corp.
1991  Name changed to Unitek Equipment Inc.
1994  Acquired by Miyachi Technos and reorganized as Unitek Miyachi Corporation with merger of Miyachi America Company.
1994  Established Integrated Systems division
1995  Acquired Weld-Equip companies in Holland, Germany and France, and Miyachi Technos Europe in Germany.
1995  Received ISO 9001 Certification.
2000  Acquired Peco Welding Systems, GmbH.
2001  Acquired Benchmark International, Inc.
2005  Renamed Miyachi Unitek Corporation, consolidated Benchmark International to California.
2008  Reorganized European companies into single entity: Miyachi Europe Corporation.
2010  Opened applications lab in Detroit, MI.
2011  Opened sales office and applications lab in Brazil.
2013  Miyachi Corporation acquired by AMADA CO., LTD.
2014  Renamed Miyachi America Corporation.
2015  Reorganized as Amada Miyachi America, Inc.
2020  Renamed AMADA WELD TECH INC.
Automotive applications require across-the-board manufacturing technologies including resistance and laser welding, projection welding, hermetic sealing, and hot bar reflow soldering. AMADA WELD TECH’s best in class products provide process stability with power feedback and monitoring options, as well as industrially proven reliability.

Part tracking and traceability has become a reality of modern manufacturing. AMADA WELD TECH also offers a range of laser marking, engraving products, including integrated systems, for direct part marking with text, graphics, bar codes and data matrix codes.

Our technologies are used in a wide variety of automotive applications including sensors, switches, dashboard electronics, lighting components, brake shoes, and more.

Medical

The challenges of today’s medical device manufacturing applications - small, single-use devices in high demand with ever-increasing reliability requirements - are pushing the need for more sophisticated manufacturing technologies, and AMADA WELD TECH, in consult with medical device industry expert customers, is leading the way with our comprehensive range of technologies. Our equipment is used in medical device manufacturing facilities around the world to build medical device components for cardiology, neurology, laparoscopy, arthroscopy, oncology, wound closure, and more.

Electronic Components

The fine control featured in AMADA WELD TECH’s resistance and laser welding technologies is well suited to electronic component manufacturing applications requiring precision, low heat input, and low (or no) force welding solutions.

The high speed, non-contact clean laser marking or laser engraving process is well suited to high quality direct part marking on ever decreasing component sizes.

Common applications include hard drive read/write armatures, hard disk assemblies, electrical connectors, lead frame assemblies, relay terminal connections, batteries, and more.

Batteries

There are many process requirements in battery manufacturing. Depending on the size, type, and capacity, these requirements include both internal and tab-to-terminal connections, can and fill plug sealing, and external connections. Several joining options may be considered including both resistance spot and laser welding. The decision to use one technology or the other is determined both by the type of weld required and production requirements.

Laser marking is also used for branding and serialization. AMADA WELD TECH has extensive experience welding and marking batteries including Lithium Ion, Nickel-Metal Hydride, Lead Acid, Nickel-Cadmium and Alkaline in all sizes.

Aerospace

Our aerospace manufacturing customers produce a variety of high technology parts for aircraft/aircraft engines, guided missiles, spacecrafts, propulsion units, and more including batteries, sensors, hybrid packages displays, and jet engine honeycomb manufacture and repair.

AMADA WELD TECH’s laser welding, laser marking, resistance welding, hermetic sealing and hot bar reflow soldering equipment is uniquely suited to these applications and has been used in the manufacture of aerospace parts for more than 60 years. Precision control, closed-loop feedback, and weld quality tools ensure reliable and durable welds and marks for these demanding applications.

.. and more

- Automation
- Consumer Electronics
- Contract Manufacturing
- Defense
- Energy/Utilities
- Heating Elements
- Home Appliance
- Lighting
- Motors & Coils
- Photonics
- Semiconductors
- Sensors
- Solar
- Tools
- Universities/Research

Key Markets
Standard Equipment and Integrated Systems Solutions by Technology

**Resistance Welding**
- Weld most metals
- Thermocompression bonding
- Fine wire welding
- Coil and stud welding
- Sheet metal welding

**Laser Welding**
- Weld metals and plastics, dissimilar materials and thin foils
- Implantable device seam sealing
- Tool assembly
- Catheter assembly
- Battery manufacture
- Automotive sensors and assemblies

**Integrated Systems**
- Turn-key semiautomated systems
- Laser welding
- Laser marking
- Laser cutting
- Laser ablation

**Laser Marking**
- Marking of metals, plastics, and ceramics
- Engrave, ablate, anneal, bleach/foam
- Cutting or welding of thin metals
- Direct part marking
- Corrosion resistant marking
- UDI marking to comply with FDA regulations
- Wire stripping
- Surface cleaning or roughening

**Laser Cutting and Micromachining**
- Cut Nitinol, CoCr, stainless steels and polymers
- Burr free cuts with femtosecond laser
- Tube diameters from 0.01 - 1 in (0.254 - 25.4 mm)

**Hermetic Seam Sealing & Gloveboxes**
- Wall thickness up to 0.039 in (1 mm)
- Metal and polymer stents
- Cannula and micro cannula
- Needles, biopsy devices
- Flexible tubing

**Hot Bar Reflow Soldering & Bonding**
- Hot bar reflow soldering
- ACF bonding
- Heat staking
- Flat panel to LCD

**Micro TIG Welding**
- Weld conductive metals - up to 0.197 in x 0.197 in (5 mm x 5 mm) area
- Weld dissimilar metals
- Bus bar welding
- Coil and terminal welding
- Coated wire welding
- Thin magnet wires
- Medical device: endoscope parts, catheter, guide wire, dental pipe
The Customer Journey

Define - Design - Deliver

At the design phase we work with customers to optimize part designs and material selection for high yield.

1. Process assessment

Sample/application qualification

Our application engineers process parts in our in-house labs to determine the optimal product and process settings.

2. Sample/application qualification

The system is tailored to the customer requirements of production throughput, product flow, and quality based on specific application results.

3. Equipment specification

A dedicated system engineer oversees each project working closely with the customer and our experienced technicians to ensure on-time delivery with all needed functionality.

4. Product and system assembly

The system undergoes rigorous testing, with each and every customer invited to our facility to oversee the system acceptance tests.

5. Test and verification

Our field service engineers install the system and verify functionality with a factory acceptance test along with any training needed.

6. Installation, training & support

Define, Design & Deliver

Integrated Systems at a Glance

- First system built in 1994
- More than 1,000 systems sold (standard and custom)
- Large team of dedicated system engineers, and system assemblers
- Mechanical, electrical and software engineers
- Project manager assigned to every system
- Concept 3D renderings
- Clear acceptance criteria determined at start of project – no surprises
- Project timelines with major milestones

- Conveyor systems
- Robotic, pick and place, load/upload
- Single operator, semi-automated, fully automated
- Process commitment
- Detailed compliance response documents
- Applications engineers run customer samples before PO and shipment in ensure quality
- Optional real-time laser weld monitoring to inspect the weld and ensure quality, throughput and traceability
State-of-the-Art Facilities

- Main entrance and lobby
- Product showroom
- Technical center (application & sample evaluation)
- Product endurance lab
- Customer-specific acceptance labs
- Standard product assembly
- In-house machine shop
- System engineering
- Integrated system assembly
In-House Capabilities

1. Safety Enclosures
2. Laser/Resistance Processing
3. Custom Tooling
4. Multi-axis Motion
5. System/Process Monitoring
Safety Enclosures
- Standard or custom
- CDRH Class 1
- Glovebox/atmospheric
- Dual channel safety interlocks

Laser/Resistance Processing
- Fiber/YAG lasers
- Nano, pico and femtosecond lasers
- Hot bar power supplies & thermodes
- Resistance welding power supplies
- Inverter, linear DC, AC and cap discharge

Custom Tooling
- Standard or custom
- Fully integrated
- Designed for process and production
- Manual/pneumatic/servo

Multi-axis Motion
- Linear XYZ
- Rotary
- Compact work area
- Custom path
- Coordinated motion
- Additional axes as required

System/Process Monitoring
- Parameter collection
- GO/NO GO

Vision

Robotics and Other Material Handling Options

Custom Software Development
Laser Welding Systems

1. Beam Delivery - Fixed/Flying/Galvo Scan
2. Monitoring Laser/System
3. Multi-axis Motion Systems
4. Cover Gas Delivery
5. Vision Systems/Teach Mode
6. Human-Machine Interface
7. Fiber/Nd:YAG
8. Tooling

Typical Applications

Medical
Automotive
Battery
Electronics/Aerospace

- Laser seam welding pacemakers
- Laser welding device assembly
- Battery pack manufacture
- Laser spot welding
1. **Beam Delivery - Fixed/Flying/Galvo Scan**
   - Quick and precise positioning
   - Multi-spot, seam welding for pulsed Nd:YAG or fiber lasers
   - Modular designed focus heads
   - On/off axis lighting
   - Vision/cameras systems

2. **Monitoring Laser/System**
   - Laser/process – power, energy, shot count, pulse duration
   - Through lens viewing on axis
   - Post weld verification
   - Customer settable frequency of power verification
   - GO/NO GO based on set levels

3. **Multi-axis Motion Systems**
   - High speed, precision motion
   - Linear and rotary stages, coordinated motion
   - Galvo beam delivery options

4. **Cover Gas Delivery**
   - Inert cover gas delivery
   - Laminar flow nozzles
   - On or off axis options
   - Flexible delivery options
   - Multi-gas options

5. **Vision Systems Teach Mode**
   - Locates weld location
   - Identifies part fit up issues prior to welding
   - Adjusts for manufacturing tolerances
   - Point and click positioning
   - Allows for part to part variation

6. **Human-Machine Interface**
   - Intuitive operations
   - Security operator/enter move
   - Simple screen designs
   - Multi-level passwords

7. **Fiber/Nd:YAG**
   - Position based firing
   - Proprietary process for laser seam welding
   - Even spacing of pulsed laser even around 2D/3D corners or curves
   - Fastest processing speeds accounting for stage motion

8. **Tooling**
   - Critical to successful welding
   - Custom design integrated with workstation
   - Collaboration between mechanical, electrical, and application engineer
Laser Marking Systems

1. Marker Motion
2. Mark on the Fly Options
3. Bar Code Options
4. Integration
5. Production Handling Software
6. Machine Vision
7 & 8. Material Handling

TYPICAL APPLICATIONS

- Medical tools & instruments
- Aluminum castings
- Ablation PTFE Coating/Stainless Steel
- Bleaching of 14% glass filled nylon
1. **Marker Motion**
   - Integrated marker motion controls up to 4 axes
   - Step and repeat jobs
   - Circumferential marking around cylinder
   - Adjustable focus position for multi-level marking

2. **Mark on the Fly**
   - Marking while part is moving for highest part throughput
   - Speeds up to 750 ft/min

3. **Bar Code Readers**
   - 1 and 2D barcode reading for job select, and information upload
   - Read verification
   - Full network communications
   - Router bar code determines the marking schedule

4. **Integration**
   - Ethernet, RS-232, Direct, I/O
   - TCP/IP, Ethernet IP
   - Proven record to integrate into production lines

5. **Production Handling Software**
   - Serialization via database
   - Custom strings
   - VDI compliant

6. **Vision**
   - Optical character recognition
   - Part presence and orientation
   - Machine path offset
   - Fixture allowance
   - Precise mark location

7. **Material Handling**
   - Shuttle moves part into and out of enclosure
   - Single and dual stations
   - Through conveyor
   - Robotic load

8. **Material Handling**
   - Multi-station rotary dial
   - 2 station shuttle
   - Flow through conveyor
   - Reduce cycle time
   - Process part during next part load
Resistance Welding, Bonding and Reflow Soldering Systems

TYPICAL APPLICATIONS

Medical
- Spot welding pacemaker

Automotive
- Projection welding radiator connector

Battery
- Battery pack assembly

Electronics
- Thermocompression bonding coil wire to terminal
Power Supplies
- Energy: 5A-200kA
- Built-in process monitoring
- Data export features
- Closed loop control
- High/mid frequency inverters
- Linear DC
- AC weld controls
- Capacitive discharge welder

Weld Heads
- Servo Controlled
  - Precise force and position
  - 0.5-100lbs
- Pneumatic Controlled
  - Low inertia-Force fired
  - 0.5-1500lbs
- Opposed/Series Configuration
  - Force and displacement options

Monitoring
- Process development
- Process optimization
- Production control
- Monitor process trends
- Data logging/traceability
- Set process limits
- SPC and Run charts
- Track: current, voltage, power, resistance, force, displacement

Vision
- Part location & orientation
- Electrode to part detection
- Electrode condition check
- Weld quality check
- Barcode reading
- Dimensional inspection
- Character recognition

Motion/Automation/Tooling
- Multi-axis systems
- Parts handling
- Custom tooling
- Up to 5 axes of programmable motion
- Stages: 6”–24”

Controls
- CNC motion
- GBM code programming
- Ethernet TCP/IP
- Profibus/Modbus
- RS232/RS485
- Digital I/O
- PLC/computer HMI interface

Motion Systems Options
- Rotary dial systems
- 2 station index
- Through conveyor feed
- Manual load/unload
- Lift & carry
- Robotic load/unload
Laser Tube Cutting

1. High Precision Stages
2. Fiber or Femtosecond Laser
3. Auto Tube Loader
4. Easy Maintenance
5. Single Screen User Interface
6. Open Workspace
7. Engineered Composite Base
8. Compact Footprint

TYPICAL APPLICATIONS

Medical

- Laser cutting cannula tubing
- Stents
- Laser cutting flexible tubing
- Hypo tube
1. High Precision Stages
   - 2-4 axes of motion
   - Rapid acceleration linear stages
   - Axes configuration options
   - XY cutting option

2. Fiber or Femtosecond Laser
   - 200 W fiber laser
   - Up to 40 W femtosecond laser
   - Multiple wavelengths
   - Wet and dry cutting

3. Automated Tube Loader
   - Auto loading of tube diameters from 0.01"
   - Automatic wet connect on tube diameters > 0.07"
   - Up to 12 ft length

4. Easy Maintenance
   - Water system, fiber laser and electronics mounted on pull out drawers from front of system
   - System can be accessed remotely for factory support

5. Single Screen User Interface
   - All user information and functionality on a single screen
   - 3 level password protection

6. Open Access to Workspace
   - Main swing door provides complete access to entire workspace

7. Engineered Composite Base
   - Superior isolation damping over granite
   - 3D-load modeling allows design optimization
   - Integrated water/debris drains

8. Compact Footprint
   - System measures: 1956 mm (77") width x 787 mm (31") depth x 1524 mm (60") height
Laser Micromachining

TYPICAL APPLICATIONS

Medical

- Micro coax wire stripping
- Cannula drilling
- Thin material machining
- Catheter drilling

1. Vision
2. Control Software
3. Laser Sources
4. Laser Monitoring
5. Stage and Scan Head Motion Platforms
6. Debris Management
7. Tooling
Vision
- Off axis and through the lens
- Fiducial or feature recognition
- High resolution camera for minimal correction error

Laser Sources
- Nanosecond
- Picosecond
- Femtosecond
- Any laser source can be integrated

Control Software
- Simple graphical interface for machine path generation
- Import vector and bitmap files

Laser Monitoring
- Average power monitored
- GO/NO GO limits
- Beam profile verification

Stage and Scan Head Motion Platforms
- Stages or gantry options according to production needs
- Drive linear and rotary stages
- Galvo steered laser

Debris Management
- Localized airborne particulate extraction
- Femto/nano-second particulate capable
- Clean room options

Tooling
- Vacuum chucks
- Custom work holding
Hermetic Sealing and Glovebox Systems

1. Glove Box Configurations
2. System Monitoring
3. Software
4. Controls
5. Welding Power Supplies
6. Ovens / Antechambers
7. Gas Purification

TYPICAL APPLICATIONS

Medical
- Laser seam welding pacemakers

Automotive
- Projection welding small TO devices

Aerospace
- Resistance welding seam seal

Electronics
- Laser seam sealing
Glovebox Configurations
- 2 and 4 glove sizes (std)
- Custom configurations
- Eye-safe laser front glass available
- Aluminum or steel base
- Add-on extensions for storage or part preparation
- Stainless steel chamber

Monitoring
- Moisture monitor
- Helium sensor
- Oxygen sensor
- All glovebox data saved every 5 secs
- Settable sensor limits
- Exportable data
- Batch/lot reports

Software
- High/Low setting for sensors
- Error messages
- Weld interlock for environment outside of limits

Ovens/Antechnambers
- Wall heated
- Heated shelves (2-3 level)
- Interlocks
- Optional
- Sliding shelves
- Extra long ovens
- Rear loading

Welding Power Supplies
- Seam sealers
- Fiber lasers
- Nd:YAG lasers
- 25Khz high frequency Inverter
- Pulsar Series (CD projection welders)
  - 1K, 2K, 6K, 9K, joules

Controls
- Computer controlled
- PLC controlled
- Manually controlled
- Custom software
- Glovebox communicates with:
  - Laser
  - Sealer
  - Projection welder

Gas Purification
- Single column
- Dual column
- Automated column change over
- Enables glovebox to reach ≤1 ppm of moisture and oxygen
Additional Systems

Conveyor Fed Laser Welding Systems

Robotic Welding Systems

Cap/Tube Laser Welding
Mini Atmospheric Chamber Laser Welding

Hot Bar Reflow Soldering and Bonding Systems

5 Axis Laser Welding Workstation