

PULSE
SYSTEMS

PRECISION LASER MACHINING & MORE

WELCOME TO PULSE SYSTEMS

PULSE SYSTEMS PROVIDES CONTRACT MANUFACTURING SERVICES TO THE MEDICAL DEVICE INDUSTRY FOR LASER CUTTING, LASER WELDING, CNC MACHINING, AND PROCESSING OF PRECISION METAL COMPONENTS, SUB-ASSEMBLIES, AND IMPLANTS.

SINCE 1998 PULSE SYSTEMS HAS BEEN IN THE BUSINESS OF SUPPORTING HUNDREDS OF MEDICAL DEVICE COMPANIES LIKE YOURS. OVER THE YEARS THE COMPANY HAS BECOME KNOWN TO ITS CUSTOMERS FOR ITS CORE VALUES OF **QUALITY, SERVICE, TECHNOLOGY, VALUE, AND TEAMWORK.**

WE PARTICIPATE WITH OUR CUSTOMERS THROUGHOUT THE ENTIRE PRODUCT LIFE CYCLE, FROM RAPID TURNAROUND FOR LOW-VOLUME ENGINEERING PROTOTYPES, THROUGH COST-EFFECTIVE VOLUME PRODUCTION IN 100,000+ UNIT QUANTITIES.

OUR MANUFACTURING FACILITY, WHICH OPERATES UNDER AN ISO 13485:2003 AND ISO 9001:2008 CERTIFIED QUALITY SYSTEM, IS LOCATED IN CONCORD, CA.

CAPABILITIES:

- + LASER TUBE CUTTING
- + LASER WELDING
- + CNC MACHINING
- + STENT MANUFACTURING
- + ELECTROPOLISHING
- + NITINOL SHAPE SETTING
- + PASSIVATION
- + MICROBLASTING
- + CLEANROOM ASSEMBLY

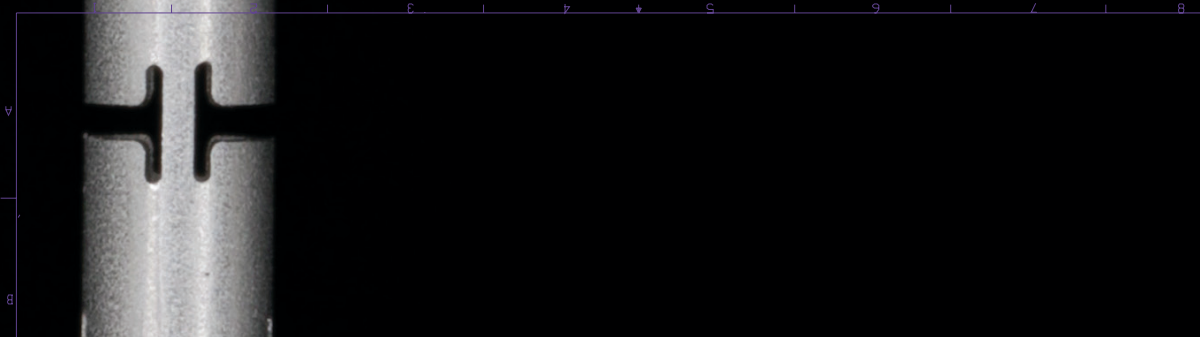




LASER CUTTING

- + Materials: Stainless Steel, Nitinol (NiTi), Cobalt Chromium, Platinum/Iridium, Tantalum, Gold, Silver, Titanium, Elgiloy®, Hastelloy®, Brass, Copper
- + Contact us regarding laser cutting of other materials
- + Wall thickness: 0.001" to 0.035"
- + Kerf width: down to .0005"
- + Cut tolerance of +/- 0.0002"
- + Tubing diameter range: 0.008" – 0.700" OD

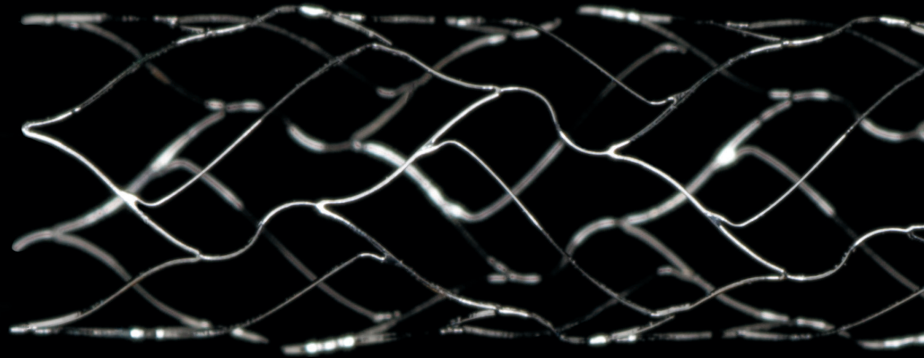
LASER MACHINING IS THE CORE COMPETENCY OF OUR FIRM. WE HAVE DEVELOPED SPECIFIC PROCESSING METHODOLOGIES THAT ENABLE US TO EFFICIENTLY LASER CUT DESIGNS THAT OTHERS CANNOT PRODUCE. WHETHER YOUR DESIGN IS AN INTRICATE, TIGHT TOLERANCE, FRAGILE PART OR A SIMPLE TUBE WITH A FEW FEATURES AND WIDE TOLERANCES, WE CAN PRODUCE COST-EFFECTIVE PARTS IN PROTOTYPE AND PRODUCTION QUANTITIES.



STENT MANUFACTURING

PULSE SYSTEMS OFFERS THE FULL RANGE OF MANUFACTURING CAPABILITIES REQUIRED TO SUCCESSFULLY PRODUCE YOUR STENT DESIGN.

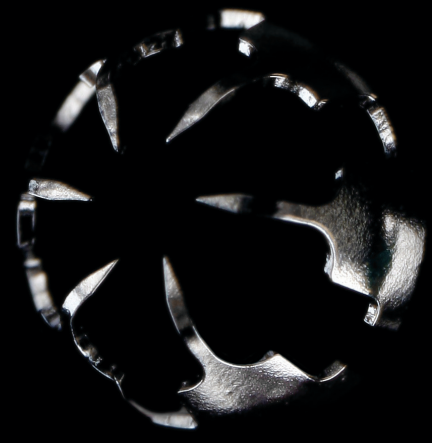
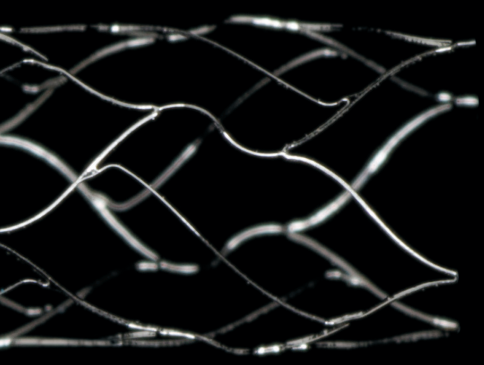
- + Precision laser cutting of intricate stent geometries
- + Surface preparation by chemical cleaning, etching, and microblasting
- + Electropolishing
- + Nitinol Shape Setting
- + Automated visual inspection system for dimensional measurement, data analysis, and archiving
- + X-ray marker assembly by micro-joining, crimping, and laser welding
- + Cleanroom facility



ELECTROPOLISHING

ELECTROPOLISHING REMOVES SURFACE IMPERFECTIONS WHILE CREATING A THIN, UNIFORM OXIDE LAYER THAT IMPROVES BOTH BIOCOMPATIBILITY AND CORROSION RESISTANCE. THIS FINISHING PROCESS IS RECOMMENDED FOR PERMANENTLY IMPLANTABLE MEDICAL DEVICES SUCH AS STENTS AND FILTERS DUE TO ITS EXCELLENT CORROSION RESISTANCE PROPERTIES.

- + Materials: Nitinol, Stainless Steel, Cobalt Chromium
- + Exceptional repeatability and predictability
- + Removes slag, machining artifacts, and heat affected zones that result from laser cutting processes
- + Eliminates surface irregularities, rounds sharp edges
- + Improves performance characteristics of Nitinol parts
- + Dramatically enhances corrosion resistance
- + Improves surface reflectivity and brightness
- + Provides excellent passivation of Stainless Steels and Nitinol



NITINOL SHAPE SETTING/ HEAT TREATING

- + Large expansion ratio
- + Radial and complex shape setting capabilities
- + Furnace and fluidized bath treatments
- + Active Af testing: bend, crush and recovery testing of Nitinol

SHAPE SETTING REFERS TO THE PROCESS OF HEAT-FORMING A NITINOL DEVICE INTO ITS FINAL "MEMORY" SHAPE. THE HEATING METHODS USED TO FORM NITINOL INTO ITS FINAL CONFIGURATION VARY DEPENDING ON THE DESIGN REQUIREMENTS. AT PULSE, WE HAVE VARIOUS PROVEN SHAPE SETTING PROCESSES FOR DIFFERENT APPLICATIONS.

LASER WELDING

- + Computerized 4-axis Nd:YAG laser welding workstations
- + Component assembly fixturing
- + Weld types: spot, seam, butt, lap, circumferential, penetration
- + Spot size down to 0.004"
- + Welding of similar & dissimilar metals
 - Stainless to Stainless
 - Nitinol to Nitinol
 - Stainless to Platinum, Gold, Tantalum, or Copper
 - Copper to Nickel Chromium alloys
 - Nitinol to Tantalum
 - Stainless to Nitinol (limited strength)
- + Contact us regarding laser welding of other materials
- + In-house tensile testing
- + Class 10,000 (ISO Class 7) cleanroom environment

LASER WELDING IS THE PROCESS OF JOINING METAL PARTS USING INFRARED LASER ENERGY. THE PARTS ARE FIXTURED TO REPEATABLY HOLD DIMENSIONAL TOLERANCES. THIS PROCESS DOES NOT USE FILLER METALS AND IS DONE IN AN INERT ATMOSPHERE, SO IMPURITIES ARE NOT INTRODUCED INTO THE FINISHED ASSEMBLY. LASER WELDING IS A VERY EFFECTIVE METHOD FOR JOINING METAL COMPONENTS USED IN MEDICAL DEVICES, SUCH AS LASER-CUT TUBES, MACHINED PARTS, AND WIRES.

PULSE SYSTEMS OFFERS CLEANROOM ASSEMBLY AS A VALUE-ADDED SERVICE TO OUR CUSTOMERS. WITHIN OUR CLEANROOM FACILITY, WE CAN PROVIDE A WIDE RANGE OF MECHANICAL ASSEMBLY CAPABILITIES SUCH AS LASER WELDING, MICRO-JOINING, CRIMPING, AND BONDING.



CNC MACHINING

- + Materials: Stainless, Nitinol, Titanium
- + Form factor: Solid, cannulated, tubular
- + Contact us regarding machining of other materials
- + Turned parts up to .787" diameter
- + Parts cut from stock down to .032" OD
- + Tolerances of 0.0005", repeatability of 0.0001"

IN ADDITION TO OUR WELL-ESTABLISHED CAPABILITIES IN LASER SERVICES AND IMPLANT MANUFACTURING, PULSE SYSTEMS OFFERS PRECISION CNC MACHINING OF SMALL COMPONENTS FOR MEDICAL DEVICES. OUR CNC EQUIPMENT IS CAPABLE OF MILLING, TURNING, BORING, AND DRILLING OF VERY SMALL FEATURES ON A RANGE OF BIOCOMPATIBLE MATERIALS, USING SOLID RAW MATERIALS OR TUBULAR/CANNULATED MATERIALS. IN CONJUNCTION WITH OUR LASER CUTTING AND LASER WELDING CAPABILITIES, CONVENTIONAL CNC MACHINING ENABLES US TO PROVIDE TURN-KEY ISO-CERTIFIED MEDICAL DEVICE SUB-ASSEMBLY SERVICES UNDER ONE ROOF.



**ISO 13485:2003 +
ISO 9001:2008 CERTIFIED**

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