



TRUMPF at ComPaMed
Düsseldorf, November 14–16, 2007 // Hall 08a, Booth L01

TRUMPF Lasers for High Quality Production in Medical Device Industry

TruPulse: Pulsed solid-state lasers for precision processing

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Ditzingen/ Düsseldorf, Germany – November 14, 2007 – Pulsed Nd:YAG lasers have been used in medical device industry for more than 30 years. For welding, cutting and marking of all commonly used materials, the laser is a production tool of first choice. The focused laser light works precisely, quickly and reproducibly when manufacturing surgical instruments, endoscopes as well as active and passive implants. The following examples demonstrate customers' benefits of laser processing and the enormous variety of applications in the medical device industry.

Precision processing of surgical instruments

The production of surgical instruments requires highest quality. Depending on the application task laser cutting, welding as well as laser marking are applied. Small radial cuts and contour cuts allow thin-walled tubes to be opened in trocars and endoscope shafts where the cutting angle is variable. The cuts are smooth, sharp-edged with only minimal burr. During production, lasers weld inlets, connections and guide tubes on and in endoscope instruments – always with a small and defined heat-affected zone and often in one setup. The nonporous and sterile surfaces of the laser seams provide the same biocompatibility as the base material.

In laser machines like the TruLaser Cell Series 3000, sophisticated welding geometries are made possible by rotating and swivel axes as well as swivel focusing optics. As a unique tool, lasers ensure the reproducibility of the various processing tasks. Even hardly accessible seam geometries can be welded in manual laser stations with perfect quality.



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Laser processing of medical implants

Pulsed Nd:YAG lasers offer excellent production methods for medical implants where durability and biocompatibility have high priority. One example: Overlap spot welding closes the titanium housing of pacemakers. The two 0.3 millimeter-thick titanium shells are placed in the rotary index table laser machine and then welded gas-tight. Here the melt-heat spreads from pulse to pulse across the housing, so that the sensitive electronics located inside are never heated to more than 50 °C. The welding depth can also be precisely adjusted. This prevents any interior weld splatter.

TruPulse: Twelve models for every application

Pulsed Nd:YAG solid-state lasers produce several kilowatts of pulse power for a few milliseconds for welding and cutting applications where conventional manufacturing processes fail. Together with the fast real-time power control and pulse forming of the new TRUMPF TruPulse Series, the heat input can be precisely regulated and adjusted to the material characteristics. Due to a heat-affected zone of only a few micrometers, it is possible to process temperature-sensitive materials like titanium alloys while maintaining high quality.

New TruPulse models have expanded the series of TRUMPF's pulsed solid-state lasers, which were only introduced a year ago. The TruPulse Series now includes 12 different models with an average power ranging between 20 W (TruPulse 21) to more than 500 W (TruPulse 556). With pulse powers in the kW range, beam qualities between 4 and 25 mm*mrad are possible.

At ComPaMed, TRUMPF will present the TruPulse 21 in combination with the TruLaser Station 3002 for precision welding of stainless steel tubes. Individual prototypes as well as small and



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medium series can be produced quick and cost-efficient on the versatile laser workstation. Depending on the model, the TruLaser Station 3002 has an automatic door or, combined with the programmable PFO focusing optics, a rotary index table for 2-station operation. The workstation can be combined with all TRUMPF solid-state lasers with up to 500 W output power.

Every model in the TruPulse Series has what is known as a “burst function.” As a result, the average power can be briefly exceeded to increase the pulse sequence frequency and minimize the welding time in a processing cycle. “Long Pulse Welding” can be used to generate a welding seam by moving the component or the laser beam in a single pulse. Depending on the application requirements, the user can select the maximum average power, pulse energy, focusability and beam quality.

Just like every other model in the TruPulse Series, the removable operating panel with touch screen and buttons makes it easy to handle the new laser control. The improved real-time power control is another outstanding feature. It offers a very high pulse-to-pulse stability that ensures consistent processing results. Graphic pulse forming, which supports the welding of critical materials like copper, is also possible. All TruPulse lasers are water-cooled as standard equipment. Up to 150 W, the lasers are also available with air cooling. With up to six laser light cables on a device, a laser can be used by several workstations. Using the TRUMPF TelePresence Portal, it is also possible for service technicians to access the system online for maintenance purposes – securely and regardless of location.



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TRUMPF is a high-technology group with focuses in production, laser and medical technology. For further information on the company, go to www.trumpf.com. Detailed information on TRUMPF's MEDICA presence is available at www.medica.trumpf-med.com.

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