SPI Lasers
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VERSATILITY COMES AS STANDARD

SPI LASERS BY MARKET

In this infographic we explore nine of the main markets that benefit from the performance of a Fiber Laser. The diversity of markets using the SPI Fiber Laser range shows that versatility comes as standard. Learn how SPI Lasers are making an impact in each of these nine markets.

AEROSPACE

The Aerospace industry presents a uniqueset of challenges in the manufacturing process. Aerospace craft need to be extremely lightweight, of massive strength, 100% reliable, and endure challenging conditions, all of which can be delivered, via the use of Fiber Lasers in the manufacturing process,

Applications and Benefits

Additive manufacturing
This is a major benefit to the Aerospace industry, some example benefits are provided below:

Key aerospace parts can be produced such as fuel nozzles, heating elements, cockpit equipment, etc.

Parts can be produced with reduced weight which is critical in the Aerospace industry.

Parts can be manufactured in one component rather than welding together multiple components which reduces the overall strength.

Parts with intricate and unusual designs which mimic nature can be produced.

Additive manufacturing is fast, can be produced without expensive tooling and suits small-batch / one-off production.

Honeycomb welding
This is frequently used to add structural strength. This delivers special lightweight alloy needs (e.g. Inconel, Hastelloy, etc.) which reduces weight.

Laser welding
Laser welding of turbine components is of high value to the Aerospace industry.

Laser drilling
Laser drilling into super alloy strength aerospace components is simplified.

Fiber Lasers
Fiber Lasers can be used to remove thermal barrier coatings prior to drilling applications.

Butt, lap and fillet laser welding
Butt, lap and fillet laser welding joints provide high-strength and enduring components.

AUTOMOTIVE

Lasers offer advantages compared to traditional manufacturing methods in the Automotive industry. Emphasis is placed on low-cost (in a price sensitive industry), high strength, low weight and innovation. Fiber Lasers can be used in many ways in the Automotive industry, just a few examples are given below (as it's impossible to list them all!)

Applications and Benefits

Additive manufacturing
Extensively used in rapid prototyping and design stages of vehicle production.

Producing parts such as exhausts, bumpers, valves, frames, etc.

Laser cutting
Laser cutting offers speed, precision at low cost for example in hydro foam / body cutting.

Laser drilling
Laser drilling of drive train, engine and transmission components.

Laser welding
Laser welding offers excellent control and low heat input, low carbon/power footprint – air bag initiators, fuel injectors, welding of aluminium and copper in electric cars.

Laser marking
e.g. night and day marking on dashboard parts.

BATTERIES

Batteries are a rapidly expanding market for Fiber Lasers. With the increasing demands for longer-life batteries, produced in an environmentally friendly way and whilst working with a diversity of metals, Fiber Lasers are the best available option to manufacturers.

Applications and Benefits

All are delivered through laser welding:

Weld all types of batteries such as Cylindrical batteries, Large prismatic batteries and Lithium polymer batteries.

Welding of dissimilar metals (i.e. more than one metal can be welded together, even if they are not similar).

Low power consumption and green friendly with a lower carbon footprint.

Increased weld quality and strength, spot weld without contact, electrode wear or electrode sticking.

Creation of a hermetic seal which protects against damage from water vapour.

High speed welding capability with low heat input, which causes less damage and reduced cracking.

Welding of aluminium and copper in batteries of electric vehicles.

DENTAL

The dental industry already extensively uses Fiber Laser technology and this is likely to grow at pace. SPI Fiber Lasers are actively used in dental additive manufacturing and tool production. The dental industry demands innovation, the ability to quickly produce one-off designs and all at the lowest possible cost. A summary of potential uses is provided below.

Applications and Benefits

Additive manufacturing
Provides reduced error rates and much faster production rates.

Prototype and one-off designs can be created.

Dental tool manufacture is successfully achieved with additive manufacturing.

Printing of crowns, bridges, teeth, etc. are all possible. These dental parts need to be-strong yet intricate, precisely made with a high degree of customisation.

Laser welding
Micro welding is enabled providing microscopic tools for dental use.

Laser cutting
This is ideal for cutting small dental components and also for tool trays.

ELECTRONICS

Fiber Lasers are extensively used in the production of electronic components and circuits. A variety of uses of Fiber Laser applications can be made including marking, welding and additive manufacturing as just a few examples. SPI Fiber Lasers can be used in a number of ways which are summarised below:

Applications and Benefits

Additive manufacturing
Electronic circuits can be created using conductive ink.

Ability to print microscopic components, e.g. chips, conductors, resistors and semiconductors.

Laser cutting
Electronic stencils and laser cutting of tungsten for electron emitters, integrator circuits and light bulb filaments.

Laser marking
Products like CDs/DVDs can be indelibly marked, delivering the ability to withstand harsh environments and chemicals such as disinfectants. Electronic epoxy can be marked without burning (which it often does with other types of lasers).

Laser sintering of electronic printed circuits.

Laser welding
Delivered with absolute precision for sensors (discussed later), of batteries (discussed earlier), of telecoms products, in disk drive flexures.

JEWELLERY

SPI Fiber Lasers are ideal for working with all kinds of precious metals, which make them ideal for the jewellery industry. 3D modelling is especially valuable in the creation of new jewellery ranges and designs, which can all be printed using additive manufacturing.

The jewellery industry has been revolutionised in the past ten years due to the laser industry and the requirement now is for "old school" jewellery design knowledge and expertise combined with the use of modern technological laser advances and the use of CA software.

Applications and Benefits

Additive manufacturing
Enables the rapid creation of unusual, intricate, complex and spectacular designs.

There is minimal wastage (especially when compared to traditional techniques).

Reduces the barriers to entry as expensive tooling / equipment are not required.

The cost of producing one-off unique items and small batches (which is ideally suited to the jewellery industry) is dramatically reduced.

Laser cutting
The precision cutting of precious metals (e.g. silver, titanium, etc.) to the required size.

Laser engraving
Both deep and light engraving of gold and silver jewellery.

Laser marking
Fiber Lasers can etch fine text, textures and colours onto jewellery (e.g. sterling silver and other metals). An example of a marking application would be hallmarks, which are found on all gold, silver and platinum jewellery.

Laser welding
Intricate, microscopic, high-strength and invisible welding joins can be created which add value to customised jewellery.

MEDICAL AND HEALTH

Medical/health industries place high demands on manufacturing processes, many of which can be enhanced by Fiber Lasers. This industry is gradually embracing laser technology due to lower costs, the consistently high-quality of products, the 100% reliability that is needed and the ability to work at microscopic levels whilst guaranteeing sterility

Applications and Benefits

Additive manufacturing
in 2012 over 16% of all additive manufacturing use was in the medical industry:

The ability to create custom one-off designs and small batches economically is proving exciting in this industry.

Speed and low cost of production are also other attractions in the industry.

Parts/tools manufacture
In the field of orthopaedics the production of unique body parts (e.g. prosthetic legs, arms, etc.) tailored to the patient is revolutionary.

Internal organs such as kidneys, livers, etc. can be 3D printed.

Custom-made disposable tools are increasingly popular.

Laser cutting
This is a popular application and includes products such as stents (used in arteries). Precision micro cutting is often needed, which is guaranteed to be 100% free of anything which could cause an infection.

Laser marking
The creation of indelible, smooth, (inks and dyes can't be used for marking due to the risk of contamination and allergies). Laser marking can be used to mark bottles, etc. reducing the need for labels, which can peel off.

Laser welding
Offering low heat input laser welding can be used to create clean and strong (and in some cases microscopic) weld joins – which can all be sterilised. Hermetic seals are a popular welding application in the medical industries for products like pacemakers, which need a strong seal, whilst not damaging the sensitive electronic components within.

SEMI-CONDUCTORS AND SOLAR CELLS

The production of semi-conductors and solar cells are important for the Fiber Laser market as there are many benefits to be realised from using Fiber Lasers. These are detailed below, but are why this industry is growing rapidly, particularly with the emerging ability to 3D print semi-conductors and electrical circuits.

Applications and Benefits

Additive manufacturing
Printing electronics – Printing of semi-conductors and LEDs using raw semi-conductor inks material.

Nanotechnology – Extremely accurate microscopic sized semi-conductors can be created using a blend of additive manufacturing and nanotechnology.

Silicon wafer processing
Various Fiber Laser tasks can be used to process silicon wafers which play an important role in the semi-conductor and solar cell industry:

Benefits include fast processing times, absolute precision and accuracy, less waste and processing a wide variety of widths and no micro cracking.

Cutting
Laser cutting can be used to accurately cut various sizes of silicon wafer, the ability to process various thicknesses is a major benefit.

Dicing
Cutting or "dicing up" of a large silicon wafer into many individual silicon semi-conductors.

Scribing
Lasers can scribe/mark semi-conductors and solar cells to very high levels of accuracy.

A large variety of other materials (e.g. Gallium Arsenide) can be processed in wafer form for semi-conductor and solar cell use by lasers.

SENSORS

Sensors are widely used across a vast number of industries in our everyday lives, e.g. cars, microwaves, aircraft, etc. Sensors need to be managed with care as they include sensitive electrical components, which are temperature sensitive. We discuss below how Fiber Laser welding is a great solution in the manufacture of sensors.

Applications and Benefits

Laser welding
Can be delivered at a very low comparable cost to traditional methods.

Low heat input which protects seals, circuits and components.

Laser welding of sensors is easy to incorporate into a wider manufacturing process.

The process is non-contact, which reduces the risks of contamination.

Creation of hermetic seals
Necessary to prevent contaminants reaching sensors and pressure transducers.

WITH SPI LASERS – "VERSATILITY COMES AS STANDARD"

We conclude with a reminder that when buying an SPI Laser, "versatility comes as standard". This is a Company mantra, but we're sure you can see from the markets served above that it's really true; the SPI Fiber Laser range really does offer incredible levels of versatility.

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To discover just how versatile our Fiber Lasers can be, and how they could benefit your business call us on **01489 779 696**