



TAILORWELD

Energy Distribution for Laser Welding

Press Release TailorWeld

The project **TailorWeld** - “Tailored Energy distributions for Laser Welding”, sponsored by the EC FP7 Research for the benefit of SME associations has started on November 1st 2013.

The **TailorWeld** project aims to develop and demonstrate an innovative laser welding system, which uses simple and robust diffractive optical elements, to increase the flexibility and simplify the application of laser welding; removing the key barrier to entry for a large number of SMEs. Most existing laser systems are fitted with either a standard process head or a 2D galvanometer scanner – both of which deliver a “standard” Gaussian or “top-hat” energy distribution to the work piece. However, this relatively simplistic energy distribution is not directly suitable for many applications and significant laser welding expertise is required in order to develop acceptable process parameters. Laser beam welding with a tailored energy distribution produced by a galvanometer beam scanner is possible, but this technology is not economically attractive. Diffractive optical elements are a robust, simple tool and are capable of producing (virtually) unlimited tailored energy distributions.

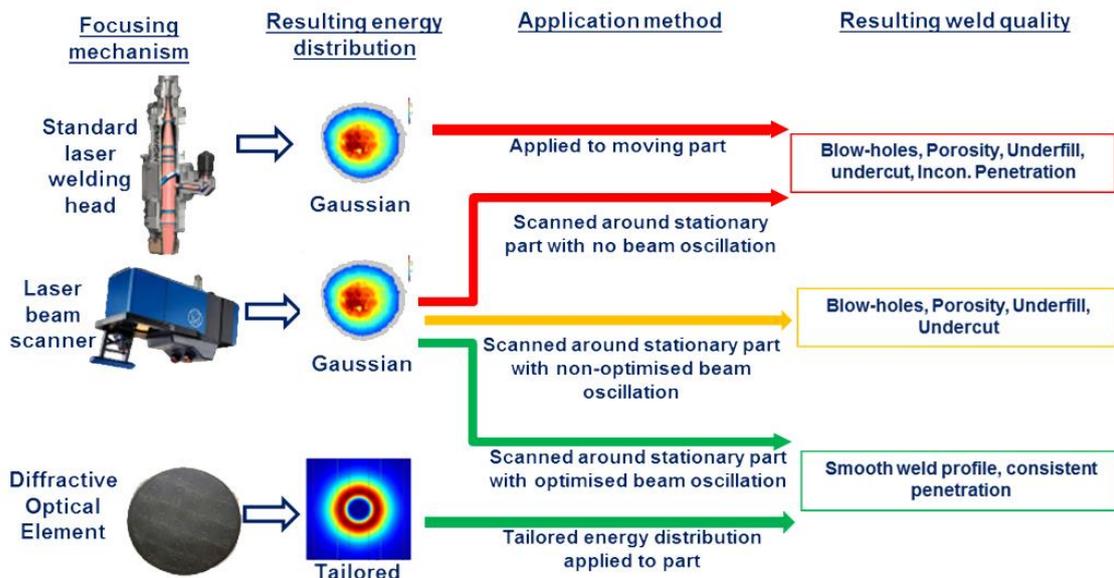


Figure 1 - Typical example of the benefits of laser welding with a tailored energy distribution compared to existing solutions.

TailorWeld aim will be realized through two critical developments:

- Development of a thermo-physical model, easily accessed through a DOE (diffractive optical element) design tool with a Graphical User Interface (GUI), that is capable of calculating the necessary laser beam energy distribution for a given joint (taking into account common materials and joint geometry).
 - Allowing simple assessment and adoption of laser welding process.
- Production of a DOE laser welding head module, allowing for quick and simple interchange of DOEs for different laser welding processes, and incorporating process monitoring for Quality Assurance.
 - Providing a ‘turn-key’ system, which gives the necessary flexibility required by SMEs, whilst requires little (or no) advanced training to operate.

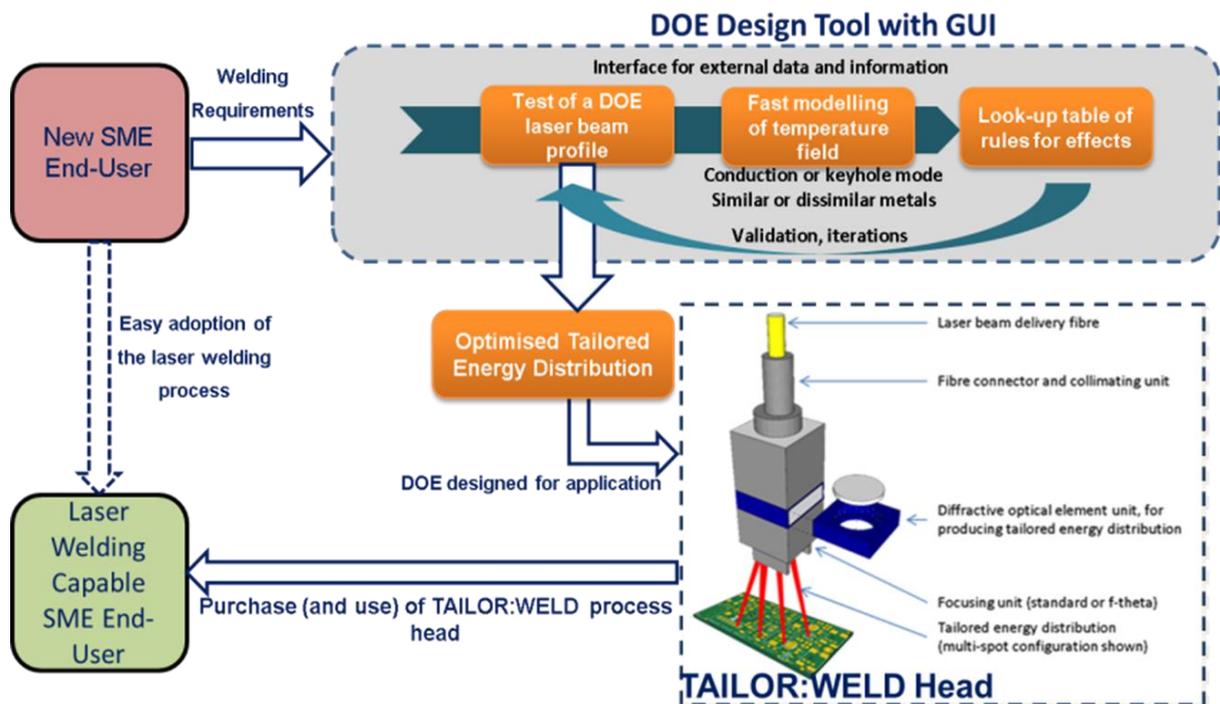


Figure 2 - Overview of the TailorWeld system – showing how a new SME end-user would use the model to then determine a suitable DOE design and then be able to purchase the welding head (or full laser welding system, as appropriate)



The key benefits of the novel TailorWeld system include:

- A simplified method to determine the applicability of laser welding for welding processes undertaken.
- Replacement of high-cost and complex galvanometer scanner systems (~€80-150k) with simple DOE optic element (~€2k per application)
- A low-cost, robust system for producing tailored energy distributions, facilitating the adoption of laser welding by new end-users, across multiple industry sectors.
- A novel method of interpreting end-user requirements and reducing adoption costs.
- A retro-fittable DOE laser welding head module, suitable for new or existing laser beam welding systems.
- Built in process monitoring for optimum performance and Quality Assurance for end users.
- Interchangeable DOE module (cartridge system), allowing for a variety of welding operations and/or simple updating as necessary.

The project is comprised of a transnational consortium, which includes nine partners:

- European Federation for Welding, Joining and Cutting
- VIP Products Maschinenvertriebs GMBH
- Holo-Or Ltd
- Nederlandse Instrumenten Compagnie - Nedinsco BV
- Impact clean power technology SA
- Halitic
- Graham Engineering Limited
- Lulea Tekniska Universitet
- TWI Limited

The use of the “Research for the benefit of SME associations” will ensure the TailorWeld project will be of dedicated benefit for the European industry.

The research is funded by the European Union’s Seventh Framework Programme and managed by REA-Research Executive Agency under grant agreement no. FP7-SME-2013-606064-TailorWeld. Information is provided as is and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof uses the information at its sole risk and liability.

More information regarding the TailorWeld project can be found here: www.tailorweld.eu