



TAILORWELD

Energy Distribution for Laser Welding

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. 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.

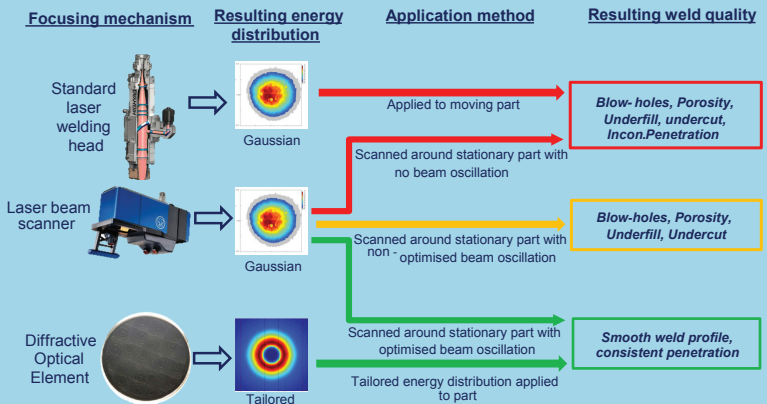
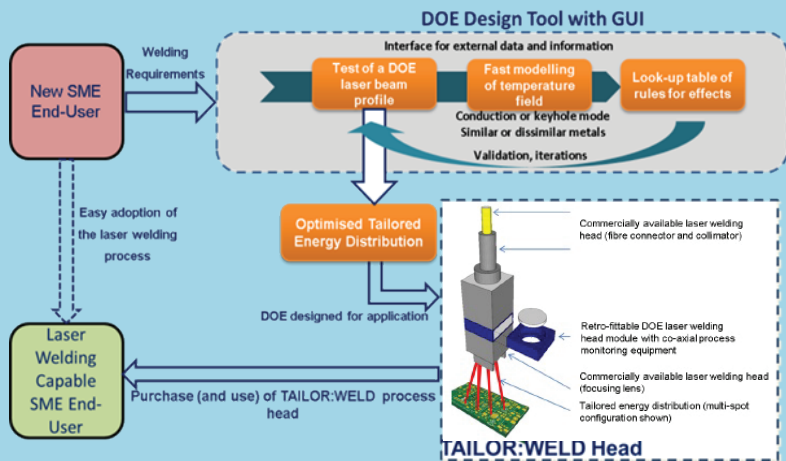


Figure 1 - Typical example of the benefits of laser welding with a tailored energy distribution compared to existing solutions.

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.*



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 (diffractive optical 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:



More information regarding the TailorWeld project can be found here:

www.tailorweld.eu

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