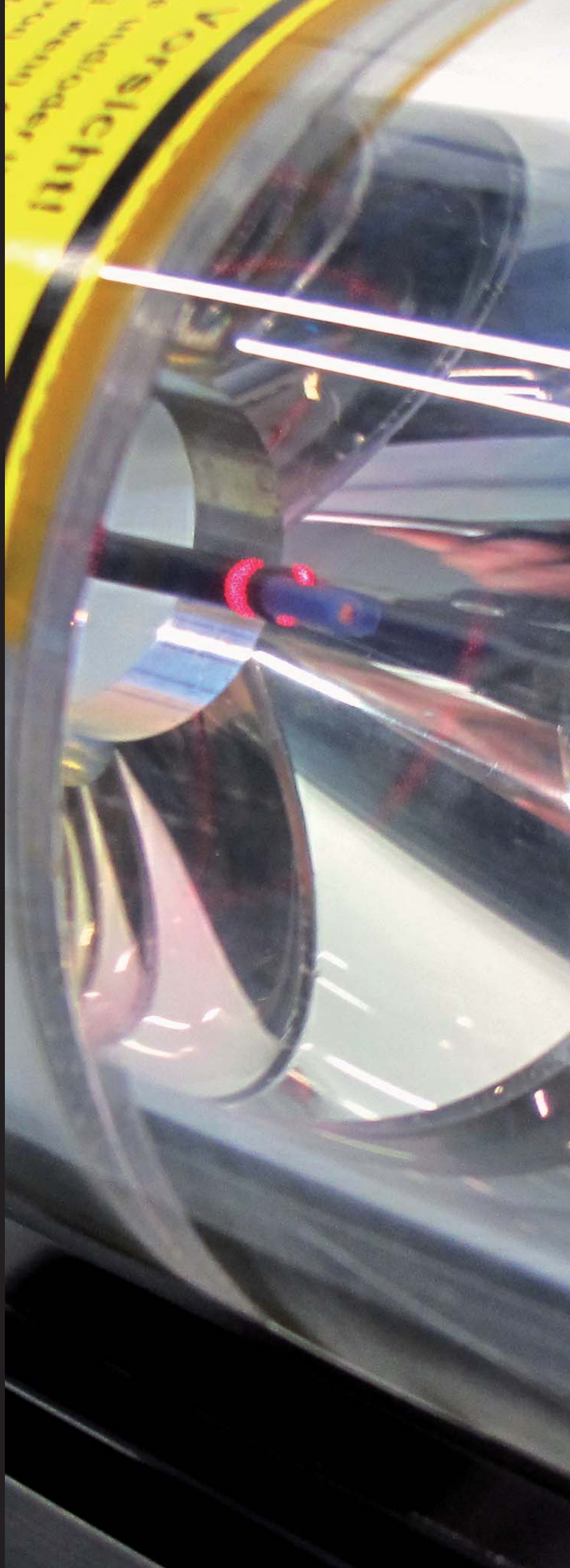
LEISTER
LASERSYSTEMS

Laser for industrial process heat

High power density applied with precision

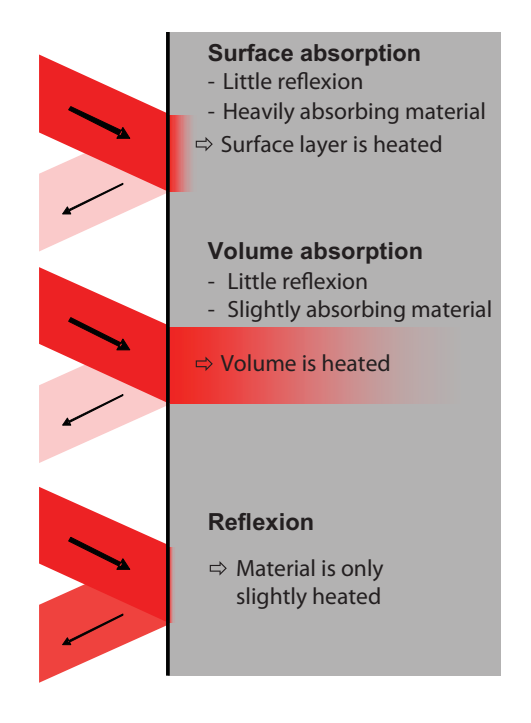


NOVOLAS™

High power density applied with high precision

Hot air and infrared radiation are frequently used for industrial process heat. If high power density or fine patterns are required, these techniques are reaching their limits. It is for these applications that laser may be an option.

Basic Principles



Whereas hot air blowers and middle wave infrared systems achieve a power density of 10-20 W/cm2, short wave IR or halogen systems achieve a power density of 100-300 W/cm2. If the application requires a higher power density, a laser is used. A laser system, however, achieves a power density of 100’000 W/cm2, thanks to its high focusability. With laser, process heat is applied at high precision and can be applied locally.

The techniques also differ with regards to heat input. With hot air, the process heat is applied on the surface. Infrared or laser radiation apply the heat on one specific layer of the surface or within the material, depending on the wave length and absorption properties. In this case it is important that the radiation is not heavily reflected by the material.

Compared to infrared radiators, laser provides more power per area. Furthermore, laser can be used for delicate patterns. This solution is especially interesting where process heat is used on limited areas of the surface layer. The fine patterning of the laser radiation is realised by shading the beam with a mask.

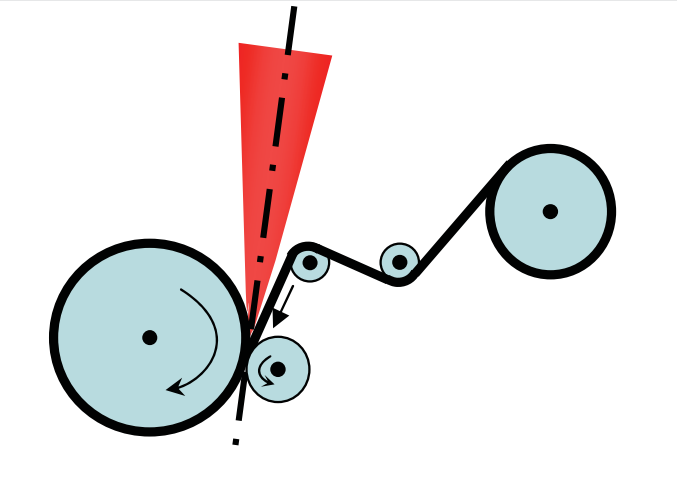
Applicability

- Coating
- Softening
- Remelting
- Joining
- Soldering
- Hardening
- Selective desiccation
- Activation of surfaces
- Triggering chemical reactions

Applications

Welding long-fibre reinforced plastic strips

Carbon strips based on a thermoplastic matrix (CFRP) are increasingly used in aviation and automotive industry. Long CFRP strips are automatically placed on top of each other and welded with laser radiation.
The laser beam is directed to the gap between the strips, where it plastifies die surfaces of two layers, before these are pressed against each other. This technique produces a both light and highly rigid component of composite materials, without the usual baking of the layers in a furnace.



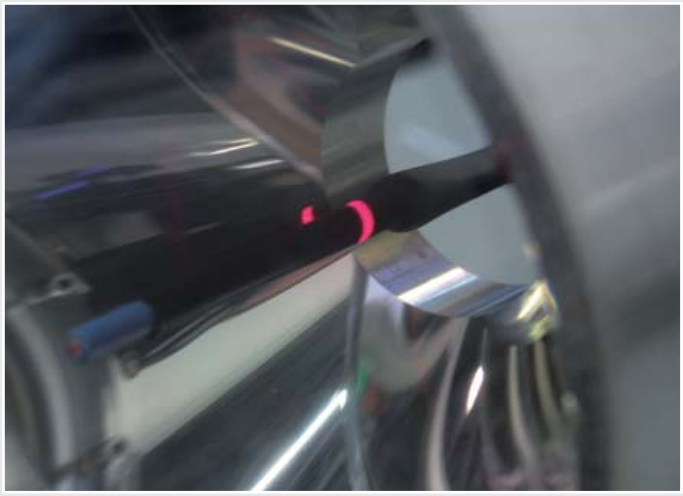
Welding principle of CFRP-Strips

Welding CFRP-Strips
(Image: MF-Tech, Frace - www.mftech.fr)

Shrinking

If precision is the critical aspect in the shrinking process, the laser is the right tool. Energy is applied locally to a target, allowing for selective shrinking.
With cylindrical components, a process advantage is achieved by using the radial optic by Leister. The laser beam applies the heat simultaneously to the ring-shaped welding zone, providing homogeneous energy input all around.

Precision shrinking with Laser



Laser laser applied to shrinking zone

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Products

The laser systems of the NOVOLAS product line gives rise to a multitude of options, ready to take on every challenge. The product line includes laser systems for integration into production lines and –cells as well as turnkey systems. Its modular design yields optimal combination for customer specific configuration. Comprehensive accessories have been developed for varied applications, allowing you to assemble or retrofit a laser welding system specifically geared to your needs, applications and processes.

Systemes

NOVOLAS Basic AT und Basic AT compact

- For integration
- Flexible and cost-effective
- Multiple laser module capability
- High throughput
- Upgradable

NOVOLAS Basic AT

NOVOLAS WS

NOVOLAS WS

- Turnkey system
- Intuitive user interface with programming tools
- Customisation possible

NOVOLAS Basic AT compact

Lasermodules

- Line laser module
  Line length: 20 –100 mm
  Laser power: 150 – 600 W
- fibre coupled spot laser
  Laser power: 40 – 200 W

Radial optic

Line laser module

Optics

- Spot optic Ø Spot ≥ 0.6 mm
- Ring optic Ø Ring 2 – 55 mm
- Radial optic
- Application-specific Optics
  e.g. surface emitting diode

Spot optic

Ring optic

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