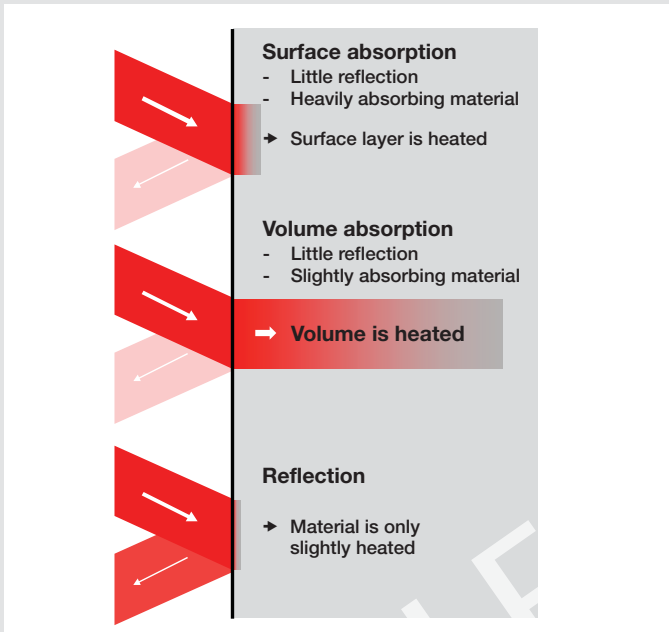


# Laser for Process Heat: High power density applied with high precision.

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.



Whereas hot air blowers and middle wave infrared systems achieve a power density of 10-20 W/cm<sup>2</sup>, short wave IR or halogen systems achieve a power density of 100–300 W/cm<sup>2</sup>. If the application requires a higher power density, a laser is used. A laser system, however, achieves a power density of 100'000 W/cm<sup>2</sup>, 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 can be realised by shading the beam with a mask.

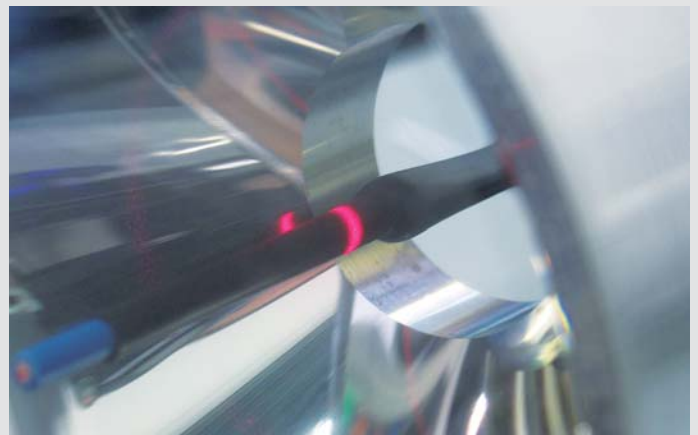
## Typical applications

- Plastic welding
- Remelting
- Coating
- Activation of surfaces
- Hardening
- Joining
- Softening
- Triggering chemical reactions

- Selective desiccation
- Soldering



Welding of CFRP-Strips. (Image: MF-Tech, France, [www.mftech.fr](http://www.mftech.fr))



Precise shrinking for sensitive parts.

## 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.

## Systems

### NOVOLAS Basic AT and Basic AT compact

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

### NOVOLAS WS-AT

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

### Laser modules

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

### Optics

- Spot optic  $\varnothing$  spot  $\geq 0.6$  mm
- Ring optic  $\varnothing$  ring 2 – 55 mm
- Radial optic
- Application-specific optics, e.g. surface emitting diode



BASIC AT Compact: Compact and cost-efficient laser system featuring an air-cooled diode laser.



Line Laser LineBeam AT.