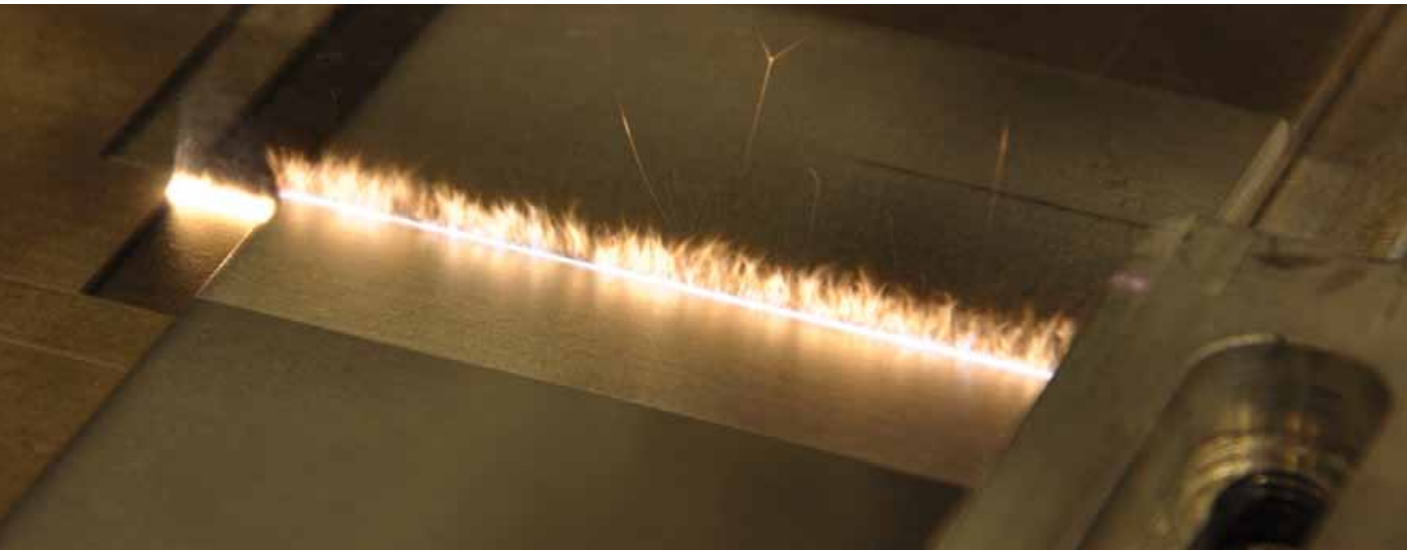


## LASER PRE-TREATMENT FOR SOLDERING AND WELDING



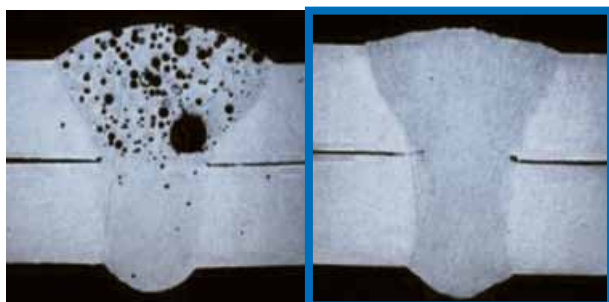
Oil, grease or residue layers from upstream processes can be removed uniformly and without residue. The cleaning is done locally with high precision. Free of abrasion, the laser cleaning process replaces wet chemical washing processes and is therefore particularly gentle on the material and environment. Due to its compact design, the laser system including processing optics can be integrated directly into the process chain.

### ALUMINUM

When removing an irregular grown oxide layer with the cleanLASER a uniform, near-surface remelting of the boundary layer can be achieved. The then „compressed“ or microcrystalline and amorphous transition zone is less susceptible to material-dependent corrosion.

The new instantaneously conditioned, very thin and homogeneous oxide layer on this surface directly created by the laser cleaning process represents the optimum basis for a very uniform welding process. This creates connection qualities with minimal porosity in the welding area.

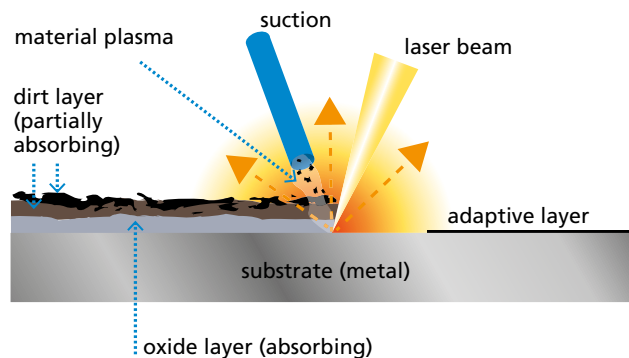
The laser cleaning works particularly well with oily or greasy substances primarily in the oxide layer between the metal and contaminant. Also, transparent residues such as dry lubricants and emulsions are safely removed; the dirt is blasted away from underneath. By residue-free removing of the organic substances an evaporation of contamination during the thermal welding process is inhibited. Defects in the seam can be effectively prevented, resulting in cleaning qualities in an unprecedented manner.



untreated

pre-treated with cleanLASER

The porosity of a weld seam pre-treated with verifiably decreases to less than 1%



# WELDING PRE-TREATMENT

## GALVANIZED STEEL PARTS

The very uniform and gentle cleaning power of the cleanLASER allows the zinc layers to remain free of damage throughout the homogenized radiation. The galvanized parts remain resistant to corrosion, even after the laser treatment.

The gentle cleaning of galvanized steel sheets is applicable to both galvanic zinc and hot-dip galvanizing.

By removing the near-surface zinc hydrate and a possible reduction (precisely adjustable) of the zinc layer thickness, the quality is significantly improved by the quieter melting. The method is suitable for a thin sheet to much larger components.

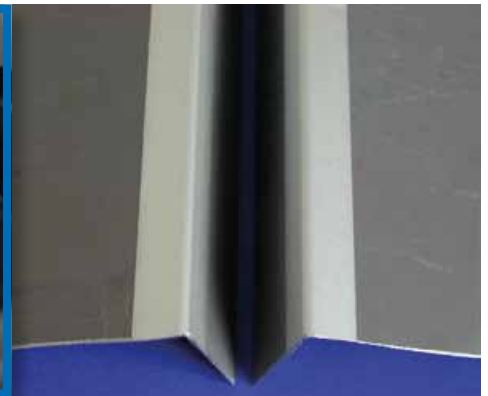
## DE-COATING



*cleanLASER when welding in car body pre-treatment*



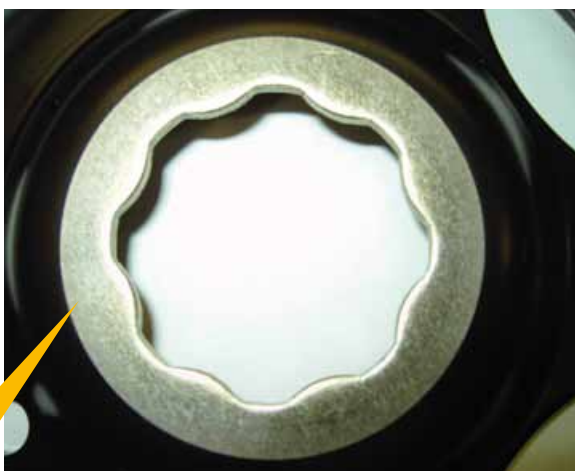
*Oiling and cleaning of steel components in the power train*



*De-coated sheet steel at the edges to pre-treatment before soldering*

The laser light removes protective coatings, primers or organic coatings of any kind and is therefore also suitable for the preparation of phosphated or anodized parts. The base material can then join with high quality. Metallic coatings such as layers on aluminum iron (AlFe) on hot-workable high strength steels, can be used in quenched and tempered condition to prepare it for the welding process.

*Precise and chemical-free de-coating with laser light*



### Welding pre-treatment by means of laser light

- No media and blasting consumables
- Easy to automate and integrate into any process
- High reproducibility
- Low operating costs (mostly < 1/h)
- Typical process speed for 20 mm track width:
  - Aluminum sheet metal approx. 5 m/min
  - Removal of shop primer approx. 20 m/min
  - De-oiling and cleaning of steel approx. 10 m/min
- Minimal space requirements
- High level of precision
- Environmentally friendly process with energy savings up to 87%

awarded with  
**Deutscher Umweltpreis 2010**

We are looking forward to testing your application.  
Feel free to get in touch with us.

## LASER POST-TREATMENT OF WELD SEAMS



*Photomicrograph of a part prior to laser treatment*



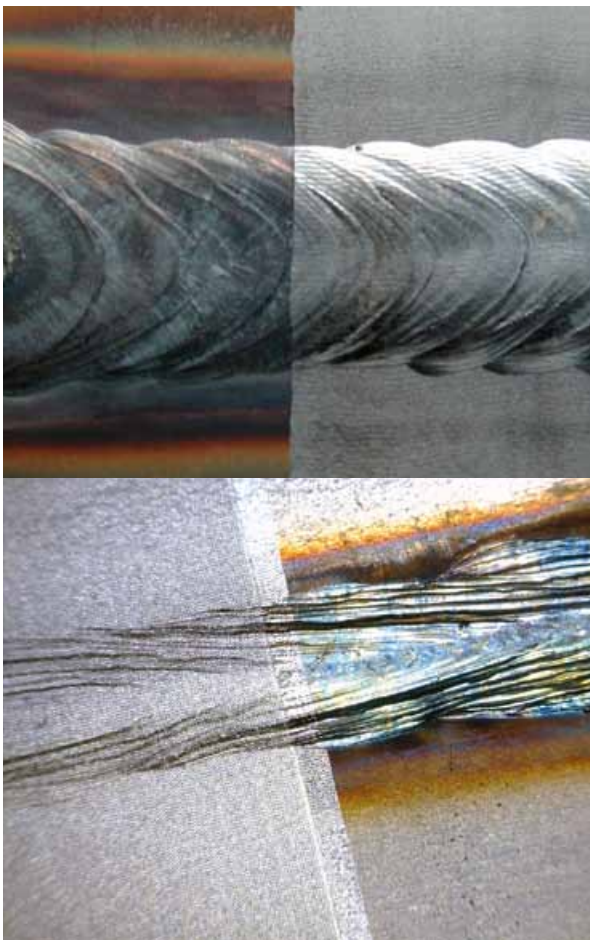
*Part after welding post-treatment by cleanLASER; silicate residues completely removed*

Even with good treatment in the welding process, oxidation and contamination phenomena can occur in the weld area. Oxides and/or organic residue can be removed with the laser beam exceptionally well but issues could possibly arise in welding spatter or glassy silicates.

The resulting MIG welding process slag is blasted through the use of the high intensity laser beam. This prevents any loosely adhering slag fragments

from generating localized corrosion favoring a later corrosive infiltration after painting.

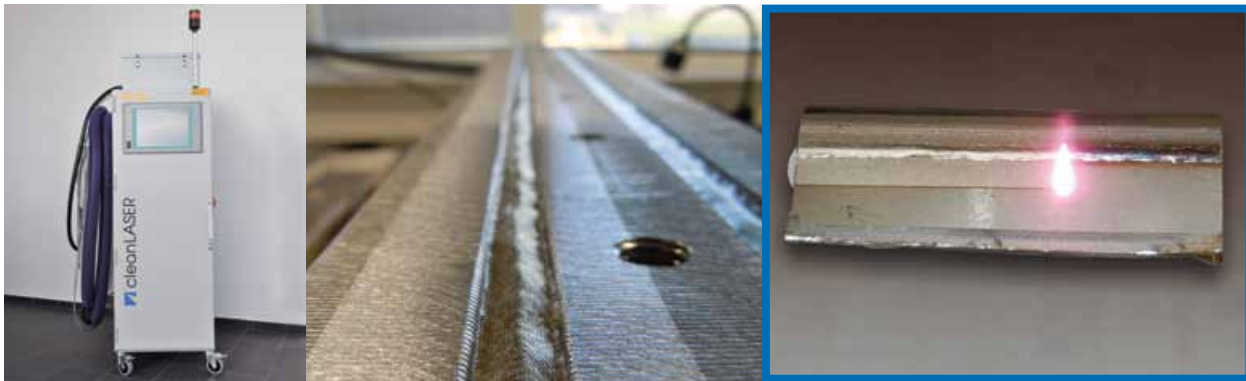
*Laser cleaning of a stainless steel seam (above) as well as of carbon steel (below)*



### Benefits:

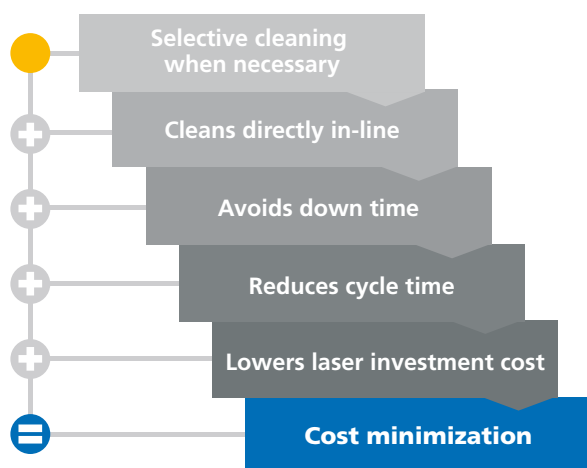
- Optimum pre-treatment for subsequent coating
- Passivation of stainless steel welds
- No peeling paint or corrosion effects by slag residue
- Customer confirmed corrosion stability of laser treated and then painted welding zones
- Replacement for example of brushing processes or abrasive blasting technology
- No carryover of particles
- Damage-free cleaning of galvanized steel sheets without affecting the corrosion protection by particularly gentle beamforming possible

## LASER POST-TREATMENT OF WELD SEAMS



Optimum weld seam pre-treatment by means of laser light

### The smartCLEAN Strategy



cleanLASER offers a wide portfolio of laser systems from 20 W to 1000 W. From a hand-guided backpack laser up to a fully automated, robot guided laser cell. The basic modules are tailored to the customer's specific application.

The operating costs are exceptionally low, almost a maintenance-free technology and a correspondingly high technical availability. After a brief instruction any cleanLASER can be easily operated respectively integrated into a production line.

Since no abrasives or cleaning agents are required, the process is proven to be quiet, clean and particularly eco friendly.

Cleaning and pre-treatment by means of laser light – Environmentally friendly, precise and profitable.

Both in welding pre- and post-treatment cleanLASER has years of operational experience. Besides advising the correct machining strategy we advise our customers in the selection of the most suitable application and cheapest laser system.

We are looking forward to testing your application. Feel free to get in touch with us.