

WE CREATE YOUR MACHINES



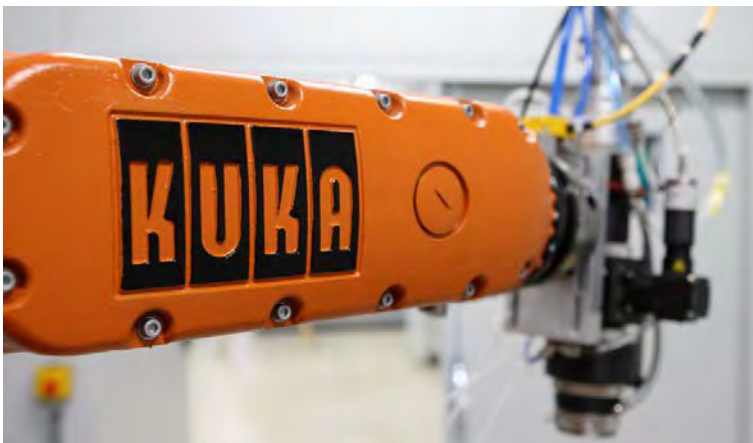
TECHNOLOGIES OF LASER APPLICATION CENTER



LASER HARDENING OF MOLDS

We dispose with a 6-axis robot that enables us a highly precise and fast heat treatment of complex shaped tools and forming molds.

During the laser hardening process, the constant temperature is ensured by an IR pyrometer.

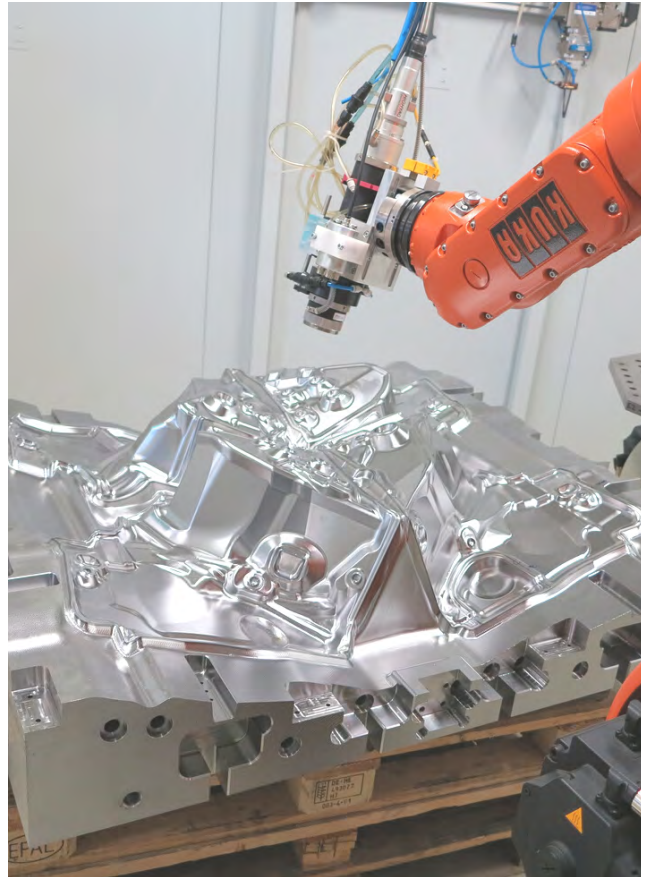
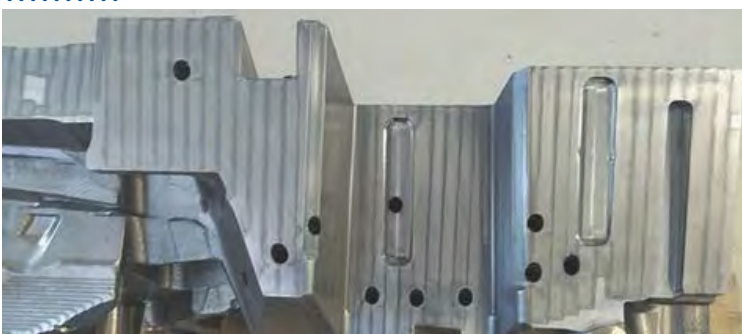


We offer two basic methods of laser hardening to our customers:

CONTOUR - with 1 spot of a width of 4, 8 or 16 mm



SURFACE - using an overlapping method

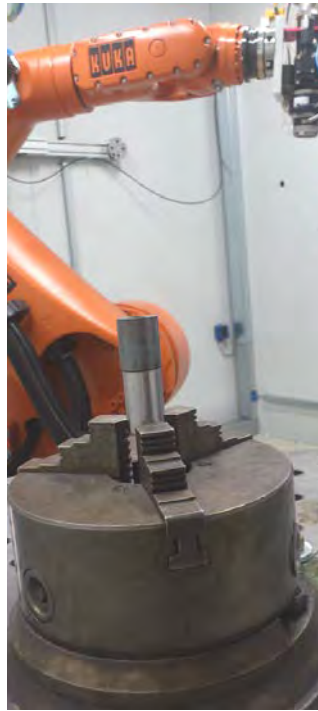


The capacity of the robot cell allows the processing of parts up to a size of 2000 x 2000 mm and weight up to 3000 kg.

We are able to program the robot paths using CAM software and a 3D model provided by the customer.



LASER HARDENING



MATERIALS SUITABLE FOR LASER HARDENING

- **Cast iron:**
GGG50L, GGG70L
- **Structural steels:**
C45, C55
- **Steels for tempering:**
1.7225, 1.7707
- **Tool steel for cold work:**
1.2379, 1.2842,
- **Tool steels for hot work:**
1.2343, 1.2344
- **Tool steels for mold making:**
1.2312, 1.2738

After laser hardening, the surface hardness reaches 55-60 HRC.

The depth of hardening reaches up to 1 mm.

The condition for laser hardening of the material is a carbon content of at least 0.3 %.

FURTHER USE OF LASER HARDENING TECHNOLOGY

The Laser Application Center also specializes in hardening the functional tool surfaces, such as:

- feed rollers
- rules
- cams
- cutting tools
- ejectors
- shafts
- pins
- bearing housings, etc.



ADVANTAGES OF LASER HARDENING



LOW TEMPERATURE
DEFORMATIONS



NO OR MINIMUM NEED FOR
FURTHER PROCESSING



ENVIRONMENTAL
FRIENDLINESS OF THE
PROCESS

ON-LINE
PROCESS TEMPERATURE
CONTROL

NO SURFACE CRACKS

ENERGY EFFICIENCY

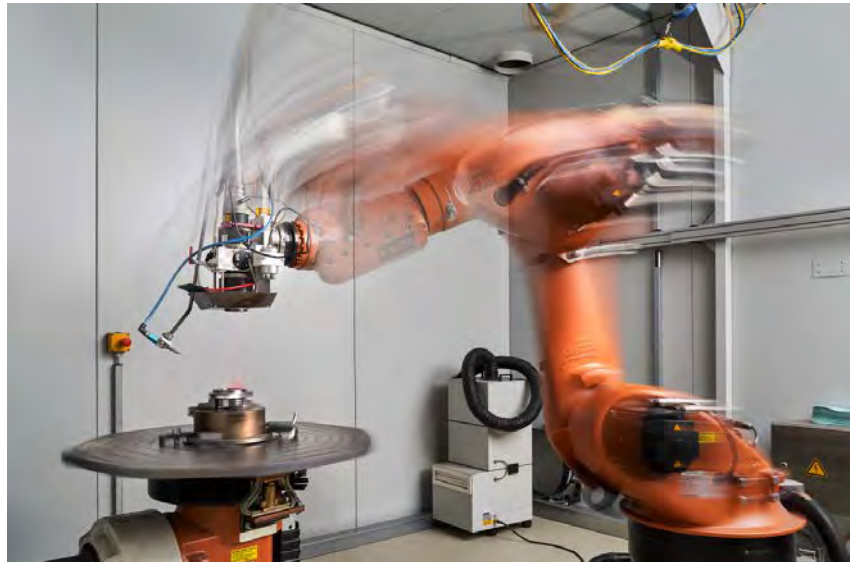
HIGH PROCESSING
SPEED AND
EFFICIENCY

LOW
SURFACE OXIDATION

EASY PROCESS
AUTOMATION

LASER POWDER CLADDING

Technology of the laser powder cladding allows to improve the surface properties of metal machine parts. The principle of the technology is the melting of the powder material on the surface of a part.



MOST COMMON USE OF LASER CLADDING

- Refurbishing existing surfaces
- Increase the life of a part
- Creating new functional surfaces and coatings for pressing and cutting tools
- Increasing the resistance of highly stressed parts

We use cladding powders, based on nickel, cobalt or iron, with different hardness value.



**AUTOMATED
MACHINE
APPLICATION USING
ROBOT ENSURES
LOW POROSITY OF
THE WELD AND
COATING**



**LOW TEMPERATURE
EFFECT
ON THE
SURROUNDING
MATERIAL**

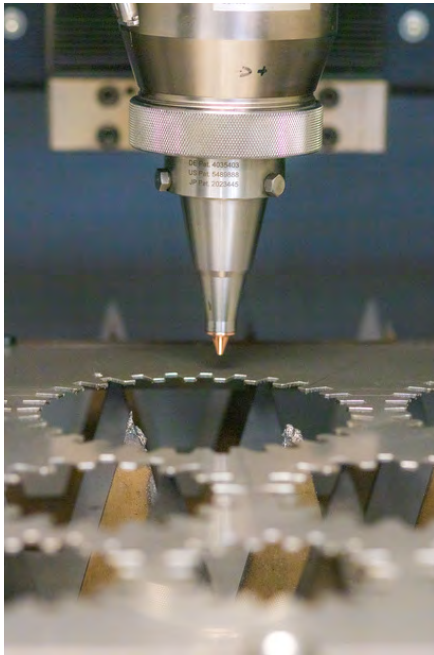


**DIVERSITY OF
CLADDING
POWDER MATERIALS**



**THE ROBOT CAN
ALSO BE
USED TO PROGRAM
COMPLEX SHAPES
AND PARTS OF UP
TO A SIZE OF 2000 X
2000 MM AND
A WEIGHT OF 3000
KG**

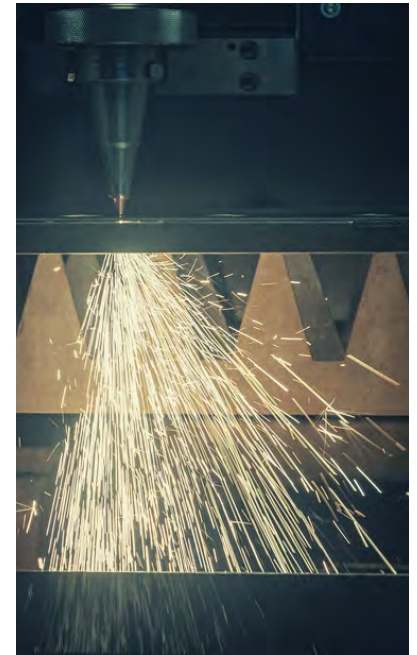
LASER CUTTING



We offer 2D cutting of structural and stainless steels and non-ferrous metals up to a thickness of 4 mm and up to a size of 800 x 600 mm.



Thanks to the possibility of controlling the laser beam, it is possible to create even very complicated shapes with a high cut quality.

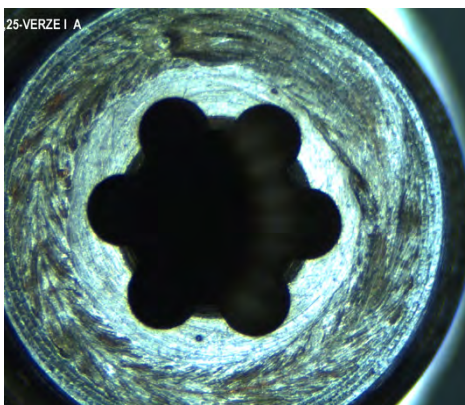


LASER WELDING OF METALS

Laser welding technology is an effective method of joining metal parts without additional material.

We offer welding using pulsed and continuous mode.

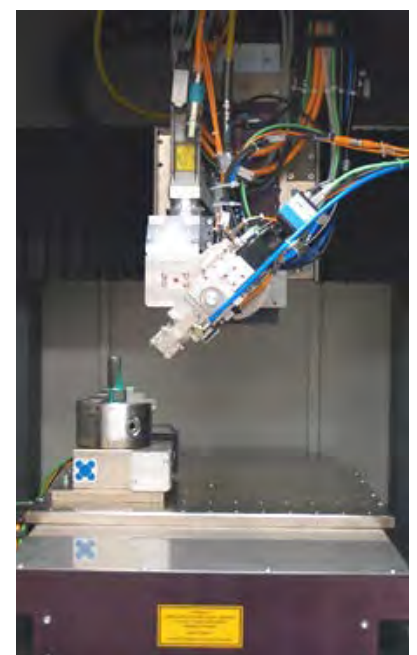
Possibility of welding in a protective argon atmosphere.



MAIN ADVANTAGES OF THE TECHNOLOGY

- high welding speed
- minimal deformation of connected parts
- very narrow heat affected area
- minimal temperature influence around the weld area

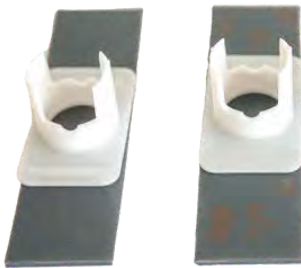
The result is a precise, regular and high-quality weld without pores and cracks.



LASER WELDING OF PLASTICS

The Laser Application Center offers a technology of laser transparent welding of thermoplastics.

This is a non-contact method of joining without additional material. The result is a very precise gas-tight weld that is highly resistant to mechanical stress.

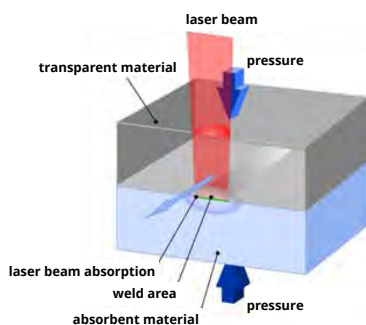


Welds often achieve the same strength as the base material. Welded surfaces are free of micro particles and adhesives.

The laser beam can be precisely focused on the weld spot without affecting the surrounding material. The parts are joined at the interface of the welded materials, so the outer walls are not thermally affected.

The technology is suitable for a welding of visible parts.

THE PRINCIPLE OF TRANSPARENT LASER WELDING



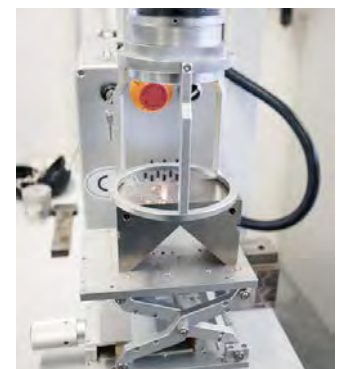
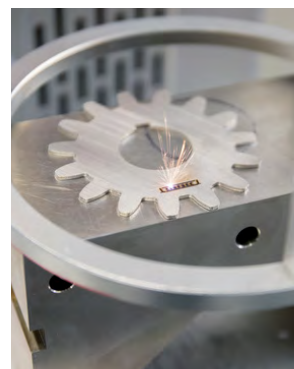
- condition is welding of two parts with different absorption (transparent + absorbent)
- welded parts must be in constant contact using pressure
- necessary setting of the weld parts by overlapping

LASER ENGRAVING

Laser marking device with a power of 20 W for marking metal materials.

Engraving to a depth of tenths of a mm. The working area is 110 x 110 mm.

A removable head can be used to marking larger objects.



METALLOGRAPHIC LABORATORY



HARDNESS TESTING AFTER HARDENING

After laser hardening of the tool surface, we always perform check hardness measurements using the alphaDUR portable hardness tester. We attach a report with measurement results to each order.

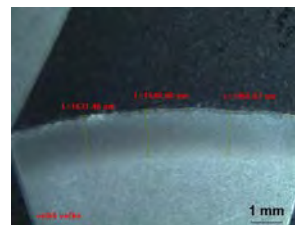


We use a metallographic laboratory equipped with a table hardness tester and two microscopes to check and evaluate the results of our technologies.

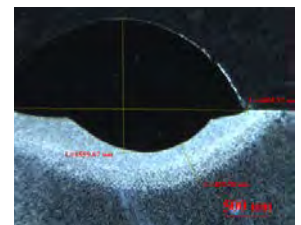


HARDNESS DEPTH EVALUATION

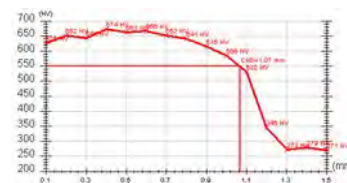
We are able to evaluate the depth of hardening in our metallographic laboratory equipped with a table hardness tester.



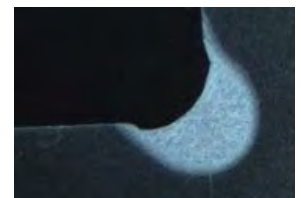
Checking the depth of hardening of the part



Coating with a cobalt-based powder

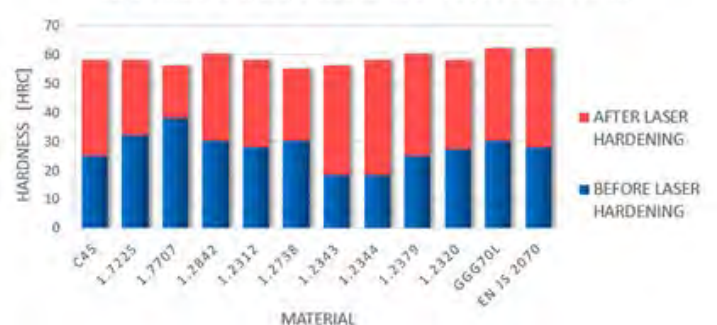


Hardening depth diagram



Corner weld

INCREASING OF SURFACE HARDNESS AFTER LASER HARDENING



Increasing of surface hardness after laser hardening



Ing. Libor Dvořák

+420 485 302 768

libor.dvorak@vuts.cz



VÚTS, a.s.

Svárovská 619
Liberec XI- Růžodol
460 01 Liberec
Czech Republic



www.vuts.cz