

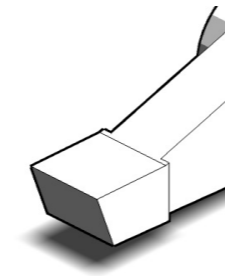
Manual hardening workplace
IHU110/2 (Induction Hardening Unit – 1 x TTH10 10kW)

Scope of work: Induction hardening of rocker arms

This small work place was constructed for the hardening of rocker arms for aircraft and motor sport engines. The zone to be hardened is approximately 10mm x 10mm.

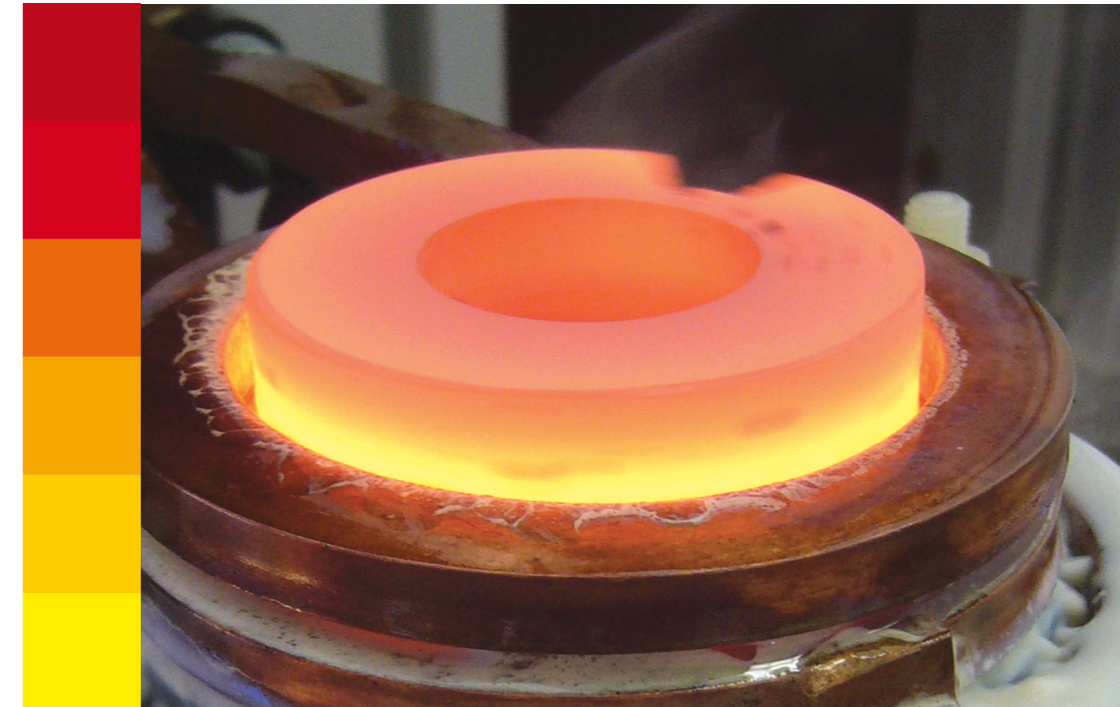
The single components of iew have been integrated locally on a worktable supplied by the customer. The small hardening unit consists of a PLC sequence control (menu guidance in German and English) for the power control of the induction system, the activation of a solenoid valve for the emulsion shower and an infrared pyrometer for the temperature measurement. A drip pan for the emulsion liquid has also been integrated in the working table which is also equipped with a temperature sensor and connection to a cooling system to ensure a constant emulsion temperature.

As the weekly number of hardness components was only about 300pcs but the need to integrate the hardening process into the in-house manufacturing process was given, the more cost effective solution where the induction hardening unit was integrated into an already available worktable at the customer was chosen.



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Induction Hardening Units

Manual and automatic systems

Manual hardening unit

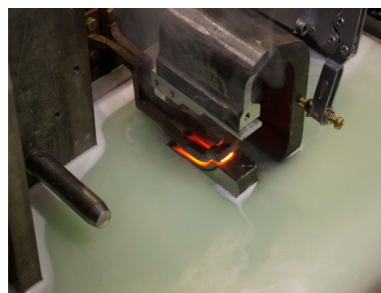
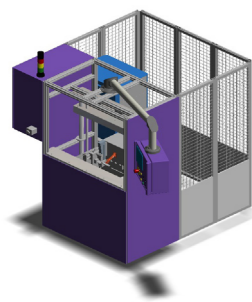
IHU130 (Induction Hardening Unit – 1 x TN30 30kW)

Scope of work: Induction hardening of safety relevant elevator components

This hardening system was developed for the hardening of elevator components (cable guide and securing clamps) and built for a wage labor hardening plant.

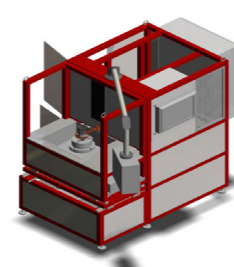
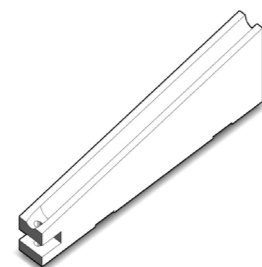
The to be hardened components are clamped into a stationary device and heated to approximately 900 °C. Upon reaching the hardening temperature, the entire device is lowered into the corresponding emulsion bath. In addition, workpieces with a length of up to 300mm can be inductively heated in a continuous process and then quenched in the emulsion bath via feed control. This fastest possible cooling of the components ensures a steady and constant hardness. Due to the complete cooling of the hardening component it can be manually removed from the device without risk of burns. Furthermore, due to the use of an emulsion bath, the use of workpiece related cooling showers is no longer necessary.

In order to ensure a 100% constant hardness degree, the emulsion tank is equipped with a temperature sensor and integrated cooling system.



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Manual vertical hardening unit

IHU120 (Induction Hardening Unit – 1 x TTH20 20kW)

Scope of work: Vertical hardening of small parts

This unit is a vertical hardening system for the hardening of small parts and for the annealing of chucks.

This system is equipped with a rotary clamping system with a speed of 100 to 200rpm and a lifting system with 450mm traverse path. With the help of an infrared pyrometer precisely matched to the required hardening temperature, the proper feed rate of the inductor can be calculated. Alternatively it is possible to harden at a constant feed rate. Both options allow the greatest flexibility for different hardening tasks.

The PLC interface allows the creation and saving of up to 100 hardening programs. By connecting the unit to the customer's corporate network, these hardening programs and hardening data can be exchanged.



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Automatic hardening unit

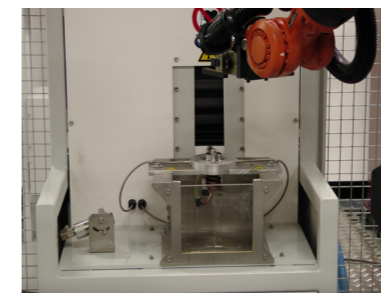
IHU108 (Induction Hardening Unit – 1 x TTH8 8kW)

Scope of work: Induction hardening of a compressor wheel and its shaft

This hardening unit is used as a part of a training system for determining the energy efficiency of a welding and subsequent hardening process.

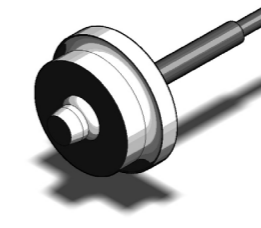
First, the workpiece carrier plate is equipped with a compressor wheel and a shaft and retracted into the security cell by pressing a button. From this carrier plate a robot takes the two parts and clamps them in an automated welding system where they are welded. In the following step, the component is extracted by the robot and inserted into the holding fixture of the IHU108. After an optical workpiece recognition, the actual hardening process starts with a setpoint temperature of 1000 °C. Thereafter, the workpiece is quenched by a shower integrated in the inductor.

Through the PLC sequence control, as well as the contactless temperature measurement (pyrometer) multiple heating programs can be defined which allows the training participants to be gradually introduced to the improvement of the energy efficiency. After removing the finished component from the IHU108 it is again deposited on the carrier plate and then discharged out of the safety cell.



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Manual hardening workplace

IHU110 (Induction Hardening Unit – 1 x TTH10 10kW)

Scope of work: Induction hardening of rolling bars

This small workplace was designed for the hardening of roller bars in the textile industry.

Since the customer is also an engineering company, they could make the periphery in form of a cooling bath and workpiece fixture by themselves. During the hardening process, the bar is placed in a fixture and is heated at one of the two front ends. Upon reaching the desired temperature, this front end is quenched and hardened by an emulsion shower. Thereafter, the bar is manually rotated 180 degrees, and the hardening process takes place again on the second front end.

Of course, the hardening unit IHU110 is equipped with an infrared pyrometer and a PLC sequence control (menu guidance in German and English). Additionally it is equipped with two solenoid valves to control the emulsion shower and the component cooling.



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