From Handcraft to High-Tech

The world trusts in HEESS

HEESS is today the world’s leading manufacturer of fixture hardening systems. Backed by many years of expertise and decades of experience, systems and machines from HEESS are characterized by:

• high reliability
• minimal tolerances
• minimum grinding allowances
• low maintenance
• high machine availability
• and exceptionally good dimensional accuracy of components.

HEESS has great manufacturing depth and efficiently interweaves design and assembly enabling the company to respond quickly and flexibly to customer requirements and to implement them immediately. HEESS provides a comprehensive range of storage facilities and handling equipment to complement its hardening machines and systems. Optimized tools have been developed for the low-distortion hardening of gear and coupling parts, roller bearing rings, shafts, axles, blades, etc. An environmentally friendly, compact washing system that operates without heaters or washing additives, is available for washing before and after hardening. This is not only good for the environment, but also for your cost calculation.

At 10%, our training rate is exceptionally high.

The passion of our staff – the basis for precision and innovation

A comprehensive range of hardening machines and components, which is continuously being extended and refined, has been developed in recent years thanks to the outstanding craftsmanship and quality philosophy of our staff. All company activities are carried out at a high quality level.

HEESS is a family-run company in which the owners have always been actively and personally involved at management level since the company was established. They represent continuity and innovation, and have today made HEESS into a company with operations around the world.

Processes & experience

Practical requirements demand different processes for different products in order to achieve optimum results after hardening. HEESS provides systems for using various types of quenching media:

• Oil
• Polymer
• Water
• Gas/Air
• Indirect cooling
Blades and plowshares. Whether the blade of a hedge trimmer or the moldboard of a plow – millions of parts are hardened on HEESS hardening systems. And these can easily weigh three tons or have diameters of more than 2,500 mm. We even shape and harden plowshares simultaneously in one work step.

When it gets hard, we are the best.
Shaft hardening and straightening machines

Shafts are frequently subjected to considerable distortion during hardening. They usually require subsequent cold straightening, which often leads to micro cracks resulting in high rejection rates. This is not the case when using shaft hardening and straightening machines from HEESS. Distortion is significantly reduced by hardening shafts in fixtures. After hardening, the dimensions of the hardened shafts are much more accurate, and the formation of micro cracks during cold straightening is prevented.

The advantages of the shaft hardening and straightening machine:
- Significantly lower rejection rates
- High economic viability and return on investment
- Low distortion, little grinding or rework required
- Prevention of microscopic cracks
- Fault-free tool changing
- Integratable into the pre-hardening process
- Modular design for one to five shafts

Fixture hardening

Fixture hardening is the answer to continuously increasing demands on material and quality. Modern gears, for example, are becoming smaller and lighter and the requirements for torque, smooth operation, and functionality are increasing. Increasingly thinner components are particularly susceptible to distortion during the hardening process. These requirements can be met only to a certain extent with batch hardening, as the precision of reproducibility for all components of a batch is hard to achieve with fixed parameters. Unlike workpieces hardened in fixtures, after the parts have been heated up in the furnace, these workpieces are individually quenched with a defined and reproducible stream of coolant thereby increasing the quality considerably.

The advantages:
- Controllable and reproducible hardening process
- Short setup
- High precision
- Minimum rejection rates
- Extensive reduction in subsequent operations such as straightening and grinding
- Heat-treatment shop integrated into the automation concept

The fixture is the heart of the hardening machine. HEESS, a world leader in the development and design of fixtures, will help you choose the optimum design.

Depending on the requirement, workpieces are hardened on a smooth mandrel or on a toothed mandrel. Because the mandrel is pressed out directly in the hardening station, no additional ejection devices are required. Tool costs are considerably reduced when hardening with a fixed mandrel versus an expanding mandrel.

The advantages:
- Controllable and reproducible hardening process
- Short setup
- High precision
- Minimum rejection rates
- Extensive reduction in subsequent operations such as straightening and grinding
- Heat-treatment shop integrated into the automation concept

Tools

In addition to the different processes, different tool concepts are also developed. Tools with fixed mandrel or expanding mandrel, a base plate and one or two hold-down devices are used depending on the component. A system with external jaws is incorporated if the workpiece requires it. Components of different diameters can be hardened with one tool by using lamella mandrels.

In hard cases: HEESS.

Components being conveyed in a fixture hardening machine

Fixture hardening

Fixture hardening is the answer to continuously increasing demands on material and quality. Modern gears, for example, are becoming smaller and lighter and the requirements for torque, smooth operation, and functionality are increasing. Increasingly thinner components are particularly susceptible to distortion during the hardening process. These requirements can be met only to a certain extent with batch hardening, as the precision of reproducibility for all components of a batch is hard to achieve with fixed parameters. Unlike workpieces hardened in fixtures, after the parts have been heated up in the furnace, these workpieces are individually quenched with a defined and reproducible stream of coolant thereby increasing the quality considerably.

The advantages:
- Controllable and reproducible hardening process
- Short setup
- High precision
- Minimum rejection rates
- Extensive reduction in subsequent operations such as straightening and grinding
- Heat-treatment shop integrated into the automation concept

The fixture is the heart of the hardening machine. HEESS, a world leader in the development and design of fixtures, will help you choose the optimum design.

Depending on the requirement, workpieces are hardened on a smooth mandrel or on a toothed mandrel. Because the mandrel is pressed out directly in the hardening station, no additional ejection devices are required. Tool costs are considerably reduced when hardening with a fixed mandrel versus an expanding mandrel.

The advantages:
- Controllable and reproducible hardening process
- Short setup
- High precision
- Minimum rejection rates
- Extensive reduction in subsequent operations such as straightening and grinding
- Heat-treatment shop integrated into the automation concept

Tools

In addition to the different processes, different tool concepts are also developed. Tools with fixed mandrel or expanding mandrel, a base plate and one or two hold-down devices are used depending on the component. A system with external jaws is incorporated if the workpiece requires it. Components of different diameters can be hardened with one tool by using lamella mandrels.
Hard and tough. For over 65 years, HEESS hardening machines have been characterized by economical operation and high quality. The flexible machine concept allows them to be individually matched to their specific requirements. Subsequent expansion is possible at any time.

SP product series (Single Press)

The successful HEESS SP series of hardening machines is ideal for workpieces ranging from less than 500 mm to 1,500 mm outside diameter. The special feature is the simplicity and robustness of the machine, which is designed for expanding mandrel technology. Special hardening recipes for up to 100 workpieces are stored in the machine. The machine is loaded and unloaded manually. A pyrometer can be fitted for temperature monitoring; the SP quenching press can be fully automated if required.

CP product series (Compact Press)

The hardening machine series for maximum flexibility. The machine uses fixed mandrel or expanding mandrel technology depending on the requirements of your components. Available in several sizes – for outside diameters of less than 260 mm to 750 mm. The machine can be fully automated on request. Connecting the machine to a magazine, a furnace manipulator, a secondary cooling system, and, if requested, to a robot and to cleaning equipment results in a system to meet the highest quality requirements.

HP product series (High Press)

For workpieces ranging from 100 to 650 mm in diameter, fully automated, from a single hardening station to six-station systems, with fixed mandrel or expanding mandrel technology. HEESS HP hardening systems have proved their worth under the hardest conditions – in three-shift operation, with cycles of less than one minute, and always with the highest availability. A three-station HP hardening press is able to produce up to 1.2 million hardened parts per year.

LP product series (Large Press)

These machines are designed and manufactured individually to your requirements, expectations, and circumstances. Available in different sizes for workpieces ranging from less than 1,500 mm to 2,500 mm outside diameter. The special feature of these machines is that the red-hot workpiece is concentrically straightened in the machine by the tool before hardening.

From general to special tasks – we set the standard when it comes to hardness.

HEESS has the right solution for all hardening tasks. Whether for workpieces of 60 mm or 2,500 mm outside diameter, with weights of 80 grams or 3 tons, whether as an individual machine or a fully automated multi-station system, no other manufacturer offers you such a comprehensive machine concept individually tailored to your requirements. Fixed mandrel, quick tool change, recoling and heating of the quenchant, secondary cooling, and removal of oil by centrifugal force – all in one machine. Advantages you will only find with HEESS.
HEESS designs hardening machines and handling concepts to meet many requirements.

Cut costs and increase performance – simply with the right components.

In order to integrate the hardening machine into the automated manufacturing process, HEESS has developed a comprehensive series of storage, conveying, and handling equipment as well as cleaning machines. HEESS automation components are optimally matched to the particular heating concept, and can be easily controlled by means of the programmable logic controller.

Magazines
Rotary magazines, belt, or storage cells – HEESS offers you a wide range of parts storage devices. The various models can be exactly integrated into your machine. The design depends on the buffer time that you require. And this of course also applies to the discharge of components after hardening.

Furnace charging and discharging
Regardless of whether your furnace has one or more levels, with HEESS charging and discharging you are in best hands. Accessing the hot zone of a furnace poses a particular challenge. This is where HEESS’s great experience comes in. The exceptional ruggedness and availability of HEESS manipulators meet the stringent demands of the automobile industry without any problems. A robot can also be used to place hot workpieces in the quenching press or stack them in baskets for transfer to the tempering furnace.

Quick tool changing system
Tool changing can be carried out quickly and easily. Fully pre-assembled base fixtures can be changed manually or fully automatically. Automatic tool changing is carried out by means of a storage magazine, and minimizes the changeover and down times.

Control and process documentation
The control system images the fully automatic production process in the hardening system. All key parameters are displayed here in plain text and enable the process data in the hardening system to be tracked at any time, for each individual component if required. Data can be recorded and formatted graphically for the quality documentation. All workpiece-specific parameters, such as media flows, forces, cooling times and much more, are stored in the comprehensive program library.

Low energy and media consumption – HEESS cleaning systems
HEESS offers machines and systems for cleaning workpieces with optimum return of the quenching media for considerably reduced water and energy consumption. The hardened components are cleaned in two stages.

In the first stage, the clinging quenching oil is spun off by rapidly rotating the component. In the second stage, the rotating components are sprayed with industrial water and then dried with compressed air. The quenchant is fed back into the machine; there is very little carryover. The cleaning water is brought up to temperature by the residual heat of the components. This eliminates the need for heating and washing additives. A phased separator then finally ensures cleanliness.
Flow simulation as a tool for optimizing fixtures

HEESS/IWT research project: optimization of large component hardening

How to become the world’s leading manufacturer of fixture hardening systems.

Test hardening

Existing testing facilities make it possible to harden a trial series of your components on a fixture hardening system for test purposes to determine the most suitable tool and machine concepts. The fixtures used here will be designed specifically to meet your requirements. This gives you the assurance of optimum quality for your high-value components. Fixture design, manufacture and test hardening are carried out on a shared cost basis. HEESS guarantees that the results relating to dimensional accuracy will also be maintained on the production machine.

Reliable, precise, value-for-money – typically HEESS.

To stand still is to go backwards

The demand is for maximum availability and the avoidance of downtime. This is made possible by rapidly changing to a second gripper system. HEESS has developed an ideal solution for this in which all electrical, hydraulic, and mechanical feeds are combined with innovative control technology.

Research and Development

HEESS has always placed great emphasis on research and development. Our aspiration is to be the leader in technology. Processes are continuously refined and optimized in close collaboration with universities, institutes, and scientific facilities. HEESS’s high degree of innovation is also documented by numerous patents and industrial property rights. Many applications in the hardening industry today can be traced back to HEESS developments.

In addition, HEESS is participating in numerous research projects:

- Quenching with gaseous media in the fixture
- RFID (radio frequency identification) for marking and identifying tools
- Identification of workpieces during processing for clear traceability within production
- Flow simulation and optimization of coolant flows for further development and optimization of fixtures
- Software system for process documentation, fault diagnostics, and online support
- Use of servo motor drive systems

As a member of relevant technical committees, HEESS is continuously confronted with interesting challenges.

Regardless of whether the task involves large components in the wind energy or aircraft industry or large serial production in the automobile industry - HEESS will find creative and economic solutions.
Extraordinary solutions are often found in ordinary places.

HEESS always keeps an eye open for new solutions, and uses the knowledge and potential of highly qualified technical staff. They have many years of experience and high motivation, in design as well as in manufacturing and in service. Whether the concept for a new machine or the modernization and optimization of an existing system, HESS employees strive for practical and economic solutions.

Modernization means saving money

Existing systems can be brought up to date by replacing old, unprofitable components and installing modern technological developments. The modernization of an existing system increases productivity and reliability at a significantly lower cost compared with buying a new system of the same type.

The advantages:
- Longer machine life and optimum utilization of components and systems
- Increased level of automation
- Adaptation to changed production conditions
- Environmentally friendly energy-saving measures
- Adaptation to new components, processes, and materials
- Installation of new assemblies such as controllers, gripping systems, hydraulic components, etc.

New designs of manipulators, mechanisms, and machine modifications are also possible. Work is carried out on site or at HESS depending on the scope.

Service and maintenance

HEESS products have a particularly long life and are easy to maintain. Although these factors have been taken into account when the machines are designed, regular maintenance of machines and systems is important to ensure availability at all times and to guarantee long life. Inspection and maintenance are carried out by experienced HESS service technicians at a time that is most convenient for you whenever possible. Downtimes are reduced to a minimum thanks to modular component changing.

Our expertise is also available internationally. You will find our global sales and service partners at www.heess.com