



# HardLine

Industrial heat treatment systems



# Facts about HardLine



Boosting productivity: an EFD Induction HardLine vertical hardening machine with automated handling.

HardLine is EFD Induction's family of heat treatment systems for surface- and through-hardening.

Comprehensive in scope, HardLine ranges from small, manually loaded machines to large, automatic turnkey hardening plants complete with component handling, washing, straightening and tempering capabilities.

HardLine includes vertical, horizontal centerless and customized machines—and serial or parallel compensated induction power sources with a wide range of output power and frequencies.

The HardLine range builds upon our unrivaled process and applications knowledge. And our decades of international experience in solving the toughest heat treatment challenges. All HardLine equipment is backed by EFD Induction's worldwide service and support program.

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## THREE KEY BENEFITS

### **Optimum hardening results**

At the heart of each HardLine machine is an EFD Induction Sinac heat generator, the industry's most advanced induction frequency converter. These acclaimed converters help ensure optimum hardening results—day in, day out, year after year.

### **In-line integration**

HardLine includes a full range of hardening systems for in-line integration—which results in shorter lead-times. This key benefit is enhanced by minimal footprints, easy installation, user-friendly controls and

clever design features for quick and easy set-up, changeovers, cleaning and maintenance.

### **High availability**

During the past half a century we have designed, built, installed and maintained thousands of systems. Choosing HardLine means choosing proven mechanical solutions and high availability. Modular sub-assemblies, together with the use of modules from proven suppliers, further ensure the reliability of our solutions.

# Systems for every job

The HardLine family is made up of a range of systems that meets virtually every hardening need. We design, make, supply, install and maintain all the elements needed for each system. We can also help with feasibility studies: whether it's computer-aided simulation of different technical solutions, or detailed cost-benefit analyses of different investment strategies.

## Vertical systems

Our versatile vertical machines cover everything from manually loaded to fully automated in-line systems. Different models are available for hardening workpieces ranging from small components to large-dimension rollers. Our vertical systems are a proven solution for complicated geometries such as flanged shafts, cams and gears.

## Rotary table systems

The parallel loading/hardening capability of our rotary table machines makes them ideal for minimizing cycle times in high-volume production. Throughput rates can be further increased by adding extra stations.

## Centerless systems

EFD Induction offers horizontal pusher-feed and continuous-feed machines for short cycle times and high reproducibility. A specially developed multi-language, high-speed controller (reaction time of only 1/1000 s) ensures extremely accurate hardening in- and outlet zones at even the fastest traverse speeds.



Mains cabinet



Working area

- Induction coil
- Quench shower

Control unit



### Crankshaft systems

These systems cover every type of crankshaft (marine, compressor, car, truck, etc.) and production volume. Our systems include robot-loaded machines, and drum and single-station models for large crankshafts. We also offer walking beam and chain conveyor machines with a capacity of 1-4 stations.

### Custom-engineered systems

Developing customized hardening solutions is an EFD Induction specialty. In fact, custom-engineered systems account for almost half of our hardening machines. Areas of particular expertise are the design and production of laser hardening and drum (Trunion) systems. We also design and supply in-line transfer and conveyor systems for complex components with multiple hardening and tempering zones.



Sinac Heat Generator



Cooling and quench system



## MAXIMUM VALUE FROM YOUR HARDLINE. BROUGHT TO YOU BY THE PEOPLE WHO BUILT IT.

Choosing HardLine gives you access to the skills, experience and services of EFD Induction—resources that ensure you extract maximum value from your HardLine equipment.

Here's an overview of what you can count on:

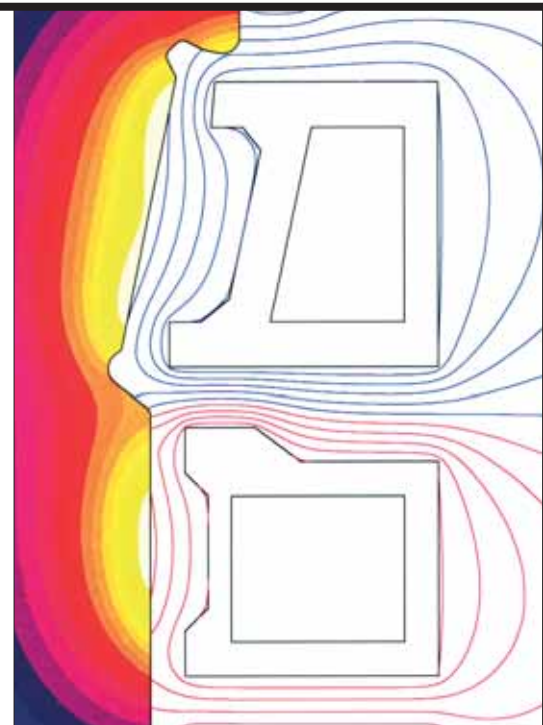
- Latest technical features. EFD Induction pioneered the use of solid-state technology for induction heating. We're also leaders in finding and perfecting new applications for induction equipment. Your HardLine solution incorporates the very latest in induction science—ensuring you get the most efficient, most reliable systems currently available.
- Advanced testing. Our modern, accredited labs and test centers dot the globe. Wherever you are, you're close to our highly qualified metallurgists and mechanical/electrical/electronic engineers. These experts, together with tools such as computer simulation, make sure you receive optimum results from your HardLine solution.
- Spares, services and training. EFD Induction has manufacturing plants, parts distribution systems and representatives in Asia, Europe and the Americas. These resources let us offer customized preventive maintenance programs. We also offer training programs so your operators make the most of your HardLine system.



### HARDLINE AT WORK

Contact us today and find out how we help hundreds of customers harden gears, camshafts, crankshafts, drive shafts, torsion bars, couplings, rocker arms, rock drills, chains, suspension arms, clutches, brake discs, steering racks, CV joints, tulips, shock absorbers, inner and outer races, control rods, valves and output shafts.

State-of-the-art lab, R&D and manufacturing facilities, a background of innovation, and five decades experience make us undisputed leaders in induction hardening.



# A family for every need

HardLine is one of five product families from EFD Induction. Together, these product families let you perform virtually any industrial heating task. And in the unlikely event they don't meet your specific needs, we can sit down with you and devise your own customized induction heating solution.

EFD Induction also develops, commercializes and supplies mechanical handling equipment, coils and software control systems. We also offer a comprehensive, worldwide service program. To learn more about EFD Induction—and how we can help your business—please contact your nearest EFD Induction office.



## **Sinac**

Universal heat generators



## **HardLine**

Industrial heat treatment systems



## **Weldac**

High-output solid-state welders



## **Minac**

Mobile heat generators



## **HeatLine**

Industrial heat processing systems