PERFECT GEARS.

HARD FINISHING OF GEARS.
GEAR HONING. ONE STEP CLOSER TO PERFECTION.

«TECHNICAL AS WELL AS ECONOMIC DEMANDS ARE CONTINUOUSLY INCREASING IN THE WORLD OF DRIVE TECHNOLOGY. FÄSSLER OFFERS INDIVIDUAL AND INNOVATIVE SOLUTIONS IN THE HARD FINISHING OF GEARS. WORKING WITH US MEANS THAT YOU ARE ALREADY EQUIPPED TODAY TO MEET TOMORROW’S CHALLENGES.»

The inventor and leader in gear honing, Fässler’s integration into the Daetwyler Group in 2014 represented a merger of expertise and engineering experience. The vision to make gear honing feasible on an everyday basis has become reality.

FLEXIBILITY
The need for individuality in the market is becoming increasingly important and requires, for example, smaller and more flexible batch sizes, reduced set-up times and a wider variety of workpieces.

TECHNOLOGY
Various regulatory and social requirements trigger new needs. Among others, the best known factors include noise and CO2 emissions. We provide the technical implementation for producing the latest drive elements with new optimization opportunities for tooth shape and ideal surface finish.

ECONOMY
Increasing competition and constant price pressure require innovative processes and maximum performance. More efficient tool strategies and space-saving machine layouts contribute to their implementation.

ADAPTABILITY
The trend of shorter product life cycles result in a greater need for adaptability and responsiveness. It is therefore vital that production facilities have a large variety of application options.
GEAR HONING – VISION TO REALITY.

THE FUTURE IS NOW.
THE NEW LEVEL.
PERFECT GEARS.
FEEL THE DIFFERENCE.
CREATE IN MINUTES.
EXCELLENT.

HIGH PERFORMANCE.
SIMPLIFY PERFECTION.
THE EFFICIENT WAY.

NEW.
HIGHEST FLEXIBILITY.

BATCH SIZE ONE.

NOW.

MAKE GEAR HONING EASIER.

GEAR HONING TODAY.

ADVANTAGE.

INTERNAL GEAR.

WIN.

GEAR HONING WITHOUT DDG.

THE FUTURE OF GEAR HONING.

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BATCH SIZE ONE.

HIGHEST FLEXIBILITY.
WHERE THE HARD FINISHING OF GEARS IS CONCERNED, GEAR HONING IS WIDELY ACKNOWLEDGED — IN HIGH-VOLUME PRODUCTION IN PARTICULAR — AS BEING THE MOST EFFICIENT AND ECONOMICAL PROCESS FOR ATTAINING THE HIGHEST QUALITY. BY SYSTEMATICALLY DEVELOPING THE PROCESS AND EXPANDING THE PRODUCT RANGE, FÄSSLER CAN OFFER YOU CUSTOMIZED MACHINE CONCEPTS FOR YOUR INDIVIDUAL REQUIREMENTS.

- The innovative development of the HGP-400 makes it possible to profile a honing ring in the shortest possible time using a completely new technological approach that dispenses with diamond-coated dressing tools. This is done using a dressable grinding wheel conditioned in the machine itself.
• With its integral, modular grinding sword, profiles can also be ground directly into the workpiece. This makes it possible to create the gear geometry in-house without any loss of time. Simultaneously, this allows small series and individual parts to be processed economically.

• Fässler’s extremely compact HMP-400 is the ideal machine for gear production. With the modular automated version, the HMP-400/AP, you get a highly productive manufacturing system for large batches in a space-saving package. This machine can also be used for the economical production of internal gears.

• The HMX-400 - the reference in gear honing - is characterized by its enormous universality. With its large work area, tailstock and integral B-axis, the HMX-400 leaves no wishes unfulfilled in gear honing.
RESPONSIBILITY AND VALUES.

«SUCCESS DEPENDS ON MANY FACTORS. WE ARE PARTNERS AND OFFER COMPREHENSIVE SOLUTIONS THAT GENERATE ADDED VALUE AND BENEFITS FOR USERS.»

Fässler attaches great importance to good and long-lasting relationships with customers, suppliers and institutions. Direct and personal communication channels are our goal. Mutual understanding and appreciation are important elements of this culture.

Many years of experience and expertise in machine manufacturing testify to innovation, continuity and technical leadership. Integrated into an international and independent group, we operate close to the customer all over the world. Working in close cooperation, we develop customer-oriented overall solutions for machines, processes and tools. Our focus is on innovation, quality and reliability. This results in a variety of economic and qualitative customer benefits. We face the daily challenge of our customers and the markets with our declared aim – perfect gears!
BENEFITS OF GEAR HONING.

«AT FÄSSLER, WE HAVE NO DOUBTS ABOUT HONING BEING THE MOST ECONOMICAL PROCESS IN HARD FINISHING - WITH OUR INNOVATIVE MACHINES YOU CAN USE THESE ADVANTAGES FROM BATCH SIZE ONE.»

Noise minimization. The typical tooth-height and width oriented surface structure plus high surface quality resulting from the honing process have a positive effect on noise characteristics.

Geometry Modifications. Correction of errors of soft manufacturing and hardening process such as angular deviations, runout, pitch error or positional error (wobble). Geometric modifications such as angle corrections and crowns. Unwanted twist can be avoided while intentional twist can be introduced.

No introduction of heat. Prevention of thermal edge zone damage. No risk of abrasive burning.

Shoulder processing. The honing process allows the machining of components with interfering contours such as clutch bodies or stepped gearing, which cannot be produced using grinding processes.

Superb wear characteristics. The high compressive residual stress resulting from our process significantly improves the wear characteristics of the tooth flanks and prevents pitting.
A VISION BECOMES REALITY

Using the processes developed and patented by Fässler, ideas and tooth modifications can be turned into reality in the shortest possible time without the need of a diamond dressing tool.

- Calculation of the target geometry on the basis of your part drawing and data.
- Dressing of the profile grinding disk to the calculated target geometry by the use of the in the machine integrated dressing unit.
- Profiling of the honing stone with the specific prepared profile grinding disk.
- The part can be honed in the same clamping with the so prepared honing stone.
«IN TODAY’S RAPIDLY CHANGING BUSINESS ENVIRONMENT, IT IS IMPORTANT TO USE NEW TECHNOLOGIES APPROPRIATELY TO SET YOURSELF APART AND CONSTANTLY BE ONE STEP AHEAD.»

New dimensions in hard finishing open up with this innovative technology - honing without diamond tooling. A few applications for inspiration – Imagine the possibilities!

• Small batches for special machine engineering, a typical area of work for subcontractors

• Economic evolution from prototype to gear production, both for development as well as research departments in various industries

• Real-time, testing and implementation of tooth modifications

• Rapid implementation of improvements on a continuous basis

• Unimagined possibilities in drive technology for the automotive, aerospace industry and general mechanical engineering
GEAR HONING WITHOUT DDG
While the honing of small and medium volumes used to be economically difficult to implement, this is now possible thanks to the elimination of expensive diamond dressing gears. Fässler’s HGP-400 is specifically designed for the machining of small and medium-sized series as well as for batch size one. Instead of copying the geometry with a diamond dressing gear to the honing stone, this is transferred using a standard dressable grinding wheel. Here, the geometries can be chosen as required and transferred directly to the grinding wheel with a dressing device on the machine.

After profiling the target geometries in the honing stone, the workpiece can be honed directly. For the re-dressing of the honing stone, the same process is used as with profiling.

BATCH SIZE ONE
Corrections can be made within a very short time and then transferred to the honing stone. In this way, process development times of several weeks can be shortened to a few days (rapid prototyping).
PROFILE GRINDING
Naturally, workpieces with internal and external teeth can also be ground on an HGP-400 by means of a single or double flank process, achieving best qualities.

SPECIAL FEATURES
■ Small batches, from batch size one
■ Gear honing without diamond tooling
■ Grinding of internal and external profiles
HMP-400

FAST, STABLE AND ECONOMICAL
An HMP-400 is the ideal basic machine for the entry into the world of gear honing. The focus is clearly on value. This new development is characterized by its compact and extremely stable construction. Ideal for manual loading, the top loader can be easily expanded with any automation system.

COMPACT
Thanks to the implementation of a spatial separation system, all drives and linear guides are located outside the work area, which supports the system’s high serviceability. The absence of a hydraulic system also ensures low-maintenance operation. The system’s small work area allows the targeted extraction of the honing oil, thus preventing the possible loss of honing oil.
SPECIAL FEATURES

- Compact, stable and expandable
- Economical, perfect for market entry
- Non-hydraulic = low maintenance
PRODUCTIVE AND POWERFUL
The HMP-400/AP is an HMP 400 machine expanded by automation. Its extremely compact design provides a highly productive manufacturing system for high volumes in a minimum amount of space. The peripheral equipment required for reliable production such as double-flank roller testing or extraction is fully integrated. This powerful work-cell consistently implements the market’s requirements for efficiency and productivity.

COMPACT AND MODULAR
The automation feature, which can be expanded by modules, permits individual layouts that are tailored to customers’ needs. This production cell can also be used for the economical production of internal gears. During the design phase of the machine, great emphasis was placed on ergonomics and short set-up times.
CLEAN FACTORY
The HMP-400/AP proves itself with speed as well as its fulfilment of the “clean factory” claim. Loss of cooling lubricant is prevented by the spatial separation system between the machine and handling area. This is achieved by the extraction and blower system as well as the two-zone handling system.

SPECIAL FEATURES
- Productive, compact, modular
- Large batches fast
- Clean factory
HMX-400

MORE THAN STANDARD - THE REFERENCE

With its generous workspace, tailstock and integral B-axis, the HMX-400 leaves nothing to be desired in gear honing. Shaft parts of up to 650 mm in length, large and heavy workpieces as well as small and complex workpieces can be easily processed with the HMX-400.

Loading of the second spindle during production time guarantees ultra-short cycle times with complex workpieces.

The integrated double flank roller checker increases process reliability.

COMBI HONING

«Combi-Honing» is a process specific to Fässler, which allows two gears, for example, two sets of teeth on a shaft to be machined in one setup without retooling. Two honing stones in the tool spindle (hone drive) as well as the B-axis which compensates for the off-center machining of workpieces, ensure reliable results with short cycle times.
**SUPER FINISHING**

«Super-Finishing» is another «Combi-Honing» application in which a set of teeth are machined in one set with two different processes (roughing, finishing). The «Super-Finishing» process results in the very best surface qualities.

**SPECIAL FEATURES**

- Combi-Honing
- Loading during production time
- Highly complex components
SOLUTIONS – FOR EVERY REQUIREMENT

Even gear honing has its limits in terms of feasibility, but not where you would expect them today.

Here is a small selection of customer applications and the machining capabilities of our machines. We deliberately use pictograms to protect our customers and their components and to maintain confidentiality.

APPLICATION  
CHARACTERISTICS AND BENEFITS

Idler Gear
Classic cylindrical involute idler gear.
Advantage: Better surface finish and surface structure.

Cluster Gear
Cluster gear with pre-mounted coupler.
Advantage: Part can be machined after the laser welding of the coupler, avoiding any weld draft on finished part.

Pinion Gear with Retainer
Pinion assembly of an electric motor with an interference contour.
Advantage: Hard finishing not possible with other processes due to limited space restrictions.

Stepped Pinion
Pinion with short distance between the individual gears.
Advantage: Hard finishing not possible with other processes due to limited space restrictions.

Multiple Stepped Pinion
Assembly consisted in the past out of many parts since the gears could not otherwise be finished after heat treating.
Advantage: Stepped gear manufactured out of one piece for better quality and reduced manufacturing costs.
<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>CHARACTERISTICS AND BENEFITS</th>
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<tr>
<td><strong>Hollow Shaft</strong>&lt;br&gt;Hollow shaft from the automotive industry for electric drives.&lt;br&gt;Advantage: Highest surface quality and advantageous noise properties due to topological corrections.</td>
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<td><strong>Internal Drive Shaft (Double Clutch Transmission)</strong>&lt;br&gt;No ground center available on the work piece.&lt;br&gt;Advantage: Work piece can be clamped on the tailstock on the outside diameter.</td>
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<td><strong>Hollow Shaft (Automatic Transmission)</strong>&lt;br&gt;Manufacturing costs of this work piece were at the limit.&lt;br&gt;Advantage: Significant reduction in cost of manufacturing in comparison to profile grinding, shorter cycle times, best surface finish and advantageous noise properties due to topological corrections.</td>
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<td><strong>Steering Pinion Shafts</strong>&lt;br&gt;Smallest possible pitch errors and run-out as well as accurate geometry.&lt;br&gt;Improved process capability on long steering pinions.&lt;br&gt;Advantage: Exact and responsive steering behavior.</td>
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<tr>
<td><strong>Steering Pinion</strong>&lt;br&gt;Smallest possible pitch errors and run-out as well as accurate geometry.&lt;br&gt;Advantage: Exact and responsive steering behavior.</td>
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<td><strong>External Drive Shaft (Double Clutch Transmission)</strong>&lt;br&gt;Machining of two gears on one common shaft.&lt;br&gt;Advantage: Combi-Honing of both gears in one clamping on one machine. Significantly improved location tolerances of the gears in relation to each other. Reduced cycle times due to less idle and handling times.</td>
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<td><strong>Main Shaft (Manual Transmissions)</strong>&lt;br&gt;Four operations on two machines.&lt;br&gt;Advantage: The honing of all four gears could be realized in only 2 clamping operations. Significantly improved location tolerances of the gears in relation to each other. Reduced cycle times due to less idle and handling times.</td>
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<tr>
<td><strong>Planetary Internal Ring Gear</strong>&lt;br&gt;Honing of the internal gear of the planetary drive housing.&lt;br&gt;Advantage: Significant improvement to the geometry, better noise behavior via process machining path.</td>
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<tr>
<td><strong>Planetary housings (Internally and External Gears)</strong>&lt;br&gt;Honing of the internal gear of the planetary drive housing.&lt;br&gt;Advantage: Significant improvement to the geometry, better noise reduction via process machining path.</td>
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<tr>
<td><strong>Crankshaft with two drive gears</strong>&lt;br&gt;Honing of a gear after assembly on the crankshaft.&lt;br&gt;Advantage: Position errors are eliminated after assembly on the crankshaft, removal of heat treat distortion and significant improvement of the noise and vibration characteristics.</td>
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TOOLING. A KEY COST COMPONENT.

“TOOLS ARE COST-DRIVING COMPONENTS. OUR MANY YEARS OF EXPERIENCE AND CONTINUOUS IMPROVEMENT ENABLE US TO GUARANTEE THE LOWEST OVERALL COSTS AND CONSISTENT QUALITY.”

Our in-house database, which goes back over 35 years, contains documentation covering more than 5000 different tools and clamping devices that we have produced in our own, in-house manufacturing facility. Continuous development, enables us to design and manufacture tools that meet today’s demands of technology, service life and quality.

FEASIBILITY AND DESIGN
We also see it as our task to support you with drive-element designs that are appropriate for production. Developed in-house, our software takes into account every aspect that is relevant to gearing applications. This guarantees you tools of the best possible design to give you full control of the honing process at all times.

TOOLING DESIGN
We use modern 3D-CAD software to create the manufacturing drawings for tools and clamping devices.
IN-HOUSE PRODUCTION

Production is a core competency that we continuously develop. This enables us to guarantee that our products are of excellent quality. The manufacturing of diamond tools is a typical example. It is done on topological grinders that we modify so that we can make tools with or without a defined twist.

Our services include:

• Diamond dressing gears (DDG) of the very best DIN quality, diamond dressing rings, master gears for double-flank roller testing, diamond wheels
• Grinding wheels
• Synthetic resin, vitrified or conglomerate honing stones to various specifications tailored to your needs.
• Mechanical clamping devices for workpieces with external or internal gears
• Hydraulic clamping devices for workpieces with external or internal gears

BENEFITS

• Long service life with consistent part quality
• long dressing intervals
• low initial dressing allowances up to ready-profiled honing stones
LONG-LASTING BENEFITS
Fässler products are designed for long-lasting benefits. This claim is underscored by the quality of products, customer focus, expertise and spare parts and consumables inventories. In addition, staff with the necessary expertise is available for all questions relating to the products.

APPLICATION SUPPORT
Along with technical support, users also benefit from comprehensive application support. To this end, experienced specialists carry out feasibility studies, analyses and quality tests in modern application centers. Customized tools are also designed and tested.
CUSTOMER FOCUS
All over the world, service locations are close to Fässler customers – either through subsidiaries, service hubs or service partners. Fässler endeavours to provide accessibility and high response rates, the aim always being to keep productive machines running troublefree and creating value.

HEADQUARTERS
Switzerland

SUBSIDIARIES
China
Estonia
India
USA

HUBS
Brazil
Germany
Japan
Poland
Sweden
South Korea
Taiwan