

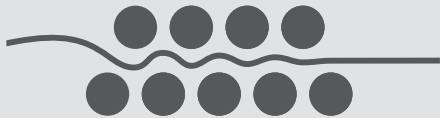
KOHLER NEWS

Issue 35



Why flat and stress-relieved quality can give you a competitive edge

Let's level to the next level



Imprint

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For ease of reading, we refrain from using gender-neutral language in the KOHLER News. All references to people apply equally to all genders.

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Content

- 3 Two processes, one goal
- 6 The invisible key to productivity
- 10 A leap in quality in South Africa
- 12 Seven-year endurance test
- 15 Making energy visible
- 16 WORLD PREMIERE: Core Leveler 60
- 18 Nomination for the Baden-Württemberg Environmental Technology Award
- 19 Tech check

Two processes, one goal

Integrated process solutions improve quality and efficiency in manufacturing. KOHLER relies on manufacturer-independent machine combinations.

Distortion and internal stress, along with burrs, are among the most common causes of quality issues in sheet metal processing. Nevertheless, leveling and deburring are still considered separate process steps in many manufacturing facilities. Yet they directly influence one another. By intelligently combining both processes, manufacturers can not only improve component quality but also shorten throughput times and increase process reliability.



Flexible combination of leveling with KOHLER part leveling machines and deburring in one single line.

Interdependence between burr formation and stress

The challenges begin as early as the cutting process: local heat input and mechanical strain lead to internal stress in the sheet metal, which is released during further handling or machining. At the same time, burrs and surface contaminants affect not only part quality but also process capability: they make welding more difficult, compromise dimensional accuracy, and can even pose safety risks. Furthermore, a deformed sheet complicates the deburring process itself, as the tools cannot act uniformly on the material.



Wide range: Mechanical, electrical, or even data integration with OPC UA.

Looking at leveling and deburring as separate processes creates additional transport routes, manual handling steps, and unnecessary downtime. This costs time, ties up resources, and increases the likelihood of errors. That is why more and more companies are turning to integrated production line concepts in which deburring and leveling follow immediately one after the other. Components are processed automatically in a single process flow and leave the system burr-free, flat, and largely low-stress. This is the crucial prerequisite for stable downstream processes such as bending, welding, or assembly.

Integration as the key to process optimization

In industrial practice, integrated line concepts often fail due to rigid manufacturer-specific systems. KOHLER breaks down these barriers: rather than relying on a closed system, the Peak Performer can be combined with deburring systems from a wide range of manufacturers.

Thanks to open interfaces and modular automation, both new production lines and existing system concepts can be expanded. For users, this means maximum flexibility in selecting their preferred deburring technology. At the same time, this creates a further advantage: operation of the integrated system can be centralized. This makes processes more transparent and reduces staff requirements.

The right sequence makes all the difference

Depending on the application, the leveling and deburring processes can be combined in different ways. When deburring is performed first, followed by leveling, the leveling rollers are protected, since sharp burrs are already removed before the leveling process. With the reverse approach, components enter the deburring system already flat. This allows grinding and brushing tools to act uniformly across the entire surface, producing an especially homogeneous finish. The optimal sequence depends on the material, component geometry, and the quality requirements of the respective manufacturing process.

Advantages along the entire process chain

The positive effects are seen above all in downstream work steps. Consistent weld gaps improve seam quality, more precise bending results reduce scrap, and better-fitting components simplify assembly.

Digitalization and flexible system integration

Alongside mechanical integration, digital networking of systems is also becoming increasingly important. Modern leveling and deburring lines can communicate with each other digitally, enabling higher-level control and monitoring. Integration into MES or ERP systems creates additional transparency and forms the basis for data-driven optimization, for example in predictive maintenance.



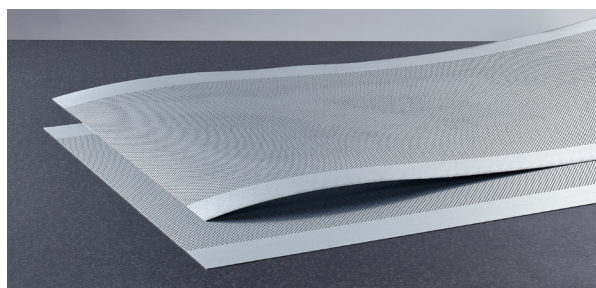
More quality with less effort

The integration of leveling and deburring processes showcases the potential for significant efficiency gains through the intelligent linking of existing processes. Rather than approaching individual processing steps separately, a seamless process chain improves both quality and cost-effectiveness. For many companies, the next boost in productivity therefore doesn't come from adding another machine, but from intelligently linking existing technologies.

The ability to combine KOHLER plate leveling machines with any deburring system, regardless of the manufacturer, allows companies to selectively advance their existing production lines, save resources, and sustainably improve component quality. This creates noticeable added value without having to replace proven machine designs.



The result: a level and burr-free part.



Thick or thin components: the combination of leveling and deburring knows no limits.



Watch the video!



Önder Metal

The invisible key to productivity

In modern sheet metal processing, discussions around productivity often focus on robotics, software, and automation. Yet in practice, a much earlier step frequently determines whether these systems can operate reliably: the condition of the material itself. Even minor deviations in flatness and internal stress can cause unstable processes and limited automation capability. As a result, more manufacturers are shifting their attention upstream. The experience of Önder Metal shows how targeted leveling can transform not only material quality, but the performance of the entire production process.

Over the past years, Önder Metal in Konya, Türkiye has evolved from a traditional steel construction and metal processing company into a manufacturing partner for international OEM customers, mainly the heavy machinery and industrial equipment sector. Today, welded steel structures and sheet metal components are produced across integrated production facilities that combine cutting, bending, welding, machining, painting and assembly in a continuous processing flow.

As production volumes increased and customer requirements became more demanding, one factor became increasingly critical: the consistency of the material at the very beginning of the process. For structural components, strict tolerances apply. At Önder Metal, flatness tolerance requirements are defined at a maximum deviation of 1 mm per meter – a key parameter for ensuring downstream quality.

A challenge at the beginning of the process chain

Like in many industrial production environments, the process starts with raw material. After incoming inspection, sheet metal is processed through cutting, bending, welding, and assembly steps. However, material flatness proved to be a variable factor. Depending on suppliers and batches, deviations occurred that directly affected downstream operations. In daily production, this resulted in additional manual work, longer setup and adjustment times, as well as lower accuracy in welding processes. As automation levels increased, it became clear that stable processes require stable input conditions.

Integrating leveling into the production strategy

To address this challenge, Önder Metal introduced a defined leveling step at the beginning of its production process. Since its purchase in February 2025, a KOHLER Peak Performer 130P.2000 has been fully integrated into the sheet metal preparation workflow. Its purpose is to ensure that all material entering subsequent processes meets consistent flatness and stress conditions. The machine operates continuously in serial production, processing approximately 150 tons of material per month, depending on demand.

Leveling as a stabilizing process

The integration of leveling fundamentally changes the role of the material within the process chain. Instead of being a variable input factor, sheet metal becomes a controlled and reproducible element. This is particularly important when processing structural steels such as S355 or high-strength grades up to S960, with typical thicknesses ranging from 3 to 25 mm. Especially with large-format and thick plates, consistent leveling is essential for ensuring reliable downstream performance.

Measurable effects in downstream processes

The effects are clearly evident in practice. Flat, low-stress components make welding easier, reduce rework, and improve repeatability. Önder Metal benefits particularly from the more stable starting conditions during assembly. Thanks to the improved component quality, the assembly time per component has been reduced by 10 to 15 minutes. As a result, production capacity for the relevant products has increased by 30 percent.

These results underline a key point: The economic benefit of leveling does not lie in the process itself but in the stabilization of the entire production chain.



Thanks to simple maintenance and cleaning procedures, downtime and production interruptions can be kept to a minimum.



The KOHLER Peak Performer 130P.2000 at the Önder Metal plant in Konya, Türkiye.

“KOHLER leveling technology is a key element in stabilizing our sheet metal processes and supporting high-quality serial production.”

Mehmet Sertok, Chairman of the Board, Önder Metal

Integration into daily operation

For serial production, technical performance alone is not sufficient – practical usability is equally important. Önder Metal fully integrated the Peak Performer 130P.2000 into daily operations; it runs as a continuous part of the production flow. Operators were trained quickly by KOHLER instructors, supported by intuitive machine handling and stable process behavior. Maintenance and cleaning of the leveling machine can be carried out efficiently, ensuring minimal disruption to production. The result is a highly stable process that performs consistently across varying part geometries and production volumes.

Beyond the technical implementation, the collaboration between Önder Metal and KOHLER played an important role. The machine configuration was adapted to specific production requirements, and the integration into the existing process landscape was carried out in close coordination. Project execution and ongoing support contribute to the overall success of the implementation.

Leveling as a key enabler for process stability

The Önder Metal application clearly demonstrates how the role of leveling has evolved in modern manufacturing. Leveling is no longer just a preparatory step. It defines the starting quality of the material and thereby directly influences the stability, efficiency, and automation capability of the entire production process.

Automated manufacturing processes can only operate reliably and economically when components are consistently flat and low in internal stress. This shifts the perspective: Efficient leveling is not an isolated process, but a strategic lever for achieving stable, scalable, and high-quality serial production.



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Önder uses the KOHLER Peak Performer to process approximately 150 metric tons of steel per month, with thicknesses of up to 25 millimeters.

Operating data

- **Leveling quantity:** approx. 150 t steel/month
- **Typical thickness:** approx. 3 to 25 mm
- **Processed steel grades:**
S355, S700, S900, S960, Hardox 450
- **Parts produced:** frame structures, booms, chassis components, complex welded assemblies



10-15 minutes less assembly time per component



30 % higher capacity for respective products

Watch the video!



A leap in quality in South Africa

Flat, stress-relieved parts have long been more than just a mark of quality in modern metalworking. They form the basis for efficient, automated, and cost-effective manufacturing processes. The South African company TW Profile Services recognized this connection early on and therefore invested in a KOHLER Peak Performer 130P.2500. Supplied through sales partner Retecon, this part leveling machine is the first of its kind in South Africa.

Founded in 1994 and headquartered in Boksburg, the company is one of the country's leading sheet metal processing specialists. With around 350 employees, TW Profile Services manufactures high-quality components for a wide range of applications. By adding part leveling to its capabilities, the company can now offer customers an additional process step. The investment also underscores the growing importance of this process in modern manufacturing chains.

Hidden stresses with visible consequences

At first glance, sheets and plates often appear perfectly flat. However, the material frequently contains internal stress created during production, for example during rolling or coiling. When the material is subsequently cut using a thermal process such as laser or plasma cutting, this stress can be released. As a result, the material may distort, bow, or become wavy.



The KOHLER Peak Performer 130P.2500 at TW Profile Services is the first part leveling machine of its kind in South Africa.

"These deformations dramatically increase the effort and labor costs involved in downstream processes," explains Shaun Waring, Managing Director of TW Profile Services. At the same time, requirements for parts rise as the level of automation increases. Highly automated processes such as robotic welding, which have become standard in modern operations, require parts with the highest levels of precision, flatness, and freedom from internal stress in order to fully realize the benefits of these systems.

Precise results instead of time-consuming rework

Many companies use a variety of methods to correct flatness defects (see infographic). However, these methods are often time-consuming, difficult to reproduce, or limited in precision. A part leveling machine, by contrast, can reliably and consistently achieve defined flatness tolerances.

For TW Profile Services, this was a decisive step. The company can now guarantee customers specific flatness requirements for their parts, thereby providing significantly greater process reliability. "Now we can ask customers: Exactly how flat do you need the part to be?" says Waring, describing the difference the new technology has made.

Cost-effective through targeted part leveling

A key economic advantage of KOHLER's machine concept is that only the finished cut parts are leveled. Compared with leveling the entire sheet before cutting, this saves time and energy and avoids unnecessary processing costs for skeletons or scrap material.

The installed Peak Performer 130P.2500 can process a wide range of part geometries and material thicknesses. An integrated cleaning system enables quick changeovers

between different materials and reliably prevents cross-contamination, for example between carbon steel and stainless steel.

TW Profile Services was particularly impressed by the electromechanical leveling gap control. It allows the leveling gap to be set with high precision and repeatability, without the typical challenges associated with hydraulic systems. The machine concept is complemented by directly driven leveling rollers, which ensure efficient power transmission and energy-optimized operation.

Higher quality throughout the entire process chain

The benefits of part leveling extend far beyond the leveling process itself. Flat, stress-relieved parts make welding, bending, press brake forming, and assembly easier. Rework is reduced, lead times are shortened, and production processes become more predictable. For TW Profile Services, this primarily means greater process reliability and higher manufacturing quality. At the same time, the company is creating the conditions needed to meet future requirements for automation, precision, and delivery performance.

The project in South Africa clearly demonstrates the important role part leveling plays in modern manufacturing processes. By specifically eliminating distortion and residual stress, it creates stable conditions for all downstream operations. The result is higher part quality, less rework, and more efficient production processes, benefiting both manufacturers and their customers.

"Now we can ask customers: How flat do you need the component to be, exactly?"

Shaun Waring, Managing Director, TW Profile Services

Comparison of leveling methods

Manual leveling

Labor-intensive, costly, and results are barely reproducible

Three-roll bending

Requires multiple passes, offers limited precision, and is time-consuming

Flame leveling

Creates new, non-uniform residual stresses; highly operator-dependent; low repeatability

Precision Leveling

Maximum flatness, stress relief, dimensional accuracy, and process reliability with high productivity



Torben Handeck, Head of Liebherr Steel Construction; WINTERSTEIGER Group CEO Pierre Bilgeri; and KOHLER Managing Director Dr. Hans-Peter Laubscher.

Liebherr

Seven-year endurance test

Leveling machines perform two fundamental tasks in industrial steel and metal processing: they ensure the flatness of components and reduce internal stress. These two factors together create the conditions necessary for stable downstream processes and reliable automation. Just how significant this interdependence is in practice is demonstrated by the long-term use of a part leveling machine in the steel fabrication division of Liebherr-Hydraulikbagger GmbH at its site in Kirchdorf an der Iller, Germany.

Steel construction in Kirchdorf is a series production area. Undercarriages and superstructures for hydraulic excavators, duty-cycle excavators, and material handling machines are manufactured there — components with large dimensions, considerable wall thicknesses, and correspondingly demanding requirements for flatness and residual stress. Since 2018, a KOHLER Peak Performer 120P has been ensuring flat, low-stress steel cuts there.

Torben Handeck, today head of steel construction at Liebherr-Hydraulikbagger GmbH and at the time project manager responsible for programming and welding technology, describes the starting situation in retrospect: "It was clear to us early on: if we wanted to achieve our automation and quality goals, the leveling process had to be absolutely under control. Flatness isn't an end in itself – it is crucial for stable welding processes and cost-effective cycle times." This makes

clear that leveling is not a supporting step but a fundamental control variable for modern industrial manufacturing.

A systematic and comparable investment decision

The decision for a new part leveling machine was deliberately made on a broad basis in 2018. In addition to senior management, machine operators, maintenance, welding engineering, and industrial engineering were explicitly involved in the evaluation. As part of leveling tests at the KOHLER Leveling Center, real components were processed and evaluated under production conditions.

Torben Handeck recalls: "We didn't take the decision lightly. It was important to us to test the machine under real operating conditions – particularly its performance in terms of flatness, reproducibility, ease of use, and costs during continuous operation." In the end, all parties involved unanimously chose the Peak Performer.

Why the drive and hydraulic-free concept makes all the difference

In addition to the direct drive of the leveling rollers – which guarantees greater energy efficiency and less wear, among other benefits – along with the enhanced cleaning system for easy cleaning of the leveling rollers and support rollers, one feature in particular stood out: The Peak Performer operates entirely without hydraulic systems. "The hydraulic-free design was a decisive factor for us", confirms Handeck. "Temperature



stability, low maintenance requirements, and extremely precise roll gap control – these are things you notice immediately in day-to-day operation.”

The direct drive replaces traditional gearboxes and cardan shafts. As a result, the drive power is transmitted directly to the leveling rollers with virtually no loss. This reduces energy consumption, increases the usable material cross-section – especially for wide sheets – and at the same time protects the surface.

High load from the very start

Even in its early phase, the Peak Performer was not a pilot project but an integral part of series production in Liebherr’s steel construction division. The targeted process stability was achieved within a very short time. “The machine ran stably right from the start. That was exactly our goal – no break-in period, no weekly readjustment, but reproducible results”, says Torben Handeck.

Operating data

- **Leveling quantity:** approx. 300 t steel/month
- **Typical thickness:** approx. 8–40 mm
- **Processed steel grades:**
S355J2+N, S355MC
- **Parts produced:**
laser-cut, plasma-cut and oxy-fuel-cut parts

Long-term use has also confirmed this assessment. The Peak Performer excels with very high system availability and minimal service calls. There are no unplanned downtimes, and maintenance costs are consistently well below 3 percent per year relative to the acquisition cost. By comparison, the industry benchmark is approximately 5 percent per year.

“Looking back, the decision was absolutely the right one. We’re not talking about a machine that wears out after two years, but about a stable series-production standard.”

Torben Handeck, Head of Steel Construction,
Liebherr-Hydraulikbagger

Leveling quality as an enabler for automation and cost reduction

Technically, the Peak Performer enables very high leveling quality with a precision of well below 1 mm/m. For the demands of series production at Liebherr, however, the focus is primarily on process reliability, repeat accuracy, and reliable reproducibility of results.

The real benefit shows up in the downstream processes:

- consistent weld gaps in oxy-fuel robotic welding
- significantly reduced stress release during welding
- simplification of fixtures, up to the complete elimination of hydraulic tack-welding systems

Combined with design adjustments, standardization, and modularization, the time required for tack welding was reduced by around a third.

Another positive effect is seen when chamfering long components. Thanks to the evenly flat surface, chamfers remain consistent across the entire length of the component without any fluctuations.

The long-term deployment also confirms very homogeneous surfaces after leveling, high reproducibility even with varying geometries, and no limitations in terms of blasting and painting.

Synergy of machine, operation, and service

The Peak Performer's extended cleaning system has proven especially valuable in continuous operation: leveling rollers and support rollers can be fully extracted from the machine electromechanically – quickly, safely, and without disassembly work. Machine operators also describe operation via the Expert Calculation System as intuitive. Enhancements such as a second operating terminal on the opposite feed side were implemented together with KOHLER and reduce walking distances.

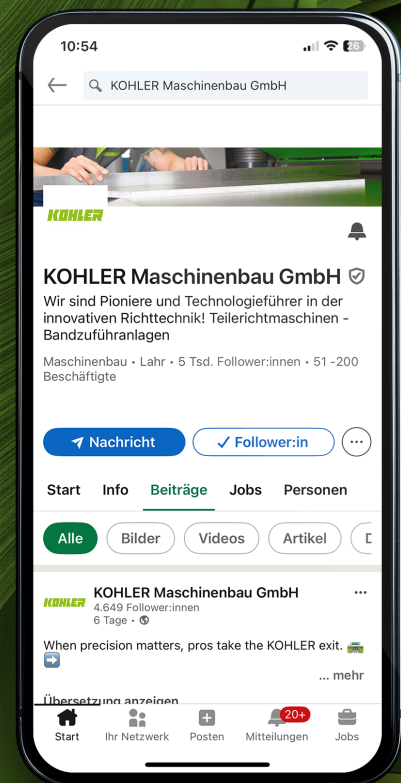
"What we appreciate in day-to-day operations is the combination of technology and service. Adjustments aren't just discussed – they're put into practice", says a satisfied Torben Handeck. As a result, the Peak Performer is not only a key technical component of Stahlbau Kirchdorf but also an impressive example of successful collaboration between customer and supplier.

Leveling as the basis for economical automation

The example of Liebherr clearly shows that the Peak Performer is not a passing fad, but a well-established industrial solution. "If we were faced with this decision again today, we would make the exact same choice", Handeck emphasizes. Precision, cost-effectiveness, and reliability have been proven over seven years of series production.

The endurance test makes clear: leveling is far more than a preparatory processing step. It significantly influences the quality, stability, and automation potential of industrial processes. The economic benefit also arises from stabilizing the entire process chain – because only when components are reproducibly flat and low in stress can automated manufacturing processes be operated economically.

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Making energy visible

Productivity alone is no longer enough to future-proof manufacturing processes. Rising energy costs, sustainability targets, and regulatory requirements are bringing another factor into focus: the energy consumption of machinery and plants.

The challenge is clear: What is not measured cannot be systematically optimized. This is precisely why the transparent collection of energy data is becoming increasingly important in modern production environments.

The first step toward energy-efficient production

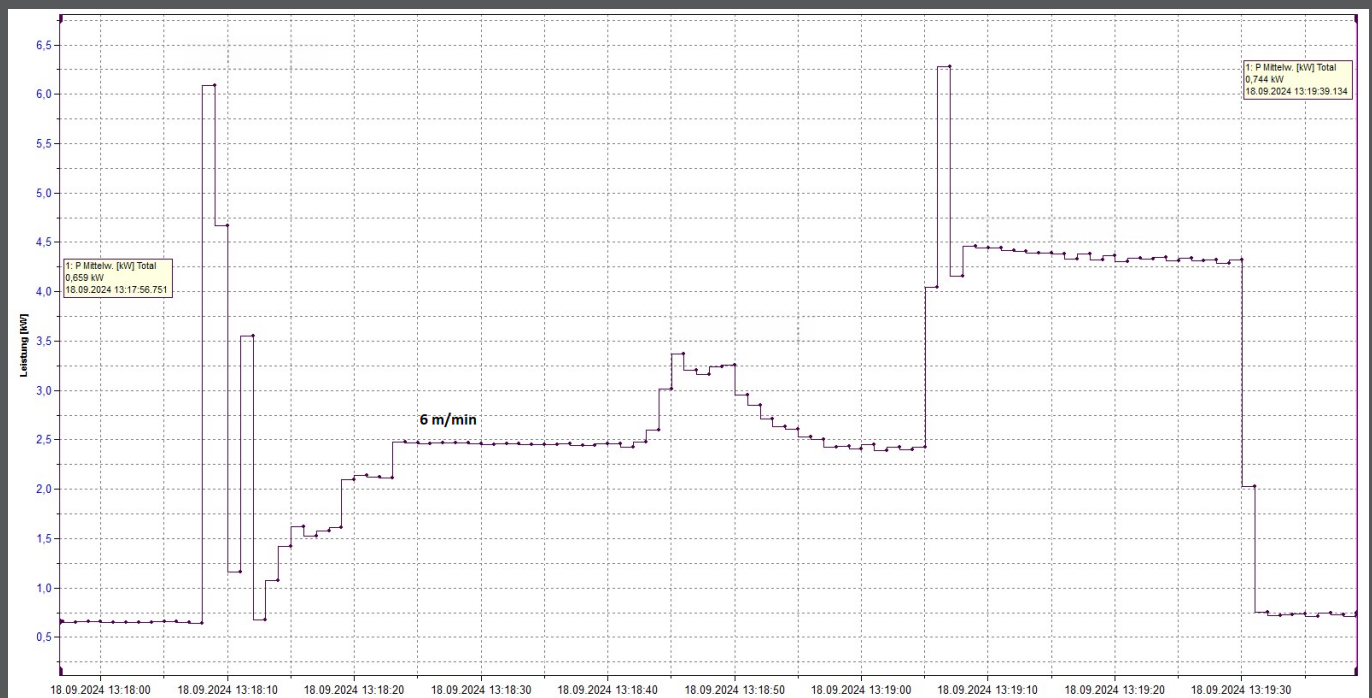
Although energy consumption is a major cost factor for many manufacturers, they often lack the transparency needed to assign consumption data to individual machines or processes and implement targeted optimization measures.

By integrating the "Sentron PAC" power monitoring device, KOHLER enables its customers to monitor the energy consumption of their Peak Performer part leveling machines and strip processing lines in real time. The system records data including current draw, voltage, and electrical power. This makes energy flows visible and helps identify peak loads. At the same time, it provides a reliable data foundation for the continuous optimization of processes.

Data as the basis for better decisions

Based on this data, companies can track the actual consumption of individual machines and identify potential savings at an early stage. Although KOHLER leveling machines are energy efficient by nature, measuring the consumption, not only helps to reduce operating costs but also supports the achievement of sustainability and energy-efficiency targets.

Thanks to standardized USB and LAN interfaces, the system can be easily integrated into existing production environments and Industry 4.0 concepts. This allows companies to selectively upgrade existing machines and create greater transparency without having to invest in new equipment.



Making power consumption transparent

Cost-effective part leveling made easy

The new KOHLER Core Leveler 60 represents a strategic expansion of the product portfolio, offering customized efficiency for many standard applications in sheet metal processing.

The increasingly competitive nature of modern sheet metal processing is putting pressure on manufacturers to make their processes more cost-effective without compromising on the required component quality. Given this context, KOHLER has strategically expanded its product portfolio by a new machine segment: While the proven Peak Performer series covers the high-end segment of part-leveling machines, the Core Leveler adds a cost-effective standard solution.

Machine design and technical features

The development of the Core Leveler followed a rigorous value analysis and a “design-to-cost” approach. The machine combines a reliable mechanical framework with the proven technology of the company’s flagship Peak Performer, while deliberately focusing on the essential core functions of a leveling machine. Thus, the Core Leveler focuses on sheet flatness, making it a distinct machine class within the KOHLER product portfolio.



Key technical specifications of the Core Leveler 60:

- **Part dimensions:** Sheets with a material width of up to 1,600 mm and a thickness of up to 15 mm can be leveled. The design is ideal for the carbon or stainless steels most commonly used in mechanical engineering.
- **Leveling roller drive:** All leveling rollers remain drive-powered. This ensures stable leveling processes as well as reliable material transport throughout the entire process, from feeding through leveling to unloading.
- **Control System:** When it comes to the control system, users do not have to make any compromises. The Core Leveler features the same high-performance control system with a touchscreen display, recipe management, and Expert Calculation System as the larger KOHLER leveling machines.
- **Throughput:** The leveling speed is up to 12 m/min, which is perfect for throughput with manual part handling.
- **Optional Upgrades:** A barcode scanner and a digital caliper are available options that provide digital traceability and process support.
- **Maintenance:** If necessary, the leveling rollers can be removed for cleaning and maintenance using the proven quick-change system. Thanks to a new replacement system, the support rollers can be removed and cleaned in individual sets. Like all KOHLER machines, the Core Leveler has low operating and maintenance costs due to not using hydraulics, its wide and durable support rollers, and its built-in overload protection.
- **Space requirements:** The Core Leveler features a compact design and can be installed without any modifications to the floor.



Economic advantages and customer benefits

By focusing on the essentials, investment costs for operators are significantly reduced – without compromising on KOHLER's renowned quality and reliability. This results in a faster return on investment and makes professional straightening technology particularly attractive for contract manufacturing facilities and cost-conscious production operations.

Since sensors are installed only to the extent necessary for the reliable operation of the system, such as for overload protection the Core Leveler proves to be low-maintenance and easy to operate even under demanding multi-shift conditions. With minimal training, operators can fully utilize the machine within the production chain in no time. This means customers pay exactly for the performance they need for their daily parts range, while making no sacrifices in terms of processing quality and rigidity.

Strategic market positioning

KOHLER's Core Leveler is a machine designed for economic efficiency. Customers whose component requirements do not demand extreme performance limits – such as those involving ultra-high-strength materials – will find this a compelling argument. Downstream processes such as bending, welding, or assembly gain significantly in process reliability thanks to the supply of flat sheet metal, while parts production benefits from an efficient and straightforward solution.



KOHLER Managing Director Dr. Hans-Peter Laubscher (left) with the other nominees.
(Photo: Armin Burkhardt, bmf)

Award

Nomination for the Baden-Württemberg Environmental Technology Award

KOHLER has been named one of the nominees for the Baden-Württemberg Environmental Technology Award 2025. In the category "Material Efficiency and Resource Conservation," the company impressed the jury with a development that solves a problem long considered unavoidable in many manufacturing operations: material losses at the end of coils.

The newly developed KRS 2.0 40.1600/21 21-roll precision leveler with roll bending technology makes it possible to process entire coils without having to scrap the final wraps due to deformation or surface defects. This enables significant material savings, particularly for high-value materials that require substantial energy to produce.

More material utilization, reduced resource consumption

The rolling and coiling process creates internal stress within the material. This stress can cause curvature, waviness, or deformation, making it particularly difficult to utilize the material at the end of the coil. As a result, the final wraps often had to be scrapped in many applications. With the KRS 2.0, KOHLER has developed a solution specifically designed to address this challenge. By combining a 40 mm leveling-roll diameter with newly developed roll-bending technology, material defects such as center buckles, edge waves, and end-of-coil deformations can be reliably eliminated. This virtually eliminates what was previously considered unavoidable scrap.

The practical impact of this development is substantial: A company in the construction industry was able to save approximately 65 tons of material per year by implementing the new technology. At the same time, its annual CO₂ emissions were reduced by approximately 900 tons.

Innovation with a sustainable impact

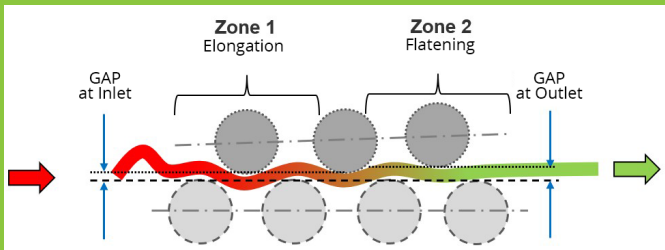
"This nomination is a special recognition of our work and commitment. It motivates us to continue advancing products that are not only innovative but also make a meaningful contribution to protecting the environment, conserving resources, and supporting climate action," said Dr. Hans-Peter Laubscher, KOHLER Managing Director.

The KRS 2.0 demonstrates how modern leveling technology can go far beyond simply improving material properties. Where scrap was once considered unavoidable, innovative technology now enables significantly better material utilization, lower resource consumption, and greater sustainability in manufacturing.

Far more than just flat

“Our parts are already quite flat. Why should we level them?” This is a question frequently heard in sheet metal fabrication. In many cases, leveling is associated solely with eliminating distortions or unevenness. In reality, however, there is much more to it.

Even a sheet that appears perfectly flat can contain significant residual stress. This stress arises during material production, for example through rolling, coiling, or thermal cutting processes such as laser, plasma, or oxy-fuel cutting. As long as the part remains unprocessed, these stresses are usually invisible. During welding, bending, or assembly, however, they can lead to distortion, dimensional deviations, and quality issues. This is exactly where leveling comes into play.



During roller leveling, the material passes through a series of offset leveling rolls and is bent alternately upward and downward. The first rolls intentionally deform the material beyond its yield point, reducing the residual stress present in the material. With each successive roll, the degree of deformation gradually decreases until the material leaves the machine flat and largely stress-relieved.

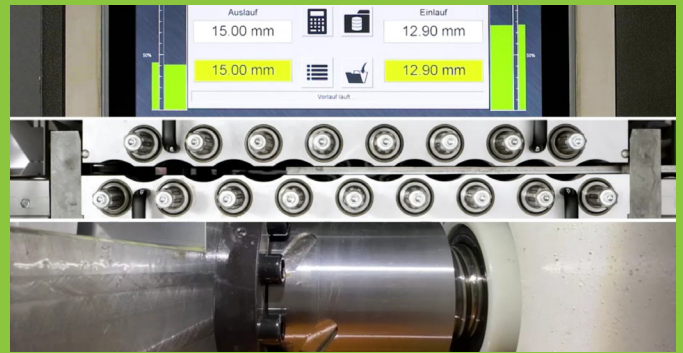
Simply put: Leveling gives the material a new “internal order.” The result is significantly more stable behavior throughout all subsequent manufacturing processes.

The real benefit often becomes apparent not at the leveler itself, but later in production. Stress-relieved parts provide more consistent weld gaps, reduce distortion during welding, and enable repeatable results in bending operations. During assembly, they improve fit-up accuracy and reduce rework. This becomes especially important in automated manufacturing processes. Robots can only operate reliably when parts consistently exhibit the same characteristics. Even minor deviations can lead to quality fluctuations or production downtime.

The unique challenge of part leveling

While coil material runs continuously through a leveling machine, leveling individual sheet metal parts places much higher demands on the equipment. Each part generates significant forces as it enters the machine, causing slight variations in the leveling

gap. To achieve consistent results, the machine must continuously compensate for these changes. Modern part-leveling machines therefore monitor the leveling gap at all times and adjust it in real time. This is the only way to ensure repeatable results regardless of material thickness, geometry, or part size.

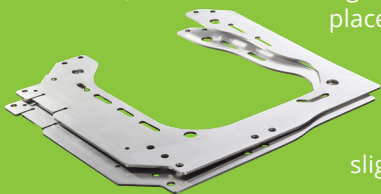


For many years, such control systems were predominantly hydraulic. While hydraulic systems deliver high forces, they also involve additional maintenance requirements, increased energy consumption, and the risk of leaks. KOHLER therefore relies on a patented electromechanical system. Sensors continuously monitor the leveling gap, while electric servo drives automatically make the necessary adjustments. This reduces maintenance requirements, improves energy efficiency, and ensures long-term process stability.

Flatness is the result, not the goal

The key takeaway is that flatness is not the primary objective of leveling; it is merely the visible result. Anyone who equates leveling solely with creating “flat sheets” is missing the bigger picture. Of course, the process improves flatness. However, its real value lies in reducing residual stress and stabilizing the entire manufacturing process chain. Only then manufacturers achieve repeatable quality, efficient production processes, and a high degree of automation.

Therefore, the crucial question is not, “Is the part flat?” but rather, “How will it behave in the downstream manufacturing processes?” This is where modern leveling technology delivers its full potential.





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