

# MASTERING THE CHALLENGES OF PERFORATED SHEET METAL

Perforated sheet metal differs greatly from non-perforated sheet material. It is the perforations that cause particular tension and unevenness in this material when it is being fabricated. However, these negative characteristics must first be eliminated to make the perforated sheet metal suitable for further processing. This is a particular challenge for perforated sheet metal manufacturers, but it can be mastered with the right levelling technology and a bit of experience.

Perforated sheet metal is not simply a piece of sheet metal in which holes have been punched arbitrarily. Indeed, the numerous sheet metal manufacturers operating on the market orient themselves on certain standards for perforated sheet metal and the perforation patterns. In the relevant DIN 4185-2 and DIN 24041 standards (DIN refers to the German Institute for Standardization), perforated sheet metal is designated as "perforated metal plate" - the term perforated sheet metal has, however, established itself among manufacturers and users.

In the DIN standards, a perforated metal sheet is described as a panel or plate with openings of a certain kind - that is, holes - in a regular pattern. The holes are usually made by punching, but sometimes also by drilling or laser cutting. The holes can have different geometrical forms (round, square, long hole) and sizes. In contrast to the DIN description, the pattern can also be defined individually.

#### Areas of application

Perforated metal sheets are products that require the particular attention of the manufacturer or processor during manufacturing and processing. They are used as functional components such as sieves or filters, or to decorate the facade of modern office buildings with their optical design.

Depending on the application and concrete use, perforated metal sheets can be made out of diverse kinds of material. Most perforated sheet metal manufacturers offer their products in various kinds of steel (for example raw or galvanized), in stainless steel, as well as in nonferrous metals such as aluminum, copper, brass, nickel or titanium. The sizes and surface finishes offered are also very diverse.

#### Low-tension perforated sheet metal - a must before further processing

All perforated sheet metal has one thing in common: Perforating the material results in significant inner tension as well as a considerable degree of unevenness. However, the perforated sheet metal cannot be used for further processing or applications as long as all these negative characteristics remain. Consequently, perforated sheet metal must first be levelled to reduce the tension and eliminate unevenness. In over 50 years, KOHLER Maschinenbau GmbH of Lahr in Baden, Germany, has become particularly experienced with the necessary levelling

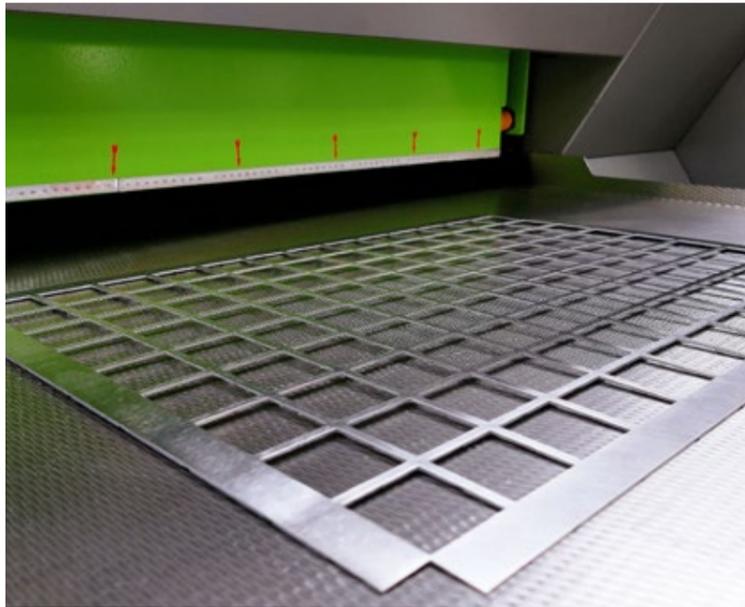


Scan the QR-Code for more information:



— Part levelling machines of the Peak Performer machine series





— Sheet metal with a complex structure poses no problem for the Peak Performer

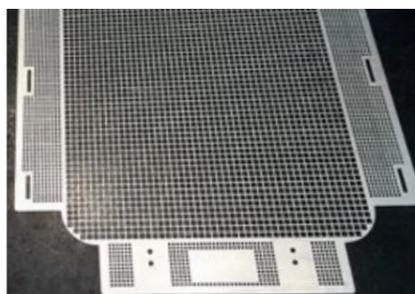
processes and the entire field of levelling technology. Thus based on his decades of experience, Franz Müllerleile, Technical Director at KOHLER, can for example say: "No matter which perforation method perforated sheet metal has been manufactured with, or which perforation form and pattern the sheet has, it will always stretch and warp. Because the distortion essentially depends on the material, the sheet thickness, the perforation and cutting, the extent can hardly be predicted."

#### Warpage - a particular challenge

Something that causes levelling specialists and perforated sheet manufacturers a lot of worry is the buckling of perforated plates. "It occurs irregularly, depending on the material being processed, sheet thickness, and the overall length and width of the sheet. That makes the whole thing a lot more difficult," says Müllerleile. Then the levelling expert adds: "The resulting curvature is usually eliminated by trimming the perforated sheet, but this cannot be done with the perforated pattern." In the levelling process, for example on a KOHLER levelling machine from the Peak Performer machine series, the perforated sheet metal manufacturers get the negative effects under control. Thus these can be eliminated to a certain extent, or even completely. To fulfil the most demanding evenness requirements, the particular perforated sheet must be levelled using the special roller bending option.



— An unlevelled perforated metal sheet



— The same perforated metal sheet, but discernably levelled. You never know how a piece of sheet metal will behave when perforated. Warpage and tension develop haphazardly



— The Peak Performer ensures an ergonomic and clean workflow

#### Roller bending is an engineering highlight in levelling technology

There is a growing demand on the market for the roller bending option specifically for perforated sheet metal. With the help of the individual and overall adjustability of the lower roller supporting blocks, the levelling rollers can be lifted or lowered in varying degrees using an adjustable motorized wedge system. These adjustments serve to preset controlled bending of the levelling rollers. Depending on the extent of the deflection along the length of the levelling rollers, it is possible to eliminate edge or center waves in the sheet. The adjustable supporting roller carriers are electric-motor driven. This feature is of particular benefit for levelling perforated sheet metal, because when center waves compromise material quality, the flexible supporting rollers in the peripheral area can be moved upward. In this way, they cause a stretching effect in the edges of the material that eliminates the unwanted waves in the middle.

The levelling of sheet metal is an essential process or step in manufacturing. Due to warpage and unevenness, sheet metal in its "raw" state is simply unfit for further fabrication steps or use. That's why sheet metal processing companies and perforated sheet metal manufacturers rely on KOHLER levelling technology. "Good levelling results are always the product of a symbiosis between experienced levelling specialists and KOHLER levelling technology," confirms Müllerleile.

#### Peak Performer PG, the economical levelling solution

KOHLER has two machine series for the levelling of parts, independent of whether they are made of normal or perforated sheet metal. On the one hand, there is the Peak Performer PG, which is a good investment for customers who are looking for a simple and economical way of levelling their sheet metal. This levelling machine is available for diverse sheet metal sizes. The PG series has demonstrated its strengths particularly in the area of thin sheet material where often the same forms are processed. It enables users to achieve top results with only a few adjustments. Despite its simple controls and configuration, the machine proves itself to be a fully adequate and above all economical levelling solution.

#### Peak Performer GC for special requirements

The second machine series with the Peak Performer GC is considered to be the bigger brother. It could be regarded as a first-class machine, because it offers solutions for particularly sophisticated levelling tasks.

Especially worth noting is its electromechanical levelling gap control, which operates without any hydraulics, which means there is no source of dirt and grime. In this gap control system, actuators keep the levelling gap constant, regulating it via a friction-optimized quadruple wedge system.

Another special feature of KOHLER levelling machines is the motorized quick-change device. The time-saving system makes it possible to service the levelling and supporting rollers thoroughly without having to dismount them. At the push of a button, the levelling rollers slide completely out of the machine so that the levelling rollers and adjoining supporting rollers can be cleaned very quickly.

#### Expert Calculation System included

The Expert Calculation System should also definitely be mentioned. It is a significant help for users when setting up the levelling machine for specific sheet metal material. The user can access sheet metal data that has been stored in the system, and thus set up the rollers quickly and reliably. The database already contains the ideal parameters for diverse sheet metal material defined by KOHLER. Thus with this help, less experienced levelling personnel can also achieve respectable results. By the way, the Expert Calculation System is included in both KOHLER machine series.

Both the PG and GC series of Peak Performer machines have a modular design concept, and based on practical experience, their standard versions are equipped to cover most applications and fulfill top quality requirements. Beyond that, KOHLER also provides tailor-made solutions for users whose needs are not met by the standard models. "Because of our many years of experience in developing, manufacturing and commissioning systems for customers around the world, we are able to deliver each machine precisely according to the desired requirements," says Franz Müllerleile, rounding up the KOHLER levelling machine portfolio.

#### Information Leaflet 317: Perforated sheet metal made of steel

More information about perforated sheet metal is provided (in German) in Information Brochure 317 from the Stahl-Informationszentrum (Steel Information Center in Düsseldorf, Germany): On page 20 you can find everything you need to know concerning the relevant DIN standards applying to technical terminology, hole forms, perforation patterns and sizes, with references to the sources.