LESSMANN®

THE GERMAN BRUSH COMPANY

DEBURRING

WITH BRUSHES

en

QUALITY MADE IN GERMANY

Made in Germany

Quality made in Germany: For Lessmann, this doesn't just mean that all of our Products from A to Z are manufactured in Bavaria, but that large parts of all raw materials from wire to wood or metal to plastics from renowned suppliers in Germany.

Because we manufacture almost all of the products in our comprehensive standard range ourselves, the quality of the raw materials plays an important role. Intense material tests and production-related controls are two important ones supporting the reliable Lessmann quality.
The location "Germany" obliges us to be pioneers in the use of the most modern technology and automatons. So our customers can get the best quality to competitive prices.

The right solution for all applications

Whether in the automotive industry, pipe and pipeline construction, in mechanical engineering or in the metalworking industry – individual brushes with special filling materials or unusual dimensions are required everywhere for special production steps.

Our application consulting and product development teams support all projects from consultation to production. This results in special models tailored to the customer's needs: designed exactly for the customer's application, precisely constructed and manufactured in the best, reliable Lessmann quality. Because we welcome new challenges and document our willingness and ability to make innovative improvements with individual solutions.

Fit for the Globe

First-class quality products, technical expertise and high flexibility - our innovative technical brushes are "Fit for the Globe". Our export department has the right know-how to advise and serve our customers on all continents.

The right brush for every case

Burrs and sharp edges are a problem and risk in production that should not be underestimated, which is why we explain the typical tasks for brushes for deburring metal and plastic parts in this brochure.

- Employees or customers can injure themselves
- Workpieces do not fit precisely
- Assembly of parts becomes impossible or is only possible with reworking
- Surfaces can be destroyed by moving parts

Conventional grinding and milling tools often leave a new burr, which must always be reworked to prevent injuries to the workpiece. However, a burr can be completely removed by using brushes.

Wheel brushes, disc brushes or cup brushes are used for machine deburring. Which brush is the right one, which filling material and which machine parameters lead to the desired result depends on the machine, the workpiece and the deburring requirements. Brushes can be used in fully automatic deburring systems for series production. However, brushes are also often used for individual production to save time and increase productivity.

Recommended cutting speeds

Wire filling material:
- 30 m/s on steel
- 20 m/s on non-ferrous metal
- 15 m/s on plastic

With wire filling material, percussive stock removal is achieved.

Abrasive grain filling material:
- 18 m/s on steel
- 18 m/s on non-ferrous metals
- 5 m/s on plastics

Abrasive removal is achieved with abrasive bristles.

Lessmann offers the right brush for your deburring application from its extensive product range. We can also find the right solution for special applications. Contact us and make an appointment with our application consultants!

… and the right brush filling material

The choice of brush filling material depends on the material that is to be machined:

Gray cast iron	→	STH, STM, STL
Steel	→	STA, STH, STM, STL, SIC
Stainless steel	→	ROF, ROH, SIC
Brass	→	MES, ROF, SIC
Copper	→	ROF, SIC, BRO
Aluminium	→	SIC, AO, ROF
Plastics	→	STH, SIC

Abbreviations of the brush filling materials

STA	= Steel wire
STM	= Brass coated steel wire
ROF	= stainless steel wire
ROH	= stainless steel wire high tensile
STH	= steel wire high tensile
STL	= cord wire
MES	= brass wire
SIC	= Abrasive filaments with SIC
AO	= Abrasive filmaents with AO
KK	= Ceramic grit
Dia	= Diamond grit
KG	= Encapsulated

The picture shows diamond brush filling material. Diamond brush filling material is particularly suitable for aggressive applications and for materials with high material strength.

Deburring machine parts

During cutting production steps, but also during non-cutting production steps such as punching, burrs are created which must be completely removed. The possilbe surfaces are as varied as the types of brushes we offer for this purpose.

Different brushing solutions are used depending on the degree of automation. Here we show a small selection of different parts and the matching brushes. Details on the possible brush types can be found further on in the brochure.

Ask our application engineers about the solution for your production or simply send us your parts. If you can't find the right brush among the tens of thousands available, we will design a tool that is precisely tailored to your production!

Deburring of sintered components

Sintering is a process for manufacturing high-precision molded parts. Pressing the powdery starting material produces a compact (also known as a green compact), which only has sufficient strength to be safely transferred to the next work step. The pressed part can be processed with the material PA as standard, but PE and PBT can also be used on request.

Sintered components

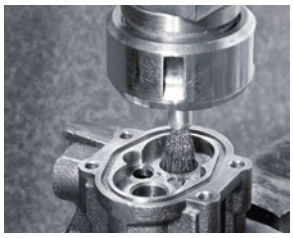
Deburring with cup or disc brushes

When deburring large-area parts with different edge shapes (e.g. gearbox housings or cylinder heads), at least two working directions are required for even deburring edges. Disc or cup brushes solve this problem effortlessly, as the 360° rotation means that all burrs are touched from different sides.

Deburring a motor block with a disc brush (wire brush filling material)

Deburring with shank brushes

End brushes and cup brushes are usually used, whereby the entire surface of the brush filling material is working: Hard-to-reach and smaller areas can be deburred with end brushes, cup brushes are suitable for larger areas. Thanks to the mounting shank (6 mm), they can be ideally integrated into tool changers of deburring or machining centers.

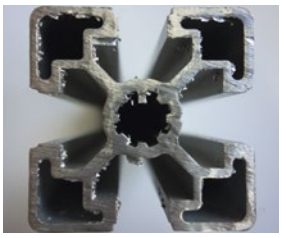


Brush

Brush with shrink tubing

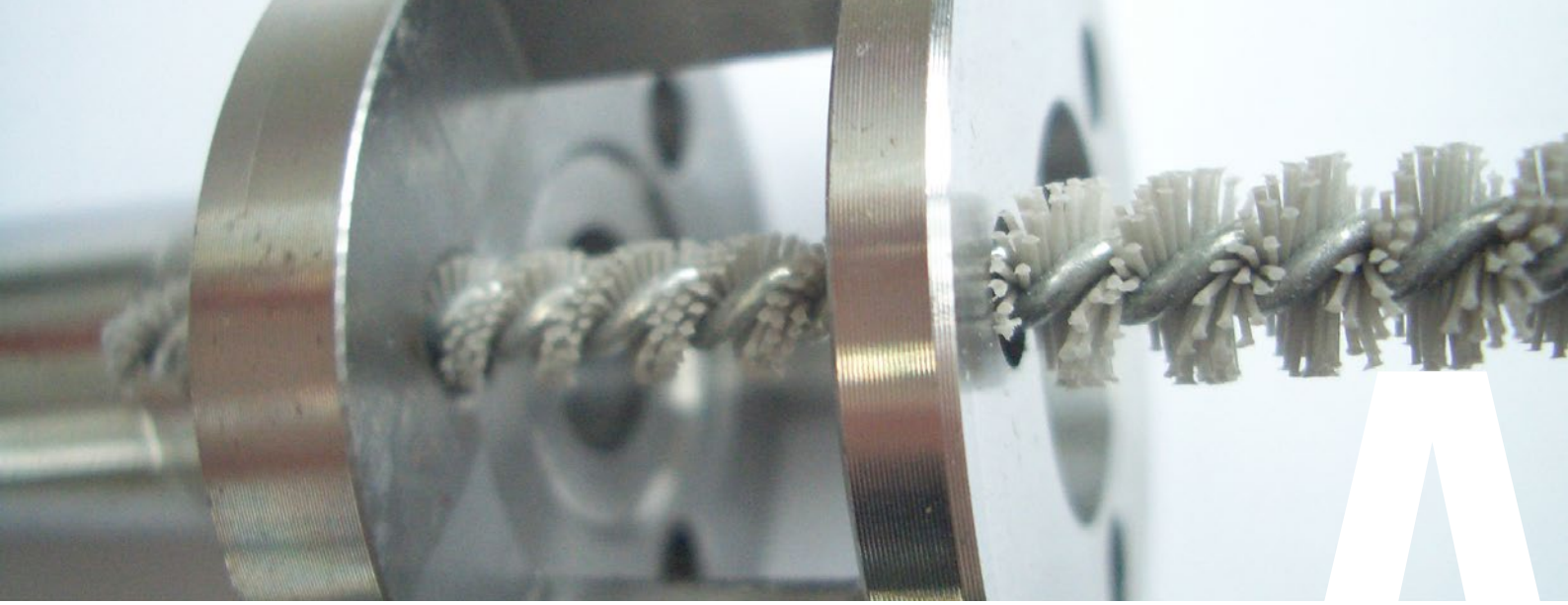
Deburring with wheel brushes

(Single-row) wheel brushes, mainly installed in machining centers or in special machines, can be used to deburr gears or, when assembled into a wider roller brush, camshafts for example. Roller brushes should work in the opposite direction.



Component before deburring

Component after deburring



Deburring and processing bores and cross bores

Interior brushes are the ideal tools for deburring or cleaning bores and, in particular, cross bores. Filled with abrasive bristles, synthetic bristles or metallic wires, they are used on valves, motor housings, pumps or nozzles.

When deburring bore overlaps in workpieces, twisted interior brushes are generally used up to a diameter of 50 mm.

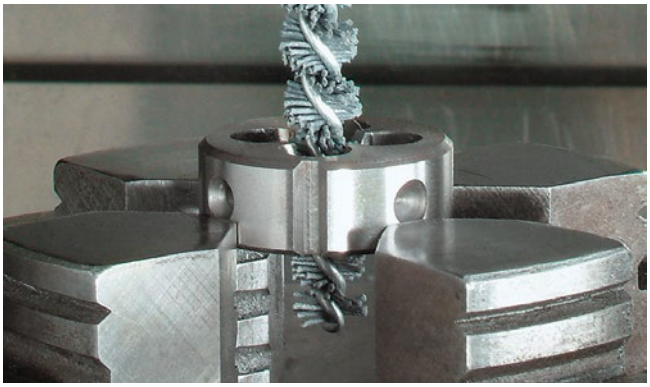
We recommend adapting the speed to the material of the workpiece: The harder the material, the higher the speed should be.

When deburring cross bores, the brushes should work in counter-rotation and oscillate in order to achieve an even removal rate over the entire deburring area.

The surface of the micro-abrasive interior brushes can be milled or ground for the finest machining. This makes high precision possible.

The contour of the brush can also be adapted to the conditions: A stepped cut brush enables, for example, the machining of different bore diameters in one operation.

Workpiece with stepped cut interior brush

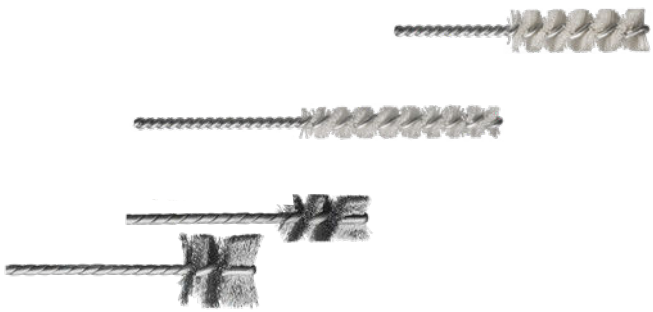


Interior brush in use

End brushes open at higher speeds. They are mainly used where the inlet opening is smaller than the surface to be machined behind it. Due to the elasticity of the brush filling material, they can also be used to machine workpieces with strong contours or, for example, to clean threads in pipe ends.

We recommend high speeds to use the full potential of these brushes.

End brushes open at a high speed



Interior brushes with steel wire and ceramic grit

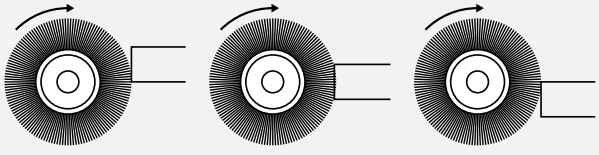
Deburring of cut edges

For burrs that occur during cutting, sawing or punching, we offer various brushes that replace laborious manual work with scrapers and files. Depending on the number of pieces, grinding stands, table deburrers or deburring machines are suitable for efficient production. There is a suitable brush for every type of machine. The cut edges of tubes in particular can be deburred very efficiently with brushes: Only brushes are able to deburr the inner and outer edges of the pipe ends in one operation and with one tool.

With just 10 saw edges per working day, the use of a wheel brush is worthwhile in every workplace!

The right holder for every drive

Table deburring brushes have metal adapters with keyways, while smaller and lighter wheel brushes are supplied with plastic adapters. For heavy roller brushes, we also manufacture welded adapters to customer specifications.
Static and dynamic balancing guarantee balanced running and long service life of our brushes!



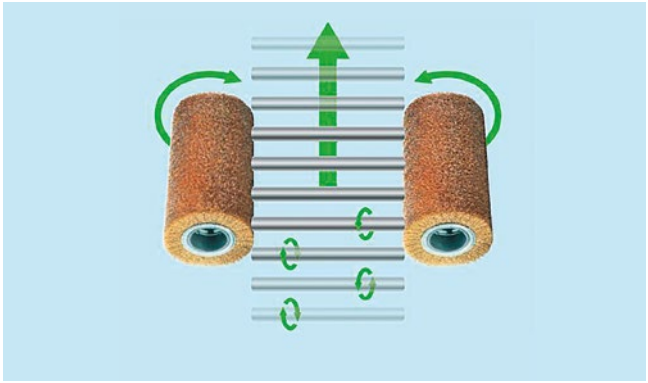
Only inner edge | Inner and outer edge | Only outer edge

Depending on the position of the brush in relation to the pipe, the outer, inner or both edges can be deburred

Due to our advanced manufacturing technology it is possible to produce balanced roller brushes without balancing weights. Hence the brush has a steady run throughout its whole lifetime.

Wheel brushes for table deburrer

Roller brush for deburring machine



Functional diagram of a deburring machine

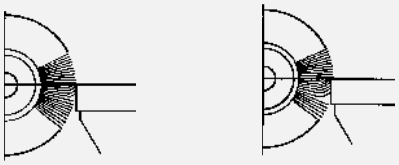
The right brush filling material depending on the workpiece and burr

Our steel wires have very high tensile strengths in order to withstand the tough conditions. Depending on the application, the wires are used crimped, knotted or in rope construction. Depending on the thickness of the workpiece and the size of the burr, the wire diameter is determined. In addition the deburring result can also be influenced by the circumferential speed. We usually use silicon carbide as the abrasive grain, which is embedded in polyamide bristles. Different grit sizes are also available to suit the different conditions.

We offer different filling materials for the various materials: The extremely hard and tensile steel wires are ideal for processing steel, stainless materials or light metals should be deburred with stainless steel wires or abrasive bristles.
The effect of wire and abrasive bristles differ, as wire brushes round off overhanging burrs, abrasive bristles, on the other hand, grind off the burrs.

Deburring on the bench grinder

Correct contact pressure



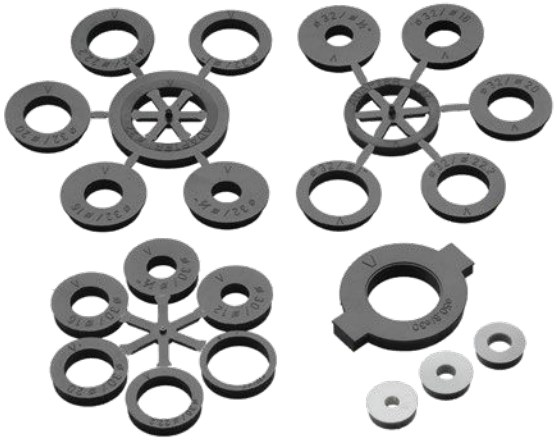
Correct immersion depth

Excessive immersion depth

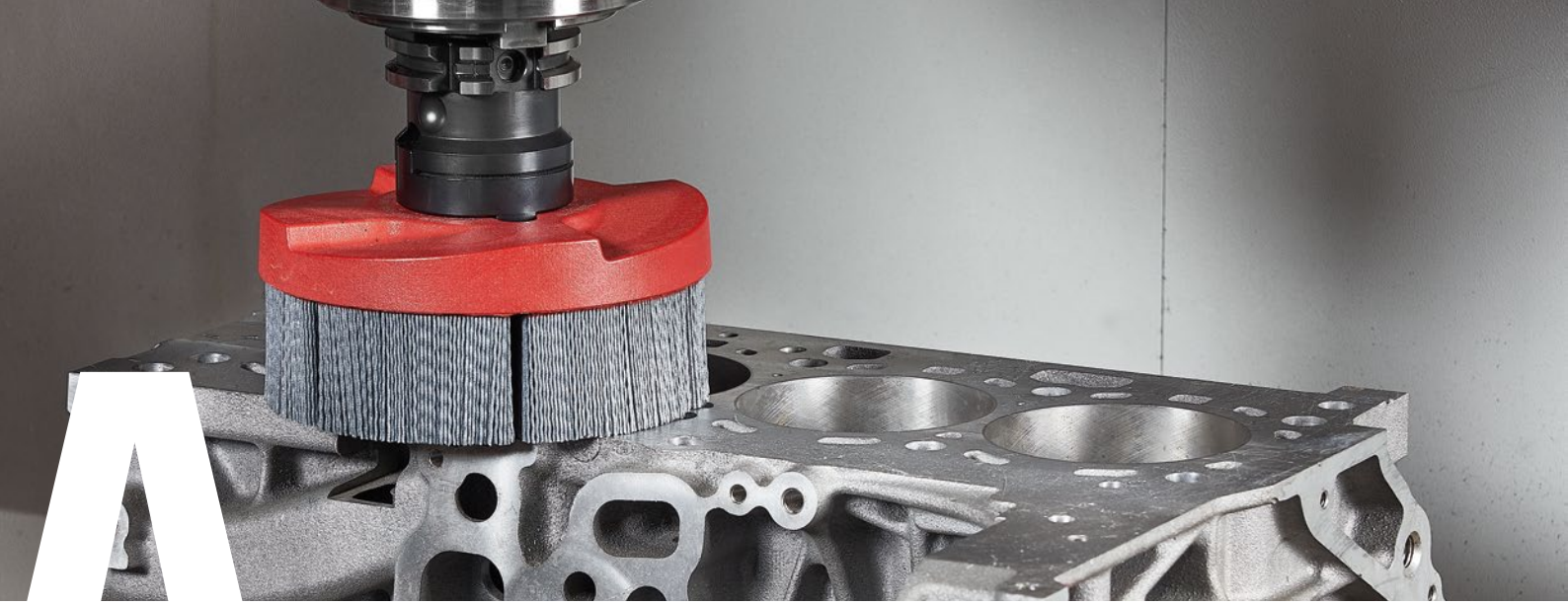
Before / after

Application of deburring end brushes

Deburring brushes for special deburring heads



Metal axle covers or plastic reducing rings guarantee a perfect fit



Deburring with high-performance filament brushes

HFB disc brushes

The highly abrasive surface tools from Lessmann perform excellent deburring work and edge rounding on workpiece edges of flat surfaces.
In addition to use in machining centers, high efficiency can be achieved particularly in continuous deburring systems with planetary brush systems.
HFB brushes are used for the flat processing of e.g: Punched and pressed parts, sintered parts, hydraulic and pneumatic workpieces, aluminum components, and much more.
Workpieces that are exposed to high pressures and place high demands on tightness and edge rounding are ideally processed with HFB brushes.

Typical workpieces that are machined with Lessmann HFB brushes.

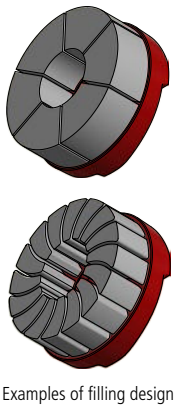
Brush filling material

In a special manufacturing process, Lessmann HFB brushes are produced with a very high filling density. Highly abrasive filaments are available with silicon carbide or aluminum oxide grains, ceramic grain and diamond grain High-quality filling material (PA6.12) is used as standard in LESSMANN HFB brushes, which is particularly resistant to bending and abrasion. The application-specific selection of the filling material enables deburring work and even edge rounding in a shorter processing time with a longer service life.

Depending on the application, the use of HFB brushes can be used dry or with the addition of coolants.

Filling pattern

Depending on requirements, the brushes can be manufactured with individual filling fields. For example, full filling is possible, but it is also possible to divide of the abrasive bristles into pre-defined fields or inclined filling. This allows depending on the direction of rotation, more effective processing, for example due to the optimum removal of cooling water.



Examples of filling design

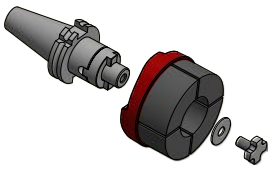
Impressive design

The brush plate has a modern, curved design. This makes the brush can be used very flexibly and the brush body is extremely stable. The resulting dynamic concentricity gives the brush optimum conditions for precise work. In addition, fewer sawdust and oil accumulate in the brush during machining, which results in less wear on the brush.

Flexible clamping systems and holders

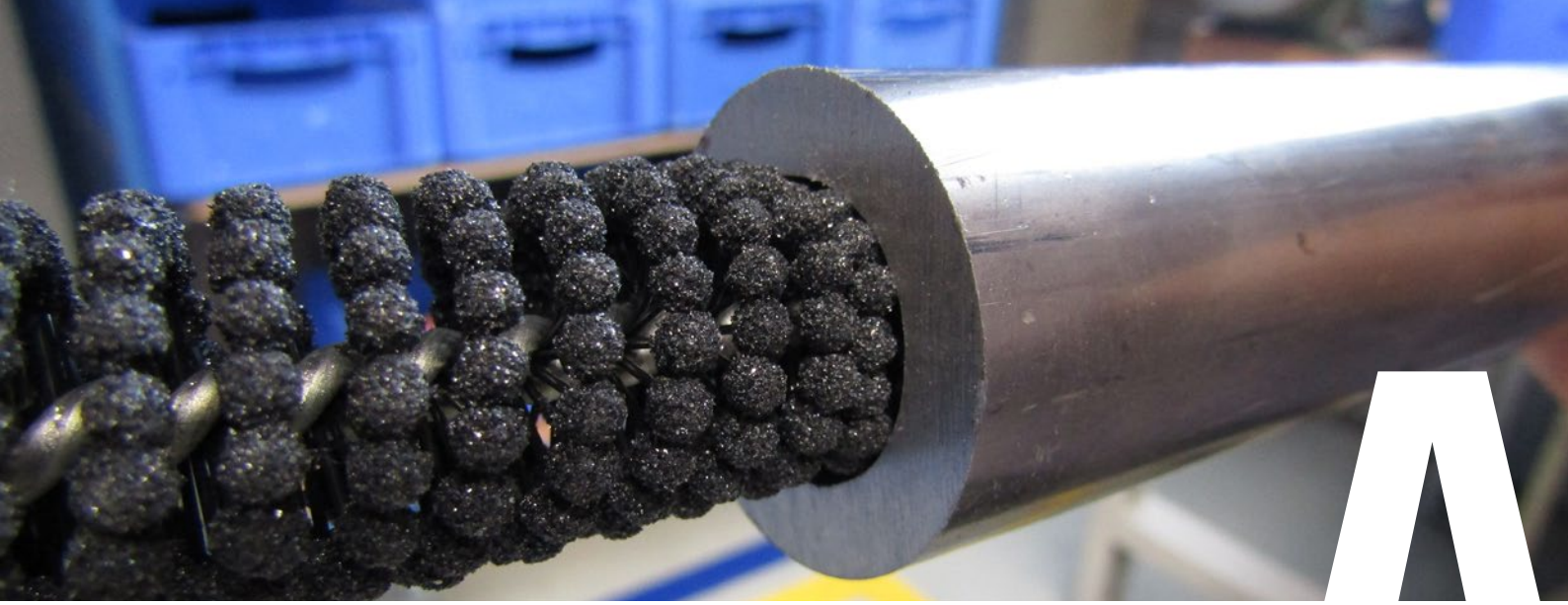
Lessmann manufactures brush types according to customer specifications for all machine brands and hole patterns. Our basic designs, suitable for the most common machines with cutter head holder (DIN 6357) or combination milling arbor holder (DIN 6358), as well as special models are available at short notice. LESSMANN HFB brushes are also suitable for accessories for working in wet conditions, e.g. clamping screws with coolant holes. On request, we can supply the brushes with a bore to suit your application.

Clamping screw with coolant holes



Common combination milling arbor holder for HFB brushes

User tips
The optimum speed is usually well below the maximum speed. Please observe the information on the brush body. For details, see page 12. The feed rate of the brush depends on the desired brushing result and must be determined individually. When working ensure that all edges and surfaces to be treated are reached. To ensure consistent processing, it is particularly important when starting and stopping that the brush is not removed prematurely from the workpiece.

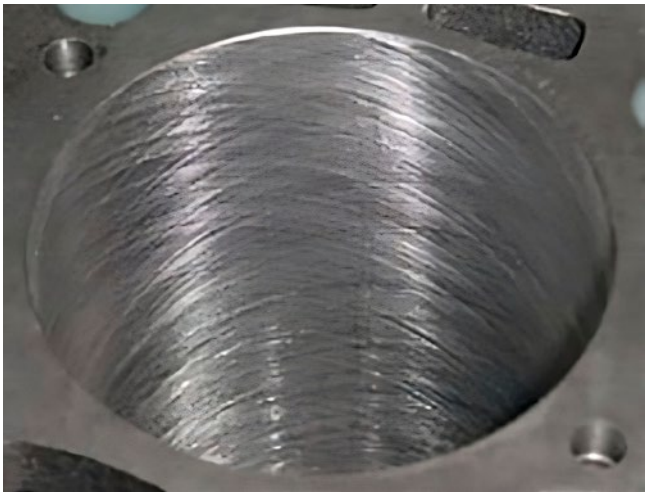


Deburring with flexible honing brushes

Lessmann honing brushes are used to process the insides of pipes, bore holes and cylinder walls. They are suitable for deburring, grinding, cleaning and surface finishing in equal measure.

Thanks to the elasticity and flexibility of the filling material, cross bores, openings and channels can also be deburred in the same operation.

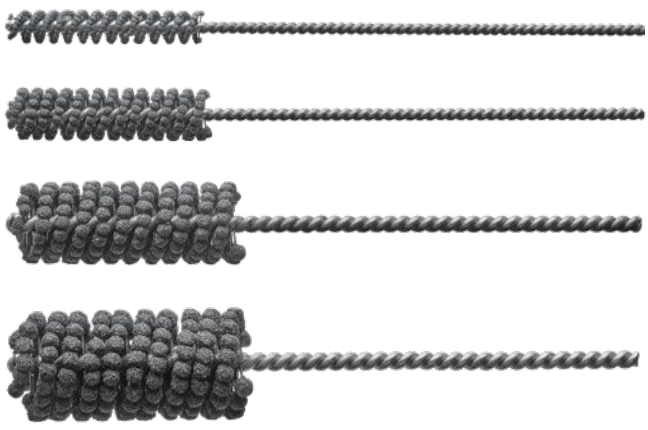
At the same time, the use of honing brushes results in a so-called cross-grinding, which is created by the simultaneous rotation and back and forth movement of the brush during processing. This structure ensures less friction and more even distribution of oil on the surface.



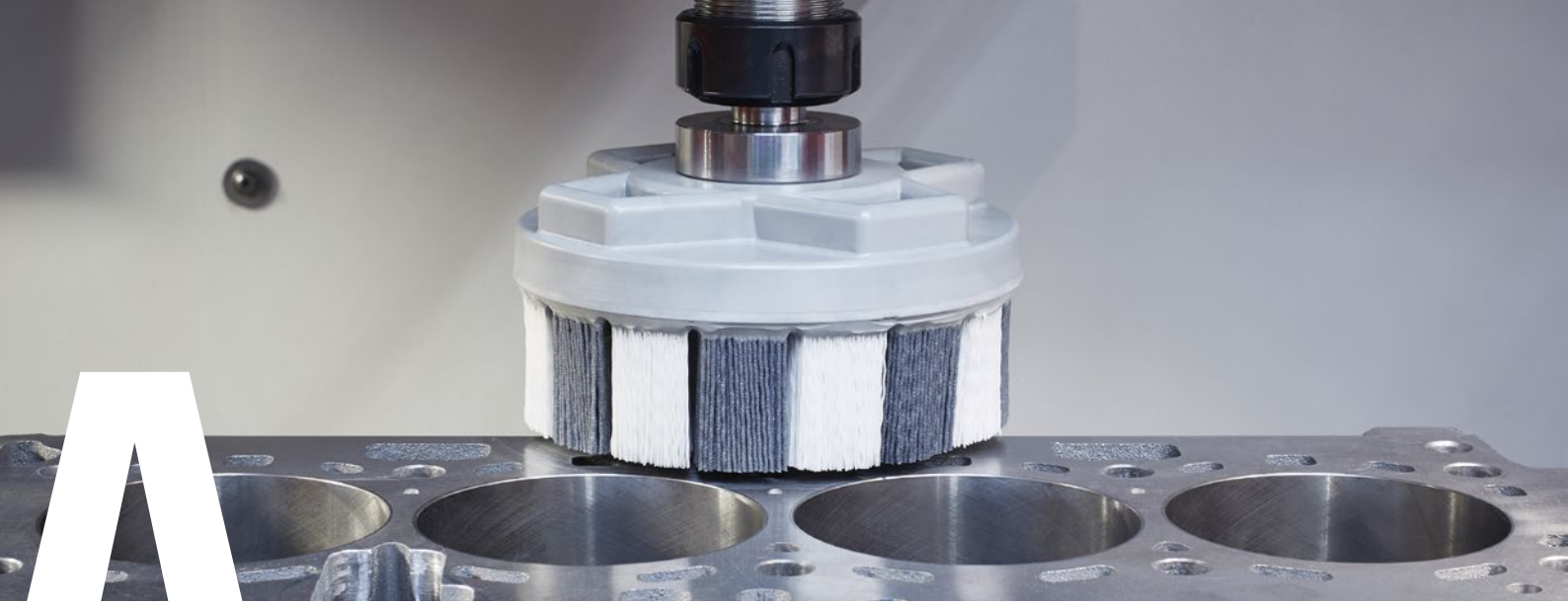
Example of the cross cut produced during honing

Machine application: When using the brushes by machine, be sure to observe the specified maximum number of revolutions. The maximum RPM of the brush is only permissible if the brush is clamped at least 10 mm deep and is inserted into the appropriate workpiece before turning. Insert the brush clockwise.

Attention: When using honing brushes, we recommend that you always use a suitable lubricant (oil or drilling emulsion).



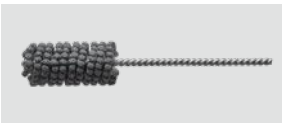
Flexible honing brushes from LESSMANN are available in various diameters as standard



Technical information on dimensions and brush filling material

Wheel brushes				
diameter	tube	working width	bore diameter	RPM
80–350 mm	26–120 mm	12–300 mm	12–120 mm	2.400–12.000

Roller brushes				
diameter	tube	working width	bore diameter	RPM
250–300 mm	100–120 mm	300–600 mm	by request	3.600



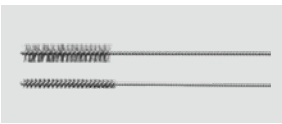
Flexible honing brushes				
diameter	für Rohrdurchmesser	working width	shank diameter	RPM
5,5–64 mm	5–60 mm	40–70 mm	2,1–7,3 mm	800–1.200

Cup brushes			
diameter	body height	thread	RPM
65–150 mm	20–33 mm	M14 or bore 22,2 mm	6.500–12.500

Disc brushes				
diameter	body height	bore	trim slant	RPM
10–800 mm	8–100 mm	8–130 mm	Max. 40°	6.600–12.500

High filament brushes				
diameter	body diameter	brush filling height	bore	RPM
45–145 mm	50–150 mm	35–40 mm bore: 16–32 mm	by request	2.500–4.500

Brushes with shank		
diameter	shank	RPM
20–100 mm	6 mm	4.500–20.000



Interior brushes		
diameter	total lenght	brush filling lenght
1,2 –200 mm	90–1000 mm	12–120 mm

Deburring with abrasive grit

Abrasive bristles consist of plastic threads interspersed with abrasive grit. The backing material used is primarily polyamide 6, for wet applications 6.12, as it absorbs less moisture.

Thanks to its flexible surface, the brush adapts to the contour of the workpiece. The abrasive bristles are also effective on the sides.

Grit size: K60–K1000
Grit thickness: 0.3–1.1 mm
Grit types: AO, SIC, KK, diamond coating

Typical areas of application for brushes with abrasive grains

- Deburring of metals and aluminum
- Processing of wood and plastic
- Grinding, cleaning, polishing, structuring of surfaces of various materials.

For further information on deburring or other applications and brushes, please contact us personally or ask for our detailed product catalog.

You can also visit us at www.lessmann.com

Five good reasons for Lessmann

Quality

We focus on products of the highest **quality** and attach great importance to our service and advice so that you can work more easily.

Fairness

We see our customers and suppliers as genuine partners. This **fairness** is the great strength of our family-run company.

Reliability

You can rely on us for consistent quality and adherence to deadlines. For us, **reliability** also means producing both standard items and custom-made products at competitive prices

Sustainability

Sustainable entrepreneurial action with responsibility for society, the environment and future generations is an important principle for us.

Independence

We strive for **independence** on the procurement and sales side. Together with the distribution of know-how across all levels, this gives you the security of having a strong long-term partner in us.

LESSMANN®
THE GERMAN BRUSH COMPANY

TEN THOUSAND AND ONE SOLUTIONS...

We are a development and production specialist for special models in small and large series. Thanks to our engineering department and the in-house tool and fixture construction, we have plenty of scope and modern equipment for your special tasks.

CERTIFIED ACCORDING TO
DIN EN ISO 9001:2015
DIN EN ISO 14001:2015

Lessmann GmbH
Lucas-Schultes-Str. 2
D-86732 Oettingen i. Bay.

Tel.: +49 9082 707-0
Fax: +49 9082 707-77
www.lessmann.com
info@lessmann.com

QUALITY MADE IN GERMANY