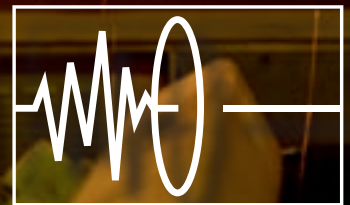
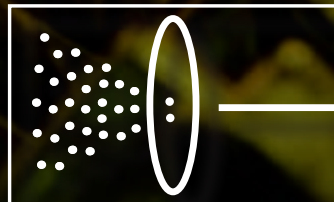




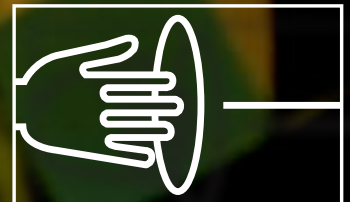
Vibration Filter



Noise Filter



Emission Filter



Haptic Filter

- Lower vibrations
- Reduced noise
- Less dust exposure
- Optimized haptics at work

People are at the focus of all the processes that a hand-guided tool from PFERD passes through during its creation. This applies from research and development right through to production of the commercially mature product.

The orientation towards the most economic cost-effectiveness of the tools for customers is one of the natural main targets of a high-quality manufacturer. The focus of all the jobs the PFERD brand has to perform is on the user.

Tough working conditions, rough applications and high physical demands characterize the world of tool users. Whether they work in a foundry or shipyards, at the workbench or outdoors: the working conditions, the multitude of applications and requirements make more and more demands of the professionals "at the tools". The task of having to produce a perfect working result under extreme deadline pressure determines the day's routine. With retirement starting later and later, people work for significantly longer than used to be the case.

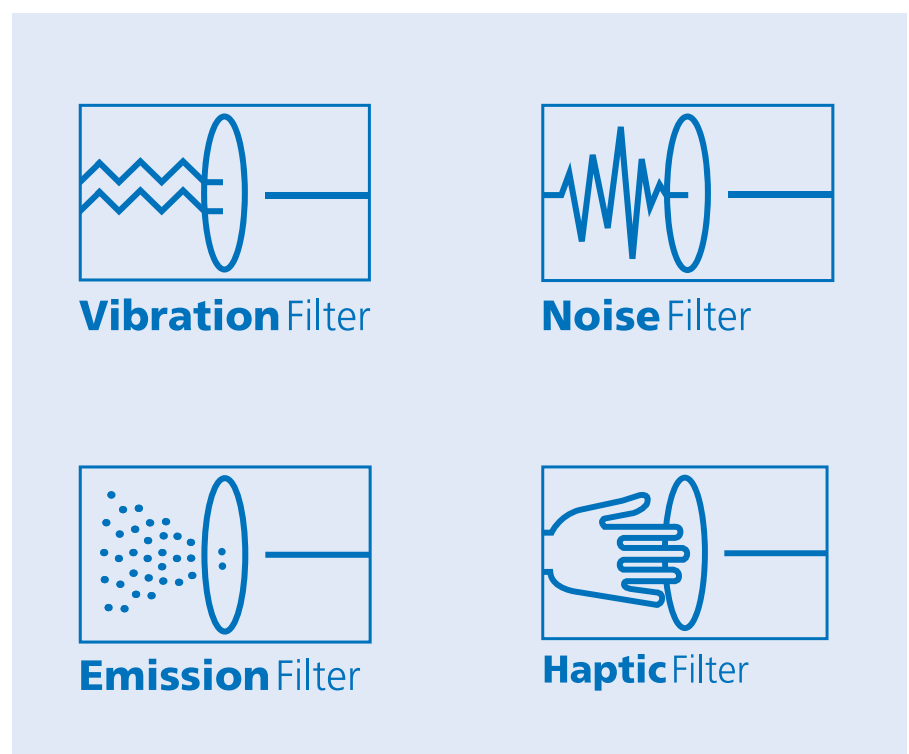
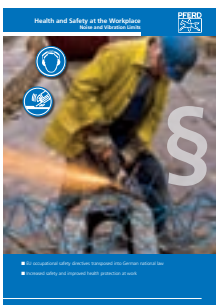


This leads to changes in requirements of the tools used. Tool selection affects the working situation of the user and his complete working environment. It not only has a great influence on the most economical problem solution, it also has a major influence on the **health, safety** and **comfort** of the tool user.

To be able to fulfil these increased requirements, PFERDERGONOMICS supplies solutions for

- Lower vibrations
- Reduced noise
- Less dust exposure
- Optimized haptics at work.

For more information see the PFERD brochure "Health and Safety at the Workplace – Noise and Vibration Limits".



Ergonomics is the science of the conformity of human work. Its central aim is to create suitable (execution) conditions for human work and the use of technical equipment and tools.

Ergonomics is extremely important in the fields of preventative industrial safety, health and safety, profitability and workplace design matched to user requirements. In addition to the manufacture of tools that are handy and convenient to use, this also includes ergonomic job engineering.

Users are to be protected from harm, even if they have to carry out a certain job for a long time.

As a manufacturer of hand-guided tools, we feel especially obliged to tool users and want to contribute to more safety, health and comfort at work.

PFERD is working particularly hard on the long-term reduction of dust, noise and vibration levels produced by tools, and on perceptibly increasing tool haptics.

ERGOSCAN

Do you have any questions about ergonomic influences at your workplace? PFERD's experienced field staff will be happy to advise you. On request, PFERD's Technical Customer Service can carry out measurements of noise and vibration load on your premises according to national and international standards.

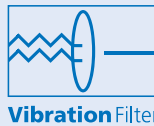
Regulations, guidelines and explanations

HAND-ARM VIBRATIONS

Limit values for the daily dose A(8)

Measured value	Measure
$A(8) \leq 2.5 \text{ m/s}^2$	none necessary
$2.5 \text{ m/s}^2 < A(8) \leq 5.0 \text{ m/s}^2$	Information obligation, vibration reduction program Offer of medical check-ups
$5.0 \text{ m/s}^2 < A(8)$	Determine reasons without delay and initiate measures Arrange for medical check-up

Based on: Noise and vibration work protection directive (LärmVibrationsArbSchV)



Vibration Filter

NOISE

Limit values for the daily noise exposure level L_{Aeq} of the sound pressure level in dB(A) or peak noise pressure level in dB(C)

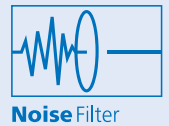
Measured value	Measure
$L_{Aeq} < 80 \text{ dB(A)}/135 \text{ dB(C)}$	none necessary
$80 \text{ dB(A)}/135 \text{ dB(C)} \leq L_{Aeq} < 85 \text{ dB(A)}/137 \text{ dB(C)}$	Information obligation, Provide ear protection, offer of medical check-up
$85 \text{ dB(A)}/137 \text{ dB(C)} \leq L_{Aeq}$	Obligation to wear ear protection, Noise reduction program, marking and bordering of noise areas, arranging for medical check-ups

Based on: Noise and vibration work protection directive (LärmVibrationsArbSchV)

For clarification

80 dB(A) corresponds to being around 5 m away from a main road.

85 dB(A) corresponds to a hairdryer directly next to your ear, if this situation continues for a longer period, this value is regarded as a trigger for noise-induced deafness.



Noise Filter

DUST

The quality of the air within working rooms must more or less correspond to outside air.

From a health point of view, the size of the dust particles is decisive in addition to the pollutant contents of the dust. A particle which has a diameter of larger than $10 \mu\text{m}$ (1 micrometer is one thousandth of a millimeter), so-called coarse dust, gets caught more or less easily on nasal hairs or mucous membranes. Smaller and tiny dust particles (fine dust, ultra-fine particles) can penetrate deep into the lung via the windpipe and bronchiae. For this reason, fine dust is also termed inhalable or respirable dust.

Based on: Hazardous substances directive (GefStoffV), technical regulations for hazardous substances (TRGS), particularly TRGS 900



Emission Filter

Haptics

The term haptic perception (sense of feel) is used to describe a sensual perception by creatures that can perceive mechanical stimuli.

Everyone knows that haptic perception, or feeling with the hands, places a special role in everyday life. It allows the brain to localize and evaluate touch, pressure and temperatures. The term haptic perception is used to describe the active feeling of size, contours, surface structure and weight of an object by integrating all skin senses and depth sensitiveness.



Haptic Filter

PFERDERGONOMICS offers perfect protective equipment for tool users. They provide maximum protection from vibration, dust and noise and guarantee comfortable work.



The protective glove SensoGrip developed by PFERD provides optimum protection from vibration combined with top-level comfort. The vibrations caused by the grinding process (according to DIN EN ISO 5349-1+2) are substantially dampened at the contact surfaces, without impairing dexterity. The glove is heat-resistant, spark-resistant and free of health-hazardous substances.



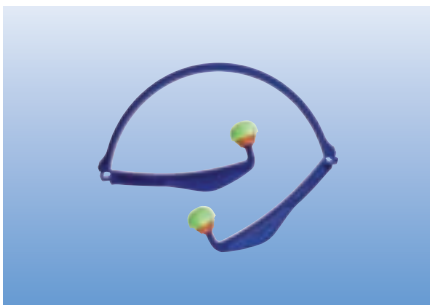
Vibration Filter **Emission Filter** **Haptic Filter**



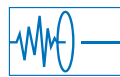
PFERD's range of protective goggles provides optimum protection from sparks, mechanical hazards and chemicals. The soft earpieces in particular guarantee comfortable wear. The impact-resistant plastics used guarantee 100% UV protection and non-distorted, low-fatigue quality of vision.



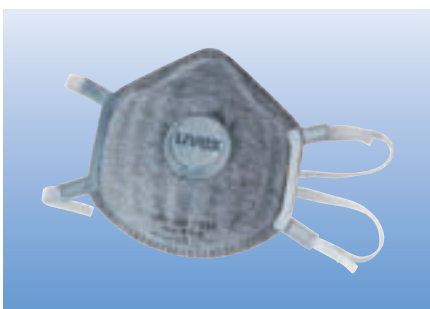
Emission Filter



PFERD's ear plugs BGS reduce the noise level by 23 dB(A) in the case of a continuous noise level up to 95 dB(A) or impulse noise up to 100 dB(A) to normal conversational level. They are very light and comfortable to wear.



Noise Filter



The PFERD face masks ASM provide optimum protection from dust, up to 30 times the MAK and TRK limit values depending on the specific type. The breath-out valve minimizes heat and humidity building up from the user's breath. The integrated nose clip (type FFP 3-5) can be adapted comfortably and flexibly and guarantees a tight fit over the mouth and nose.

MAK = maximum workplace concentration
TRK = technical reference concentration for dusts



Emission Filter



PFERD offers the SensoHandle for all conventional angle grinders (interior thread M8 or M10). The ergonomically formed rubber handle halves the vibrations produced during grinding work.



Vibration Filter **Haptic Filter**

PFERDERGONOMICS offers innovative tool solutions and matching work systems in order to improve the user's working conditions in the long term even in hard and rough tool applications.

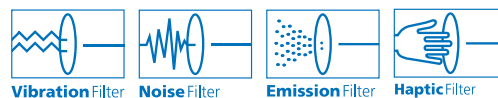
Ergonomic file handles from PFERD guarantee maximum working safety. The shape and design principle protect hands from sharp edges and corners. The angular collar prevents the file rolling away during work. The combination of two high-grade plastic components in the file handle makes the file comfortable and easy to grip and guide over the workpiece.



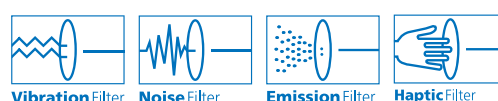
The tooth design 3RS for rough machining designed by PFERD for the TC burrs has an extremely smooth milling characteristic. The exact concentricity and optimum blade geometry of the rotary cutters make low-vibration work possible. The chips are guided away during work, almost prevent dust load completely.



Thanks to the backing pad and sturdy mount on the back of the fiber grinder, COMBICLICK® tools (German Innovation Prize in 2008) can be used on standard angle grinders. The type of construction allows particularly soft and flexible grinding. This applies for a comprehensive program from coarse to fine. The straightforward handling allows fast tool changing. The clamping system guarantees the tool fits on centrally without slipping, and low-vibration work.

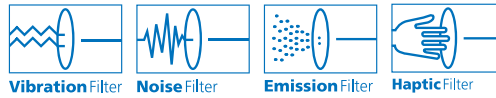


From coarse grinding through surface texturing to face-down mirror polishing the COMBIDISC® system addresses even complex machining tasks. The straightforward handling allows fast tool changing. The clamping system guarantees the tool fits on centrally without slipping, and low-vibration work.

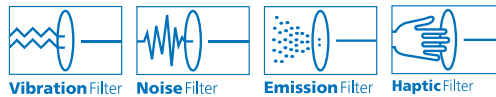




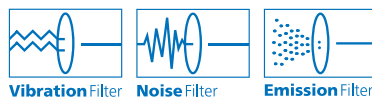
PFERD's range of extremely thin cut-off wheels (< 2 mm) contributes to reducing the user's workload significantly. The tools stand out thanks to reduced noise levels, lower vibrations under 5 m/s² (according to DIN EN ISO 5349-1+2) and less dust load. Working with the higher than average highly abrasive and fast PFERD versions guarantees low-burr, cool cutting with unrivaled cutting convenience.



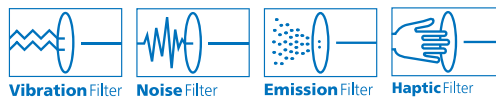
The patented design of CC-GRIND grinding discs means minimum levels of noise, vibration and dust for the user. Their excellent ergonomic properties result from its extremely high level of abrasion which makes grinding work with minimum grinding pressure possible. They are easy and convenient to use (no clamping flange required) and make fast tool changing possible.



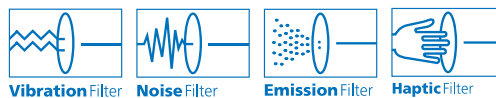
Thanks to their high-grade flaps, POLIFAN® flap discs considerably reduce noise, vibration and dust loads. These excellent ergonomic properties are due to the high abrasion level.



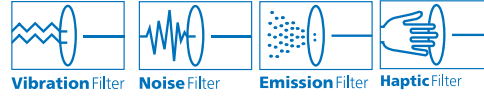
With its patented design and the special arrangement of the highly abrasive flaps, the flap disc POLIFAN® STRONG guarantees maximum tool times with minimum dust development. The unusually high abrasive effect means work can be carried out at a very low grinding pressure without too much physical effort being required.



The flap discs POLIFAN® CURVE stand out on account of their patented design with its unique ergonomic advantages. The complex processing of fillets is possible without turning the angle grinder. Thanks to this, and on account of the special arrangement of the highly abrasive flaps, precise, fast and optimum grinding of fillet geometries can be carried out.



The grinding disc WHISPER achieves significantly lower vibrations (acc. to DIN EN ISO 5349-1+2) and substantially lower noise and dust loads with an impressively higher machining capacity. The flexible tool structure allows soft, comfortable grinding with excellent surface quality.



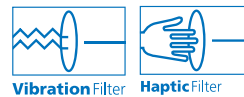
Flexible grinding discs from PFERD generate lower vibrations (according to DIN EN ISO 5349-1+2) and less noise load despite their significantly higher abrasion. They allow comfortable grinding at low grinding pressure and achieve an excellent surface finish.



PFERD wheel brushes with COMBITWIST® knots are convincing on account of their high abrasion and smoother running. The special knotting prevents the brushes recoiling even when used on tool edges and corners.

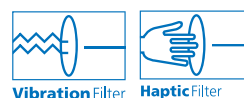


The angle grinder PW 11/120 AVH is equipped with an anti-vibration handle and auto-balancer for optimum working comfort. The ergonomically designed anti-vibration handle is comfortable to hold and pleasant to work with. It compensates imbalance when working with rotating tools.



To reduce the vibrations transmitted to the handle, PFERD supplies hand-held tool drives with elastic spindle bearings. They are marked with an additional "E" in the PFERD Tool Manual.

- Pneumatic straight grinder PGAS 2/800 E, PGAS 8/250 E-HV
- Flexible shaft handpiece 10 ZGE
- Belt sander BSG 10/35 E, BSG 10/50 E



Besides the selection of the most suitable tool, the use of suitable protective clothing and personal protective equipment, the following application instructions can contribute to minimizing the strain placed on users at the workplace.

Generally speaking, the following applies:

- The key to the user-friendly use of PFERD tools lies in the right combination of tool, application, material and drive type.
- The optimum matching of speed, machine size and drive power when selecting the drive increases working comfort.
- Working within the speed range recommended by PFERD leads to superior working results and achieves an ideal compromise between stock removal, tool life, surface quality, temperature load and wear of the tool and working comfort.

Catalogue 201

- The harder a material is, the finer the file strokes should be. This reduces the force needed for work.
- Coating with chalk prevents the file becoming clogged and helps achieve a top surface quality.

Catalogue 202

- During grinding, the vibration load is minimized by using rotary cutters with small diameters at higher speeds.
- The finer the cut, the smoother the grinding characteristic.
- Only max. 1/3 of the rotary cutter circumference may be in contact with the workpiece. Non-observance of this leads to bumpy grinding and can cause damage to the cutter.

Catalogue 203

- Using the turning stone from PFERD to remove the mounted points reestablishes the concentricity of the tools and reduces the vibration load.

Catalogue 204

- Adapted grinding pressures reduce vibration loads and tool wear. Tool life and handling comfort are increased.

Catalogue 205

- Electroplated-bonded tools are excellent for processing gray cast iron and nodular iron. They stand out on account of their long tool lives. Their stability leads to lower dust and vibration loads for the user.

Catalogue 206/207

- In the case of cut-off wheels of the diameters 178 and 230 mm, the use of a flange with an outer diameter of 76 mm increases side stability during work.
- When thin cut-off wheels are used, the use of additional cardboard flanges helps to clamp the tool correctly and safely.

Catalogue 208

- When using technical brushes, apply as little grinding pressure as possible. This reduces the vibration load, at the same time extending tool life.
- PFERD supplies suitable tool holders and adapter systems for technical brushes. Low manufacturing tolerances guarantee an optimum fit and minimize vibration loads.

Catalogue 209

- Regular servicing of power-driven tools, tool drives and equipment contributes to keeping the strain on the user as low as possible.
- Vibration-damping elements have to be replaced before their effect diminishes.
- To enable the optimum use of flexible shafts, they must be re-greased after around 100 operating hours.

