

GENERAL INFORMATION

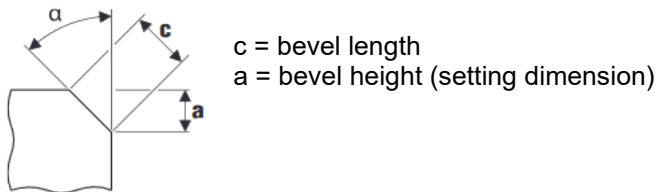
- › Which edges can be processed or what must be taken into account?
 - + There must be sufficient contact surface for the guide roller. 1.5mm (0.06“)
 - + The workpiece must be clean and deburred so that the machine can slide on it.
 - + The edge to be machined must be a flat surface oriented at a 90° angle.
 - + The workpiece must be securely and firmly clamped or have sufficient dead weight.

SETTINGS FOR THE APPLICATION

- › Which speed / pot level must be set for the different materials?
 - + Bevel and radius

MATERIAL	RECOMMENDED SPEED LEVEL
Aluminum	6
Steel 400 N/mm ²	6
Steel 600 N/mm ²	4-5
Steel 900 N/mm ²	4-5
Stainless steel	1-3

- › How to set the measure for the radius?



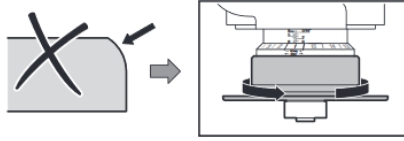
In addition to using the appropriate guide roller, the height of the guide plate must be adjusted to the respective radius.

Since the scale has a tolerance of approx. ± 1 mm (approx. 1/32"), readjustment may be necessary. The readjustment is made via the second scale (digits 1 to 15) on the guide plate. The guide plate is adjusted by 0.1 mm (1/254") for each digit. Make small adjustments until desired depth is achieved.

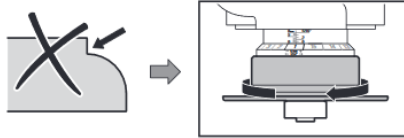
MACHINE	RADIUS	SETTING DIMENSION a
AKFH 18-5	R1.2 (0.047“) small	0.8 mm (0.031“)
AKFH 18-5	R1.2 (0.047“) big	4 mm (0.157“)
AKFH 18-5	R2.5 (0.098“)	2.7 mm (0.106“)
KFH 17-8 R / KFH 17-15 R	R2 (0.079“) small	3 mm (0.118“)
KFH 17-8 R / KFH 17-15 R	R2 (0.079“) big	3 mm (0.118“)

KFH 17-8 R / KFH 17-15 R	R3 (0.118")	4.4 mm (0.173")
KFH 17-8 R / KFH 17-15 R	R3 (0.118")	4.4 mm (0.173")

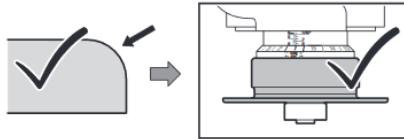
Guide plate too high



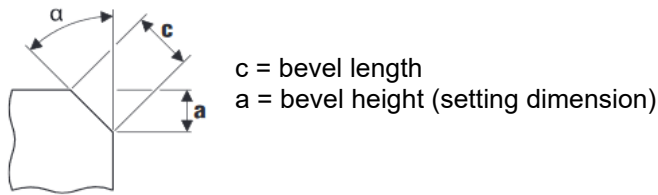
Guide plate too low



Guide plate optimal



› **How to set the measure for the bevel?**

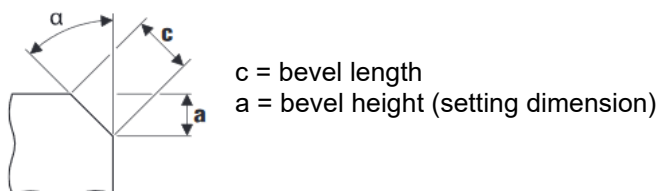


In addition to using the appropriate guide roller, the height of the guide plate must be adjusted to the respective radius.

Since the scale has a tolerance of approx. ± 1 mm (approx. 0.039"), readjustment may be necessary. The readjustment is made via the second scale (digits 1 to 15) on the guide plate. The guide plate is adjusted by 0.1 mm (0.004") for each digit. Make small adjustments until desired depth is achieved.

- + For setting the setting dimension a, the bevel length c_{max} is obtained for milling cutter angle α

α (°) a (mm)	c_{max} FOR 30	c_{max} FOR 37,5	c_{max} FOR 45	c_{max} FOR 60
1 (0.039")	1,2 (0.047")	1,25 (0.049")	1,3 (0.051)	2 (0.079)
2 (0.079")	2,3 (0.091")	2,5 (0.098")	2,8 (0.110")	4 (0.157")
3 (0.118")	3,5 (0.138")	3,8 (0.15")	4,2 (0.165")	6 (0.236")
4 (0.165")	4,6 (0.181")	5,05 (0.199")	5,7 (0.224")	8 (0.315")
5 (0.197")	5,8 (0.228")	6,3 (0.248")	7,1 (0.28")	10 (0.394")
6 (0.236")	6,9 (0.272")	7,5 (0.295")	8,5 (0.335")	12 (0.472")
7 (0.276")	8,1 (0.319")	8,8 (0.346")	9,9 (0.39")	14 (0.551")
8 (0.315")	9,2 (0.362")	10,1 (0.398")	11,3 (0.445")	16 (0.63")
9 (0.354")	10,4 (0.409")	11,35 (0.447")	12,7 (0.5")	
10 (0.394")	11,5 (0.453")	12,6 (0.496")	14,1 (0.555")	
11 (0.433")	12,7 (0.5")	13,9 (0.547")	15,6 (0.614")	



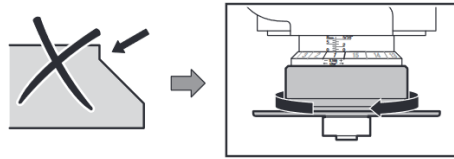
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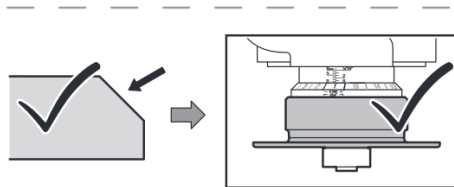
- + To obtain the bevel length c_{max} , the setting dimension a must be set for the bevel angle α

α (°)	a	a	a	a
c_{max} (mm)	FOR 30	FOR 37,5	FOR 45	FOR 60
0,5 (0.02“)	0,5 (0.02“)	0,4 (0.015“)	0,4 (0.015“)	0,3(0.012“)
1 (0.039“)	0,9 (0.035“)	0,8 (0.031“)	0,8 (0.031“)	0,5 (0.02“)
1,5 (0.06“)	1,3 (0.051“)	1,2 (0.047“)	1,1 (0.043“)	0,8 (0.031“)
2 (0.079“)	1,8 (0.071“)	1,6 (0.063“)	1,5 (0.06“)	1,0 (0.039“)
2,5 (0.098“)	2,2 (0.087“)	2 (0.079“)	1,8 (0.071“)	1,3 (0.051“)
3 (0.118“)	2,6 (0.102“)	2,4 (0.094“)	2,2 (0.087“)	1,5 (0.06“)
3,5 (0.138“)	3,1 (0.122“)	2,8 (0.110“)	2,5 (0.098“)	1,8 (0.071“)
4 (0.165“)	3,5 (0.138“)	3,2 (0.126“)	2,9 (0.114“)	2 (0.079“)
4,5 (0.177“)	3,9 (0.154“)	3,6 (0.142“)	3,2 (0.126“)	2,3 (0.091“)
5 (0.197“)	4,4 (0.173“)	4 (0.157“)	3,6 (0.142“)	2,5 (0.098“)
5,5 (0.217“)	4,8 (0.189“)	4,4 (0.173“)	3,9 (0.154“)	2,8 (0.110“)
6 (0.236“)	5,2 (0.205“)	4,8 (0.189“)	4,3 (0.169“)	3 (0.118“)
6,5 (0.256“)	5,7 (0.224“)	5,2 (0.205“)	4,6 (0.181“)	3,3 (0.13“)
7 (0.276“)	6,1 (0.240“)	5,6 (0.220“)	5 (0.197“)	3,5 (0.138“)
7,5 (0.295“)	6,5 (0.256“)	6 (0.236“)	5,4 (0.213“)	3,8 (0.154“)
8 (0.315“)	7 (0.276“)	6,4 (0.252“)	5,7 (0.224“)	4 (0.157“)
8,5 (0.335“)	7,4 (0.291“)	6,8 (0.268“)	6,1 (0.240“)	4,3 (0.169“)
9 (0.354“)	7,8 (0.307“)	7,2 (0.283“)	6,4 (0.252“)	4,5 (0.177“)
9,5 (0.374“)	8,3 (0.327“)	7,6 (0.299“)	6,8 (0.268“)	4,8 (0.189“)
10 (0.394“)	8,7 (0.343“)	8 (0.315“)	7,1 (0.28“)	5,0 (0.197“)
10,5 (0.413“)	9,1 (0.358“)	8,4 (0.331“)	7,5 (0.295“)	5,3 (0.209“)
11 (0.433“)	9,6 (0.378“)	8,8 (0.346“)	7,8 (0.307“)	5,5 (0.217“)
11,5 (0.453“)	10 (0.394“)	9,2 (0.362“)	8,2 (0.323“)	5,8 (0.228“)
12 (0.472“)	10,4 (0.409“)	9,6 (0.378“)	8,5 (0.335“)	6 (0.236“)
12,5 (0.492“)	10,9 (0.429“)	10 (0.394“)	8,9 (0.350“)	6,3 (0.248“)
13 (0.512“)	11,3 (0.445“)	10,4 (0.409“)	9,2 (0.362“)	6,5 (0.256“)
13,5 (0.531“)	11,7 (0.461“)	10,8 (0.425“)	9,6 (0.378“)	6,8 (0.268“)
14 (0.551“)	12,2 (0.480“)	11,2 (0.441“)	9,9 (0.39“)	7 (0.276“)
14,5 (0.571“)	12,6 (0.496“)	11,6 (0.457“)	10,3 (0.406“)	7,3 (0.287“)
15 (0.591“)	13 (0.512“)	12 (0.472“)	10,7 (0.421“)	7,5 (0.295“)

Guiding plate too low



Guiding plate optimal



- › **What happens if the user sets a higher bevel height than the maximum dimension on the guide plate?**

If this is the case, a step is created at the top edge of the sheet. As a result, the bevel depth is set too deep and the inserts may wear or break prematurely

APPLICATION

- › **How many meters / feet can be worked with one insert?**

20 to 40 meters (60 to 130 ft) of S235 steel can be cut per cutting edge (applies to SX and KX inserts). Since both the SX and KX inserts can be rotated 8 times, they can machine an average of 160 to 320 meters (525 to 1050 ft) of material.

The service life of the inserts depends on the material surface and the material to be machined. Furthermore, each linear meter of each infeed stroke must be counted individually.

TYPE	NUMBER OF STEPS TO THE FINAL BEVEL	LENGTH OF THE FINAL BEVEL [m]	SUM OF ALL SINGLE STEPS [m]
AKFH-5	2 x	20 (65.62 ft)	= 40 (131.23 ft)
KFH17-8	2 x	10 (32.81 ft)	= 20 (65.62 ft)
KFH17-15	4 x	3 (9.84 ft)	= 12 (39.37 ft)

- › **How many steps does it take to reach the maximum bevel length c?**

MACHINE	NUMBER OF STEPS	BEVEL LENGTH C
AKFH 18-5	2	3 (0.118") and 5 (0.197")
KFH 17- 8 R	2	4 (0.165") and 8 (0.315")
KFH 17-15 R	3-4	6 (0.236") - 8 (0.315"), 10 (0.394") – 12 (0.472"), 15 (0.591")

In general, it depends on the material and the feed as well as on whether you work with or without lubrication.

Only enough infeed should be used so that the user can maintain a feed rate of over approx.

1 meter per minute (3 ft per minute).

Important: Stainless steel or high-alloy steels or fine-grained steels must be machined with less infeed and in several steps

› **Which metals can be processed? What must be considered?**

Except for high-strength metals (hard alloys like: AR400, AR500, Hardox, V4A) almost all metals can be processed. For this purpose, a lower speed must be set and run at a low feed rate. Due to a faster wear of the cutting edge, a shorter bevel length must be expected.

› **What other materials (plastics etc.) can be processed? What must be taken into account?**

In principle, it is possible to process any type of plastic. The prerequisite is a certain hardness of the material. However, the hardness of a material with the same designation can vary depending on its composition and intended use. PVC for example is available in soft and hard. PVC pipes can be processed well. The wide variety of plastics available make it difficult to provide generalized application specifications.

A guideline is that any material that can be machined with a file can also be milled. Plexi glass is no problem. Sandwich panels with different compositions can also be milled. Plastics containing glass fiber or carbon fiber can also be processed. However, these materials are very abrasive, which means that the wear on the inserts is higher.

It is also possible to machine materials made of Teflon.

Common plastics that are milled are POM, PA, PP, PS, PET, PTFE as well as the high-performance plastic PEEK. Fiber-reinforced plastics are often used in model making, which can also be machined. In principle, a high feed rate is used to avoid lubrication.

The processing of materials such as plastics or wood should be tested beforehand on a test piece, as the surface or structure can be different.

› **When should the inserts be changed / turned?**

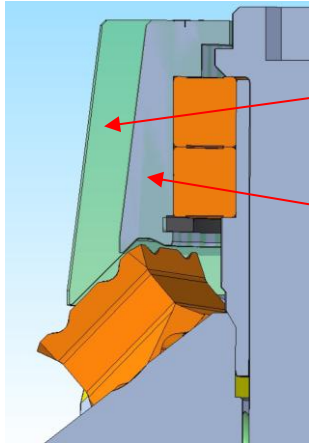
- + When the coating is worn away
- + If the edge / cutting edge is damaged (notches, saw tooth profile, broken out, etc.)



› **How to use the indexable insert 16 times?**

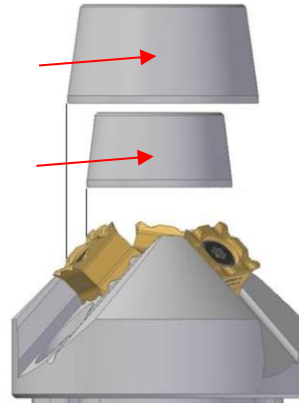
Valid only for radius 1.2 mm (AKFH 18-5) and 2 mm (KFH 17-8 R and KFH 17-15 R).

The radius is present twice on each side of the insert, for a total of 16 times. With the small roller, you can use the top row directly under the guide roller. When you have the cutter loaded like this, the radius plate can be used 8x on each side. Then the large guide roller is mounted. This covers the upper row and you mill 8 cutting edges with the lower row again.



Guide roller big

Guide roller small



› **When should the guide roller be replaced? What are the signs?**

- + When radii are produced and guide rollers wear out due to abrasion, the radius is resulting in poor radius quality and a notch appears under the radius.
- + If the ball bearings wear out, tilt or show defects.



› **What is the battery life?**

If the steel S235 is machined, the service life of the battery is up to 9 minutes. (This corresponds to about 3 meters (9.84 ft) of a final 5 millimeter (0.197 ") bevel length machined in two steps). So one battery will do both steps to the final depth.

The time depends on:

- + Condition of the inserts
- + Setting of bevel height
- + Material to be machined
- + Feed rate
- + Surface condition

The service life of the indexable inserts increases the lower the infeed / feed rate.

› **How many charging cycles does a battery last?**

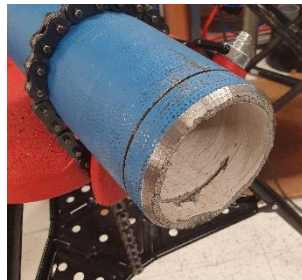
At least 200 charging cycles

› **What is the minimum wall thickness a material should have in order to be machined?**

- + Depending on the remaining web: 1 (0.039") to 1.5 millimeters (0.06"), which is more important than the minimum wall thickness.
- + Minimum wall thickness 1.5 millimeter (0.06 ") with 0.5 millimeter (0.02 ") bevel - gap guide roller
- + With a radius of 2.5 millimeters (0.984 "), the sheet metal should be at least 4 millimeters thick to round it on one side.

Hint: Thinner sheets can be placed e.g. on the edge of a table. Several sheets can also be placed on top of each other, which saves a lot of time.

- › **Pipe machining: How large must a pipe diameter be to be machined?**



When beveling on the outside, the diameter of the pipe is not important; when beveling on the inside diameter of the pipe, the cutter and the guide roller must have enough space so that there is not yet any material contact when the machine is switched on.

- › **Pipe machining: What is the minimum diameter required to bevel a hole in a pipe?**



As a general rule, the hole must be larger than the guide roller. Until now, beveling has been successfully milled from a diameter of 100 millimeters (3.937"). Due to the rounding, the bevel looks like an ellipse.

- › **What is the cause for a continuous sparking?**
 - + Indexable inserts are worn out
 - + Setting dimension is too large(too much material removal)
 - + Speed is too high
 - + Feed rate is too high
 - + Material is hardened by e.g. thermal heating

- › **Must a cutting spray be used during processing? Which spray / lubricant is used for machining aluminum / steel / stainless steel?**

In principle, no cutting lubrication is necessary for steel. In soft materials such as aluminum and copper and in difficult-to-cut materials such as stainless steel, a cutting spray / cutting paste should be used if possible. We must prevent customers from using a "flood" type of coolant so that the machine is protected.

Aluminum: AL lubricant - volatilizes

Tip: AL lubricant with beef tallow [Butcher]

With the stainless steel cutting spray, it should be noted that during the further working process (also during welding), the surface must be cleaned after the use of a spray / lubricant. If this is not the case, welding defects, among other things, could be the result. Especially when processing food processing machines, it is extremely important not to contaminate the materials with lubricant. Typically, food production end-users do not use and lubricant and accept the shortened service life of the indexable inserts in return.

› **What is the copper paste contained in the delivery used for?**

The Anti sieze paste included in the scope of delivery is intended to wet the screws of the indexable inserts so that they can be loosened again later. Without copper paste, the loosening force can be so high when loosening that the screw head is destroyed and the screw is very difficult to remove.

› **Application examples**

Machining of edges on wheel covers made of tread plate with a bevel length of 3.5 mm



SPECIAL FEATURES

› **What is the booster and spring technology?**

In contrast to angle grinders, hand-beveling machines have a strongly fluctuating torque requirement. The power requirement is very high when the milling cutters' cutting edges hit the workpiece edge, and increases and decreases at different intervals as the milling process progresses. This fact leads to rotational irregularity, which means: the motor load is not uniform and oscillations (= torsional oscillations) and vibrations occur. This effect occurs all the more strongly the greater the required milling performance.

Booster technology reduces this effect considerably. The booster absorbs kinetic energy during acceleration and releases it again during deceleration. This reduces the rotational irregularity and the motor speed remains constant. The oscillations and vibrations are significantly reduced. This has a positive effect on the uniformity of the milling process and the user hardly needs to exert any force to guide the beveling machine precisely. All in all, this means 30 to 80 percent more milling power compared to machines without booster technology.

Another challenge of edge milling with hand machines lies in the process itself. When the machines are applied to the workpiece edge, the user runs the risk of the machine kick back. This occurs if the guide system is not used in the correct function, for example, if the guide plate and guide roller are not yet completely in contact with the workpiece or the workpiece edge and the system cannot function stably. This effect can be particularly severe with bevel sizes > 8 millimeters (0.315").

To avoid this, the patented spring technology is used here: When the cutting edges of the milling cutter meet the edge of the workpiece, the rotational forces are introduced into the milling process in a cushioned manner, i.e. the cutting edge of the milling cutter is given a little more time to penetrate the material. The risk of the machine kicking back is significantly reduced and work safety is increased.

In the milling process, the energy is not absorbed as with other damping systems, but stored in the spring system. After the cutting edges have entered the material, the energy is reintroduced into the milling process via the springs. In this way, the spring system supports

the milling process and helps to evacuate the chips. This also has a positive effect on the uniformity of the milling process, wear of the entire system is minimized and the milling performance is also increased.

Booster and spring technologies give the machines the following competitive advantages:

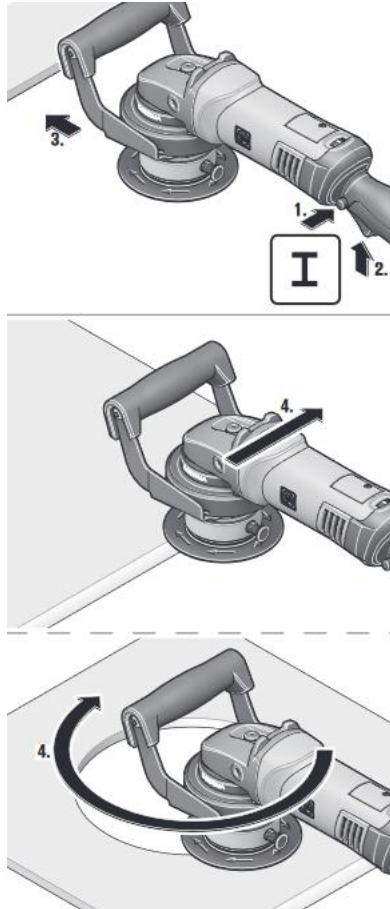
- + Users require less physical strain because fewer vibrations are generated.
- + They have better handling when starting and milling due to "softer" working.
- + The user-friendliness is significantly increased.
- + The service life of the inserts is extended.
- + Operation of the machine is extremely low-wear, allowing the machines to be operated for longer.
- + Milling performance is increased from 30 to 80 percent (depending on material and bevel size).

The combination of these advantages leads to high job efficiency and productivity, resulting in higher profit our customers.

INDEXABLE INSERTS

› What is the cause of insert breakage in the material?

- + The material could be hardened by the cutting process and/or thermal heating. If this is the case, the edges must be prepared with an angle grinder.
- + A burr on the corner to be machined could also be the reason for the indexable inserts to break. Therefore, make sure that the corners do not have a burr. In this way, the beveling machine can be guided over the material without any problems.
- + Another cause could be the wrong direction of the feed. It can be easily checked by looking at the arrow on the plate.



- + Application errors, such as too fast running-in and running-out into the material or too much material removal at once (especially with high-strength steels) can be further reasons for breaking inserts.
- + It is also possible that the inserts are already worn out. They could also have been damaged by the milling head falling down or by the inserts hitting the material directly.

› Can I use inserts from other manufacturers?




No, these are specially made and designed for the milling heads in conjunction with the guide roller. The inserts are also patented by Gerima.

› **What material are the inserts made of?**

The inserts are made of carbide, the different colors indicate the areas of application and are created by a multi-layer coating of the surface

› **Are there inserts in other qualities? / Which inserts are best suited for the different materials?**

Silver is only available as KX inserts for the KFH 17-8 R/KFH 17-15 R.

Beschichtung	0 Hellgrau	2 Gold	5 Silber
Einsatz- bereiche (Materialien)			
ALU	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
S235/S355		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
SS1.4301		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
S690			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
SS 1.4571			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

› **Can the inserts be resharpened?**

No, resharpening cannot be done under any circumstances.

CLAMPING SCREWS

› **Can other clamping screws be used?**

No, these are specially made and designed for the SX and KX inserts.

› **What is the difference between the clamping screws?**

AKFH: Silver; total length: 9mm (0.354") , thread length 6mm (0.236")

KFH: Black; overall length: 11mm (0.433"), thread length 8mm (0.315")



SERVICE

› Can the 45° milling head of the AKFH 18-5 be replaced?

No, the milling head cannot be replaced by the customer and this only happens in exceptional cases.

The machine must be sent to FEIN. The exchange itself takes a maximum of one hour.

EXPANSION OF THE PORTFOLIO

› Which other radii can be produced with FEIN beveling machines?

AKFH 18-5: Radius 1,2 millimetre (0.047")

KFH 17-8 R: Radius 1,2 millimetre (0.047")/ 2,0 millimetre (0.079 ")/ 2,5 millimetre (0.984")/ 4 millimetre (0.165 ")/ 5 millimetre (0.197 ")/ 6 millimetre (0.236")

KFH 17-15 R: Radius 1,2 millimetre (0.047")/ 2,0 millimetre (0.079 ")/ 2,5 millimetre (0.984 ")/ 4 millimetre (0.165 ")/ 5 millimetre (0.197 ")/ 6 millimetre (0.236 ")

› Are the milling heads also available in other angle degrees?

- › AKFH 18-5: Milling head is already firmly installed. Only 45° bevels can be produced.
- › KFH 17-8 R: 60°: Other milling cutters with an angle between 30°, 37.5 and 60° can also be manufactured.
- › KFH 17-15 R: 60°: Other milling cutters with an angle between 30°, 37.5 and 60° can also be manufactured.

ADVANTAGES OVER OTHER METHODS

› What are the advantages of beveling machines compared to angle grinders?

Beveling machines will make work easier above all for users who need to prepare bevels precisely for the welding process. In addition, radii can be milled with the machines to prepare edges for painting or coating work or to cleanly round off sharp end edges.

For production planning in companies, the immense time savings and repeatability of results compared to angle grinders also play a decisive role in using the technology.

A characteristic feature of beveling is that no flying sparks are produced when the material is removed, as is the case with angle grinders, but that metal chips are formed. Eliminating exposure to metal dusts results in a much safer work environment for users. All three models are also characterized by smooth running and ergonomic handling.

Particularly in the case of structures that are joined by a weld seam, the weld seam must be checked by X-ray with regard to its quality, strength and stability. The more uniform and even the surface is, the more stable is also the connection by the welding process itself. A beveling machine can be used to work very precisely and evenly, which is not possible to this degree of perfection with an angle grinder.

› [WHY FEIN - EN \(Extranet\)](#)