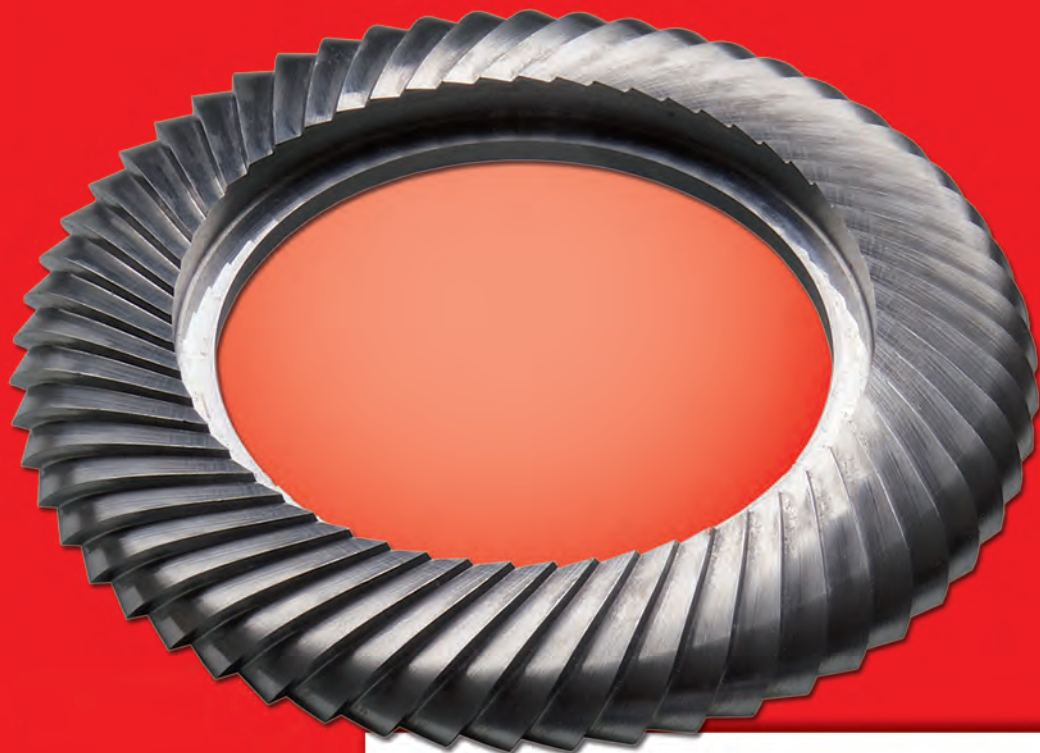


Milling with the manual angle grinder substitutes grinding and scrubbing

# Your key

to perfect joint preparation.



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## **MIGAL.CO**

## Milling substitutes grinding

### Milling with the manual angle grinder substitutes grinding and scrubbing

Milling rings and double-sided milling rings (weld root opener) from MIGAL.CO save time and money and improve the quality during the processing of non-ferrous metals, plastic, GRP / CFRP and wood.

The removal rate is significantly increased, grinding dust disappears and it does not retain any abrasive residues in the material. The life of a milling ring approximately corresponds to the use of 5,000 conventional grinding discs. Just the resulting savings from disk changing amortize the tool several times. The increase in efficiency and the savings in abrasives cut costs by orders of magnitude.



*Milling a root gap by using the weld root opener*



*Making a bevel with a milling ring*

The milling rings are used for bevelling, smoothing welds and general scrubbing, while the double-sided milling disc is used to open butt- and fillet welds. Especially with aluminium there is no smearing of the material, thereby welding defects are visible immediately. The workpiece remains largely cold and residuals of abrasives are avoided. Thus, the weld quality improves significantly. As residues remain solely chips, work safety is improved and explosion hazards from aluminium dust are avoided.

The tools can be used with commercially available electrically or pneumatically operated hand angle grinders with a speed of 12,000 rev / min and are available in diameters of 70, 116 and 125 mm. Metals such as aluminum, titanium, copper, brass and bronze, as well as plastics, CFRP / GRP and wood can be effectively processed.

For effective leveling of welds a milling slide is available which provides a constantly high surface quality due to the adjustable distance.



*Rear view of an angle grinder with a weld root opener*



*Frontal view of an angle grinder with a milling disc*

## Milling substitutes grinding

### Application

- **Milling rings - for bevelling and scrubbing**  
Milling rings are available in diameters of 70, 116 and 125 mm. These are used for bevelling, leveling of welds or general scrubbing. Suitable materials are all non-ferrous metals, carbon / fiberglass, plastics and wood.
- **Double-sided milling rings (weld root opener)**  
These are also available in diameters of 70, 116 and 125 mm and are used for opening of butt- or fillet welds. Suitable materials are all non-ferrous metals, carbon / fiberglass, plastics and wood.



Milling ring 116 mm for aluminum

### Key features and benefits

- **Commercially available angle grinders**  
Milling rings and double-sided milling rings can be used on standard angle grinders under the following conditions:
  - electric or pneumatic driven
  - 12.000 rpm
  - minimum 1,500 watts of power
- **Chips instead of dust**  
Chips are produced instead of dust. This is a significant contribution to work safety. The explosion hazard caused from aluminum dust is eliminated.
- **No abrasive residues and no smearing**  
Especially with aluminum no plastic-bonded abrasives may be used due to the fact that these leave residuals in the material. Such residuals may cause weld defects like porosity or inclusions after rewelding. With milling such residuals are excluded. Weld defects are visible immediately and the smearing caused by grinding is avoided.
- **Cold workpiece**  
With milling the workpiece remains cold. Overheating is avoided.
- **Higher profitability**  
The removal rate is significantly higher than with conventional milling discs. Thus, the work processes are more efficient. Frequent tool changes are eliminated due to the fact that the lifetime of the milling ring is up to 3.500 hours\* (in comparison to 30 minutes).



Weld root opener 116 mm for aluminum

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\* All information regarding the lifetime represent empirical values which have been communicated to us by customers. These are not binding and may differ substantially. Under no circumstances shall this constitute a guaranteed feature!

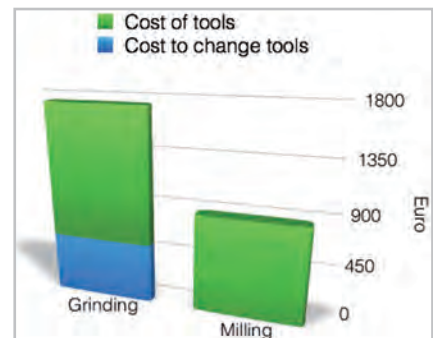
## Milling substitutes grinding

### Milling rings save money

A milling ring has a service life of up to 500 hours\* until the first resharpener. During this time it can be used without changing tools. We calculate a life time of 300 hours\* and a list price of EUR 877.50 for a 116 mm milling disc.

The life of a conventional flap disc is about 30 minutes in aluminum. We expect cost of € 2, -/disc and a tool change time of 72 seconds at labor costs of € 45, -/hour.

Without considering the higher efficiency of our milling disc we are already saving here more than € 800, - just because of the lower tool costs and the avoided tool changing times.



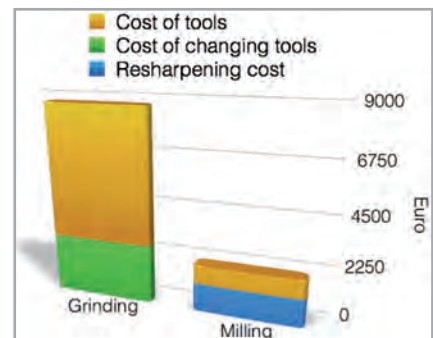
Cost comparison milling/grinding for 300 hours\* with aluminum

### Milling rings can be resharpener 5 to 7 times

After an operating time of up to 500 hours\* our milling rings can be resharpener 5-7 times.

This improves our cost calculation significantly. The list price for resharpener a 116 mm milling ring is € 258, -.

This results in a total service life of 1500 hours\* (300 hours and 5 resharpener) with potential savings of more than EUR 6.000, - without even considering the higher efficiency of a milling disc.



Cost comparison milling/grinding for 1,500 hours\* with aluminum

### Occupational health

Our milling discs and double-sided milling discs with a diameter of 116 and 125 mm have been certified by MPA Hannover according to EN 847-1.

The certification is valid for speeds up to 13,000 rpm.

The issued certificate has the number Z-13225/14.

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## Milling rings

### Milling rings - for bevelling and scrubbing



Profile of a 116 mm milling ring

These are available in diameters of 70, 116 and 125 mm and are used for bevelling, leveling of welds and general scrubbing. Suitable materials are all non-ferrous metals, carbon/fiberglass, plastics and wood.

Each material requires a unique tooth profile. You may use an aluminum milling ring for other materials as well, but with limited performance.

Our standard product range is designed for aluminum and if you need milling rings for other materials please contact us.

#### Base support

The base support *Universal* has a bore diameter of 22.23 mm (7/8") and fits to all electrical and pneumatical grinders with or without mounting flange depending on the type. It is supplied with a countersunk screw to fit on pneumatic turbo-grinders.

With a base support M 14 the milling rings may be mounted to many angle grinder with a M 14 thread not requiring an additional mounting flange.



Milling ring set: Consisting of the milling ring, the reusable transport box, the base support and the retainer nut

#### Overview table

Item number	Designation	Weight
20,001,0,070	Milling ring 70 mm - Z36/25°-Alu	0,3 kg
20,001,0,116	Milling ring 116 mm - Z55/38°-Alu	0,6 kg
20,001,0,125	Milling ring 125 mm - Z55/38°-Alu	0,8 kg
29,020,0,070	Base support milling ring 70 mm/M 14	0,05 kg
29,020,1,070	Base support milling ring 70 mm/3/8"	0,05 kg
29,020,0,116	Base support milling ring 116-125 mm/M 14	0,1 kg
29,020,1,116	Base support milling ring 116-125 mm/Universal	0,1 kg
29,000,0,002	Retainer nut 116-125 mm	0,05 kg
29,000,0,004	Retainer nut 70 mm/M14	0,02 kg
29,000,0,003	Countersunk bolt M8x35 zinc coated GTG21	0,1 kg
29,000,0,001	Reusable transport box	0,05 kg

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## Milling rings – Double-sided milling rings

### Milling ring sets

Our sets contain a milling ring with the relevant diameter, the base support (M 14 or Universal), the retainer nut and the reusable transport box.

Item number	Designation	Base support
20,002,0,070	Set milling ring 70 mm - Z36/25°-Alu M14	M 14
20,002,0,116	Set milling ring 116 mm - Z55/38°-Alu M14	M 14
20,002,0,125	Set milling ring 125 mm - Z55/38°-Alu M14	M 14
20,003,0,116	Set milling ring 116 mm - Z55/38°-Alu Universal	Universal (22,23 mm)
20,003,0,125	Set milling ring 125 mm - Z55/38°-Alu Universal	Universal (22,23 mm)

### Resharpener

Our milling rings may be resharpened 5-7 times.

Item number	Designation
21,001,0,070	Resharpener milling ring 70 mm - Alu
21,001,0,116	Resharpener milling ring 116 mm - Alu
21,001,0,125	Resharpener milling ring 125 mm - Z55/38°/Alu

### Double-sided milling rings - weld root openers

These are available in diameters of 70, 116 and 125 mm and are used for opening butt- and fillet welds. Suitable materials are all non-ferrous metals, carbon/ fiberglass, plastics and wood.

Each material requires a unique tooth profile. You may use an aluminum milling ring for other materials as well, but with limited performance.

Our standard product range is designed for aluminum and if you need milling rings for other materials please contact us.



Profile of a double-sided milling ring 116 mm for aluminum

### Base support

The base support *Universal* has a bore diameter of 22.23 mm (7/8") and fits to all electrical and pneumatic grinders with or without mounting flange depending on the type. It is supplied with a countersunk screw to fit on pneumatic turbo-grinders.

With a base support M 14 the milling rings may be mounted to many angle grinder with a M 14 thread not requiring an additional mounting flange.

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## Double-sided milling rings

### Overview table

Item number	Designation	Weight
25,001,0,070	Double-sided milling ring (weld root opener) 70 mm - Z36/25°-Alu	0,4 kg
25,001,0,116	Double-sided milling ring (weld root opener) 116 mm - Z55/30°-Alu	0,7 kg
25,001,0,125	Double-sided milling ring (weld root opener) 125 mm - Z59/30°-Alu	0,9 kg
29,025,0,070	Base support milling ring 70 mm/M 14	0,05 kg
29,025,1,116	Base support milling ring 116-125 mm/Universal	0,1 kg
29,025,0,116	Base support milling ring 116-125 mm/M 14	0,1 kg
29,000,0,002	Retainer nut 116-125 mm	0,05 kg
29,000,0,004	Retainer nut 70 mm/M14	0,02 kg
29,000,0,003	Countersunk bolt M8x35 verzinkt GTG21	0,1 kg
29,000,0,001	Reusable transport box	0,05 kg

### Double-sided milling ring (weld root opener) sets

Our sets contain a double-sided milling ring with the relevant diameter, the base support (M 14 or Universal), the retainer nut and the reusable transport box.

Item number	Designation	Base support
25,002,0,070	Set double-sided milling ring 70 mm - Z36/25°-Alu/M14	M 14
25,002,0,116	Set double-sided milling ring 116 mm - Z55/30°-Alu/M14	M 14
25,002,0,125	Set double-sided milling ring 125 mm - Z59/30°-Alu/M14	M 14
25,003,0,116	Set double-sided milling ring 116 mm - Z55/30°-Alu/Universal	Universal (22,23 mm)
25,003,0,125	Set double-sided milling ring 125 mm - Z59/30°-Alu/Universal	Universal (22,23 mm)

### Resharpener

Our double-sided milling rings may be resharpened 5-7 times.

Item number	Designation
26,001,0,070	Resharpener double-sided milling ring 116 mm Z55/Alu
26,001,0,116	Resharpener double-sided milling ring 125 mm Z59/Alu
26,001,0,125	Resharpener double-sided milling ring 70 mm Z36/Alu

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