

# MARKING AND CLEANING TOOLS



CLAMPING. SCREWING. LOCKING.



Catalogue 2015/2016

## WE GENERATE EXCITEMENT

Since its founding by Andreas Maier in 1890, our company has lived through many exciting times. Today we are the leading manufacturer in Europe, supplying over 5,000 different products from the fields of clamping, hand tools and locks. With this extensive product range we can meet all of our customers' needs and requirements. But providing optimal quality means meeting the challenges at all levels: Expert consultation, modern team organisation, individual solutions (including special developments), flexibility in response to changing conditions, etc. And we ourselves find this so exciting that we look forward every day to shaping the market together with our employees and our customers – both now and in the future. That is something you can count on.

### COMPANY HISTORY

- 1890** Company founded as a lock manufacturer by Andreas Maier.
- 1920** Product range extended to include spanners.
- 1928** Production line assembly of „Fellbach locks“.
- 1951** AMF introduces clamping elements and diversifies into workpiece and tool clamping technology.
- 1965** Toggle clamps extend the AMF product range. AMF catalogues are now printed in ten languages.
- 1975** Further specialisation into hydraulic clamping technology.
- 1982** Clamping and fixture systems round off AMF's clamping expertise.
- 1996** AMF team organisation in all sectors of the business. Quality management with certification to ISO 9001.
- 2001** AMF Service Guarantee for all products.
- 2004** Introduction of the ZPS zero-point clamping system.
- 2007** The magnetic clamping technology extends the AMF product range.
- 2009** Development and marketing of AMF Vacuum clamping technology
- 2012** Marking and cleaning tools included in the AMF product range.



### MANAGING DIRECTORS

> Johannes Maier  
Volker Göbel



### THE AMF SERVICE GUARANTEE

> Assuredly on the way to the top

#### 5 Individual development

And if the product you need doesn't exist?  
Just ask us: We will find the best solution for you – whether it is a special version or a completely new development.

#### 4 Warranty

We stand by our high quality standards. We handle customer complaints very liberally and without red tape – whenever possible even after the end of the warranty period.

#### 3 Guaranteed quality standard

AMF stands for manufacturing in-house with the utmost care. A tradition we have upheld since 1890 – and naturally for many years now with a modern quality management system to ISO 9001.

#### 2 Short delivery times

AMF's finished goods inventory with over 5,000 items guarantees a delivery readiness of 98%. You can also count on each warehouse item you order being shipped to you on the same day.

#### 1 Service from genuine experts

Different tasks, different solutions. In AMF's professional product range, you can find the right solution quickly and reliably: either from your local dealer or with help from the specialists in our teams. A phone call is all it takes.

#### E Made in Germany

It goes without saying that our range of products is developed and manufactured by our team of employees in Germany.

### PRODUCTS ON THE COVER

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AMF-Cleaner Stick No. 1520CS, page 25 · AMF-Cleaner Ball No. 1510CBVC, page 23



## THE MOST IMPORTANT THING ABOUT „AMF MARKING TOOLS“

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### AMF-MARKER

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### AMF-WRITER

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### AMF-CLEANER, CLEAN-CASE

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### AMF-CLEANER, BALL AND STICK DESIGN

23 - 26



Subject to technical alterations.



SKALENEINSTELLUNG-6 Z--1

|                  |                          |             |
|------------------|--------------------------|-------------|
| BESTELL-NR 17475 | AMF-WRITER, EXTRA LARGE, | NADEL 60R10 |
| BESTELL-NR 17418 | AMF-WRITER, LARGE,       | NADEL 90R10 |
| BESTELL-NR 17426 | AMF-WRITER, LARGE,       | NADEL 90R05 |
| BESTELL-NR 17434 | AMF-WRITER, MEDIUM,      | NADEL 90R10 |
| BESTELL-NR 17442 | AMF-WRITER, MEDIUM,      | NADEL 90R05 |
| BESTELL-NR 17459 | AMF-WRITER, SMALL,       | NADEL 90R05 |
| BESTELL-NR 17467 | AMF-WRITER, SMALL,       | NADEL 90R03 |

# AMF MARKING TOOLS

## AND YOUR MACHINE WILL MARK ECONOMICALLY.

The AMF-Writers and AMF-Markers are tools for the permanent marking of workpieces. They are preferably clamped in collets and Weldon chucks and mounted in the machine spindle of a CNC machine.

Marking is accomplished through a combination of material compression and displacement, which we call „drumming“. That means, the marking is made using a special needle with an extremely hard ball. The tool works both with and without spindle rotation.

Thanks to the special design and very high quality guides, this tool can provide an even and high-quality marking without height adjustment by the spindle, for smooth and rough surfaces that can be uneven by between 3 and 7 mm. The adaptation to different materials, material hardness and implementation of different marking depths is infinitely adjustable.

This tool is particularly economical thanks to the low acquisition costs, long service life and tremendous time savings.

### YOUR BENEFITS AT A GLANCE:

- > the surface is not weakened or damaged, but is compressed and thus strengthened
- > high marking speeds are possible
- > high wear resistance and thus long service life
- > also suitable for thin-walled workpieces
- > no burrs appear on the marking line
- > high-quality type face
- > unevenness of the workpiece is compensated for (see Fig. 1)
- > also suitable for marking round surfaces (up to 15°)
- > depending on the design, it is possible to mark surfaces with a hardness of up to 57 HRC
- > no generation of noise

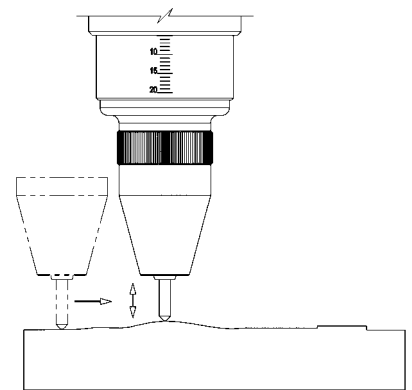


Fig. 1 Uneven workpiece surface

### PRODUCT OVERVIEW AMF-MARKER



## ARE YOU PRODUCING YET OR STILL LABELLING?

### THE CALCULATION IS QUITE SIMPLE!

Through use of the AMF marking tools, you demonstrably reduce your marking time in the machining centre by over 75%.

You avoid long times for marking, and your machine can already work on the next job - so you save money.

Take the time and simply calculate your savings potential with the AMF marking tool.

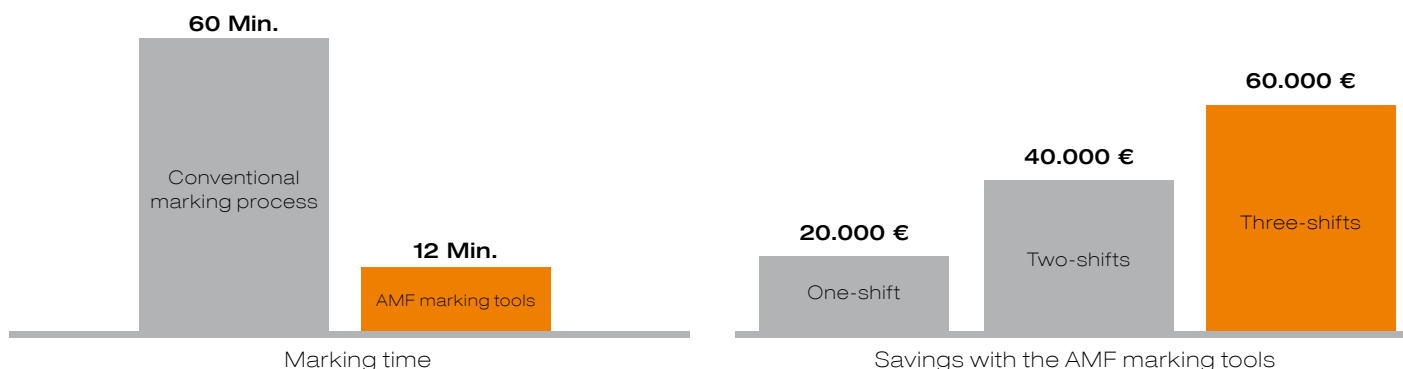
#### SAMPLE CUSTOMER CALCULATION BEFORE AND AFTER USE OF THE AMF MARKING TOOL:

| Procedure                                     | Conventional marking process | Marking with the AMF marking tool |
|---|------------------------------|-----------------------------------|
| Machine costs (in €/hr)                       | 100                          | 100                               |
| Number of markings per shift (8 hr)           | 60                           | 60                                |
| Time per marking procedure (in s)             | 60                           | 12                                |
| Time per marking procedure per shift (in min) | 60                           | 12                                |
| Costs for marking per shift                   | 100,00 €                     | 20,00 €                           |
| Costs for marking per year (250 working days) | 25.000,00 €                  | 5.000,00 €                        |
| Annual savings per shift                      | 20.000,00 €                  |                                   |

#### DRASTICALLY REDUCED MARKING TIMES GUARANTEE YOU WILL EXPERIENCE A RAPID RATIONALISATION EFFECT

If previously 60 minutes had to be invested per shift for 60 markings in the machining centre, you reduce the pure marking time to 12 minutes through use of the AMF marking tool. Through the automated exchange of the workpiece and the ability of the tool to mark quickly, you achieve savings consistently.

The savings in our customer example of €60,000 per year, for three-shift production utilisation, guarantees rapid amortisation of the invested amounts of approx. €1,600 for an AMF-Writer Extra Large.





## AMF MARKING TOOLS - AND THE PERFECT NEEDLE!

The heart of the AMF tools and the guarantee for a perfect written type face is the elaborately produced needle. This permits marking through a combination of material compression and displacement, which we call „drumming“. That means, the marking is generated by the rounded point, which we also call a „ball“. The optimal radius of these „balls“ varies, depending on the material to be labelled, the breadth and depth of the lines and print size. Therefore, AMF carries several designs of the needle in order to ensure the best marking results.

The design of the needle is classified by the angle, radius and eccentricity of the point. This means that a needle of design 90R10Ex01 has an angle of 90° at the tip of the needle and a radius of 1.0 mm as well as 0.1 mm eccentricity; a needle of design 90R05Ex00 would accordingly have an angle 90°, a radius of 0.5 mm as well as 0.0 mm eccentricity, i.e. it is a centric needle.

We are happy to assist you in the search for the optimal needle for your application.



Eccentric needle of the new AMF-Marker



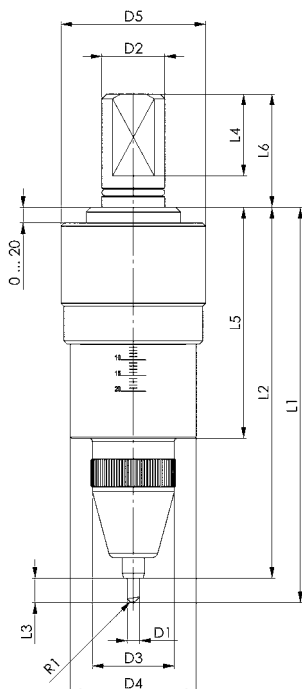
## No. 1550MXL

### AMF Marker Extra Large

Marking tool, suitable for 20 mm collets and Weldon holders (Weldon holders only when using the function check).

Marking needles are not included.

**NEW!**



| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | D4<br>[mm] | D5<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | L6<br>[mm] | Weight<br>[g] |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------|
| 548180    | 4          | 20         | 26         | 40         | 46         | 125,5      | 118        | 7,5        | 26         | 74         | 36         | 326           |

### Application:

This tool is especially suitable for marking uneven or rough surfaces with a hardness of up to 50 HRC with a large font and wide line thickness. Workpiece unevenness of up to 7 mm is compensated for.

#### With eccentric needle:

External cooling is recommended during the marking.

The marking speed as well as the spindle speed used can be adapted to the marking according to your own individual wishes and requirements. Select between 3 marking needles: 0.1 mm / 0.2 mm / 0.3 mm eccentricity.

In general: The greater the eccentricity and the higher the spindle speed (or the lower the feed rate), the deeper is the marking.

The following rule of thumb applies for a clean text:

Feed (mm/min) x 10 = Spindle speed (rpm)

#### With centric needle:

External cooling is not necessary during the marking.

The maximum marking speed: maximum feed rate.

Select between 2 marking needles: 0.5 mm / 1 mm radius at the needle tip (R1).

### Features:

The AMF Marker Extra Large has reinforced guides and a broader special needle. The setting is made continuously through a knurled nut and can be determined by means of a 0-20 scale. Due to this setting capability with the knurled nut, the tool is optimally suited for small and medium lot sizes. The tool is held preferably in 20 mm collets or Weldon holders. When using the function check, use of Weldon holders is mandatory.

### Advantage:

- Lightning-fast needle change: the marking needle is removed and changed with the aid of a pliers. This is an advantage even when the needle is worn or broken off.
- More distinct marking through use of an eccentric needle: with the AMF Marker you have the ability to select between conventional rolling and rotary swaging. In rotary swaging, the material is compressed, as well as forced sideways, and „swaged“ by the rotation of the marking needle. This requires use of an eccentrically ground needle which, in combination with spindle rotation, creates more distinct marking than conventional rolling.
- Function check for use in automation: An integrated function check makes the AMF Marker suitable for use in automation. The query takes place via a pneumatic dynamic pressure query. For this purpose, the tool machine needs an internal coolant supply (ICS) and freely, acknowledgeable M command.
- Maximum flexibility thanks to lightning-fast changes between various needle types
- Extremely high wear resistance
- Suitable for marking rough and uneven materials
- Easy adjustment by means of a knurled nut (possible also when clamped)

## No. 1550MXLN

### Marking needle

fits AMF Marker Extra Large No. 1550MXL.

**NEW!**



| Order no. | Needle          | D1<br>[mm] | L1<br>[mm] | L2<br>[mm] | R1<br>[mm] | Weight<br>[g] |
|-----------|-----------------|------------|------------|------------|------------|---------------|
| 550468    | MXLN-90R05 Ex00 | 4          | 47         | 0,0        | 0,5        | 8             |
| 550469    | MXLN-90R10 Ex00 | 4          | 47         | 0,0        | 1,0        | 8             |
| 550470    | MXLN-90R10 Ex01 | 4          | 47         | 0,1        | 1,0        | 8             |
| 550471    | MXLN-90R10 Ex02 | 4          | 47         | 0,2        | 1,0        | 8             |
| 550472    | MXLN-90R10 Ex03 | 4          | 47         | 0,3        | 1,0        | 8             |

### Features:

#### Needles for rotary swaging:

MXLN-90R10 Ex01: Radius at the needle tip 1.0 mm, eccentricity 0.1 mm

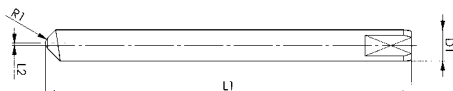
MXLN-90R10 Ex02: Radius at the needle tip 1.0 mm, eccentricity 0.2 mm

MXLN-90R10 Ex03: Radius at the needle tip 1.0 mm, eccentricity 0.3 mm

#### Needles for rolling:

MXLN-90R10 Ex00: Radius at the needle tip 1.0 mm, eccentricity 0.0 mm

MXLN-90R05 Ex00: Radius at the needle tip 0.5 mm, eccentricity 0.0 mm



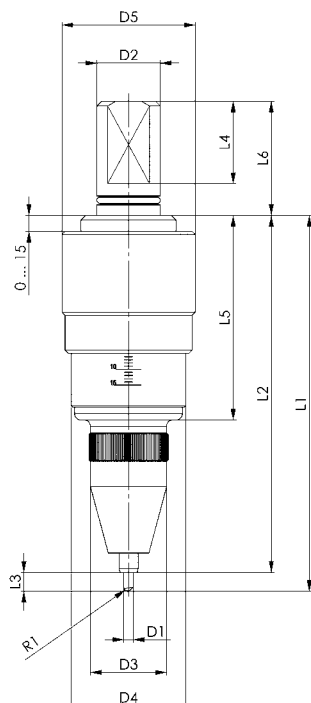


## No. 1560ML

### AMF Marker Large

Marking tool, suitable for 20 mm collets and Weldon holders (Weldon holders only when using the function check).  
Marking needles are not included.

**NEW!**



| Order no. | D1   | D2   | D3   | D4   | D5   | L1   | L2   | L3   | L4   | L5   | L6   | Weight |
|-----------|------|------|------|------|------|------|------|------|------|------|------|--------|
|           | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [g]    |
| 550223    | 3    | 20   | 24   | 36   | 42   | 119  | 113  | 6    | 26   | 65   | 36   | 263    |

### Application:

This tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.  
Workpiece unevenness of up to 6 mm is compensated for.

#### With an eccentric needle:

External cooling is recommended during the marking.  
The marking speed as well as the spindle speed used can be adapted to the marking according to your own individual wishes and requirements.  
Select between 3 marking needles: 0.1 mm / 0.2 mm / 0.3 mm eccentricity.  
In general: The greater the eccentricity and the higher the spindle speed (or the lower the feed rate), the deeper is the marking.  
The following rule of thumb applies for a clean text:  
Feed (mm/min) x 10 = Spindle speed (rpm)

#### With centric needle:

External cooling is not necessary during the marking.  
The maximum marking speed: maximum feed rate.  
Select between 2 marking needles: 0.5 mm / 1 mm radius at the needle tip (R1).  
- Needle MLN-90R10 Ex00 is optimal for marking with a large font (font size legible from 5 mm) and wide line thickness on surfaces with a hardness of up to 50 HRC.  
- Needle MLN-90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium, but deeper line thickness on surfaces with a hardness of up to 55 HRC.

### Features:

The AMF Marker Large has high-quality guides and a robust special needle. The setting is made continuously through a knurled nut and can be determined by means of a 0-15 scale. Due to this setting capability with the knurled nut, the tool is optimally suited for small and medium lot sizes. The tool is held preferably in 20 mm collets or Weldon holders.  
When using the function check, use of Weldon holders is mandatory.

### Advantage:

- Lightning-fast needle change: the marking needle is removed and changed with the aid of a pliers. This is an advantage even when the needle is worn or broken off.
- More distinct marking through use of an eccentric needle: with the AMF Marker you have the ability to select between conventional rolling and rotary swaging. In rotary swaging, the material is compressed, as well as forced sideways, and „swaged“ by the rotation of the marking needle. This requires use of an eccentrically ground needle which, in combination with spindle rotation, creates more distinct marking than conventional rolling.
- Function check for use in automation: An integrated function check makes the AMF Marker suitable for use in automation. The query takes place via a pneumatic dynamic pressure query. For this purpose, the tool machine needs an internal coolant supply (ICS) and freely, acknowledgeable M command.
- Maximum flexibility thanks to lightning-fast changes between various needle types
- Extremely high wear resistance
- Suitable for marking a wide variety of materials
- Easy adjustment by means of a knurled nut (possible also when clamped)

## No. 1560MLN

### Marking needle

fits AMF Marker Large No. 1560ML.

**NEW!**



| Order no. | Needle         | D1   | L1   | L2   | R1   | Weight |
|-----------|----------------|------|------|------|------|--------|
|           |                | [mm] | [mm] | [mm] | [mm] | [g]    |
| 550473    | MLN-90R05 Ex00 | 3    | 53,5 | 0,0  | 0,5  | 5      |
| 550474    | MLN-90R10 Ex00 | 3    | 53,5 | 0,0  | 1,0  | 5      |
| 550475    | MLN-90R10 Ex01 | 3    | 53,5 | 0,1  | 1,0  | 5      |
| 550476    | MLN-90R10 Ex02 | 3    | 53,5 | 0,2  | 1,0  | 5      |
| 550477    | MLN-90R10 Ex03 | 3    | 53,5 | 0,3  | 1,0  | 5      |

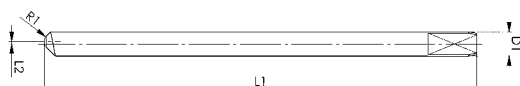
### Features:

#### Needles for rotary swaging:

MLN-90R10 Ex01: Radius at the needle tip 1.0 mm, eccentricity 0.1 mm  
MLN-90R10 Ex02: Radius at the needle tip 1.0 mm, eccentricity 0.2 mm  
MLN-90R10 Ex03: Radius at the needle tip 1.0 mm, eccentricity 0.3 mm

#### Needles for rolling:

MLN-90R10 Ex00: Radius at the needle tip 1.0 mm, eccentricity 0.0 mm  
MLN-90R05 Ex00: Radius at the needle tip 0.5 mm, eccentricity 0.0 mm

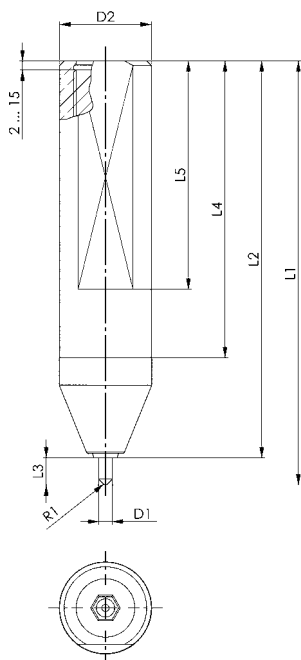


## No. 1570MM

### AMF Marker Medium

Marking tool, suitable for 20 mm collets and Weldon holders.  
Marking needles are not included.

**NEW!**



| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | Weight<br>[g] |
|-----------|------------|------------|------------|------------|------------|------------|------------|---------------|
| 550224    | 3          | 20         | 93         | 87         | 6          | 65         | 50         | 78            |

### Application:

The tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.

Workpiece unevenness of up to 6 mm is compensated for.

Two needle types are available:

- Needle MMN-90R10 Ex00 is optimal for marking with a large font (font size legible from 5 mm) and wide line thickness on surfaces with a hardness of up to 50 HRC.
- Needle MMN-90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium, but deeper line thickness on surfaces with a hardness of up to 55 HRC.

The maximum marking speed depends on the feed rate of the machine.

### Features:

The AMF Marker Medium has high-quality guides and a robust special needle. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is held preferably in 20 mm collets or Weldon holders.

### Advantage:

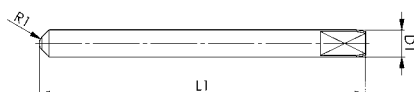
- Lightning-fast needle change: the marking needle is removed and changed with the aid of a pliers. This is an advantage even when the needle is worn or broken off.
- Maximum flexibility thanks to lightning-fast changes between various needle types
- High wear resistance
- Suitable for marking a wide variety of materials
- Compact design

## No. 1570MMN

### Marking needle

fits AMF Marker Medium No. 1570MM.

**NEW!**



| Order no. | Needle         | D1<br>[mm] | L1<br>[mm] | R1<br>[mm] | Weight<br>[g] |
|-----------|----------------|------------|------------|------------|---------------|
| 550478    | MMN-90R05 Ex00 | 3          | 36         | 0,5        | 3             |
| 550479    | MMN-90R10 Ex00 | 3          | 36         | 1,0        | 3             |

### Advantage:

#### Needles for rolling:

MMN-90R10 Ex00: Radius at the needle tip 1.0 mm, eccentricity 0.0 mm

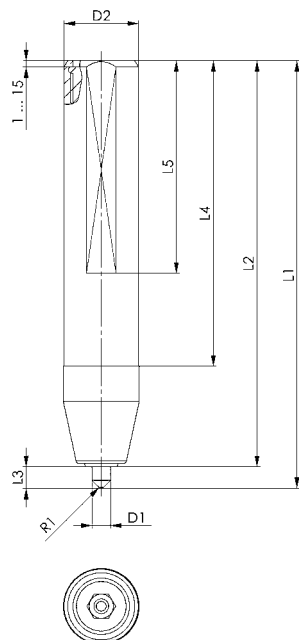
MMN-90R05 Ex00: Radius at the needle tip 0.5 mm, eccentricity 0.0 mm

## No. 1580MS

### AMF Marker Small

Marking tool, suitable for 12 mm collets and Weldon holders.  
Marking needles are not included.

**NEW!**



| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | Weight<br>[g] |
|-----------|------------|------------|------------|------------|------------|------------|------------|---------------|
| 550225    | 3          | 12         | 69         | 66         | 3,5        | 49         | 34         | 21            |

### Application:

The tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.

Workpiece unevenness of up to 3 mm is compensated for.

Two needle types are available:

- Needle MSN-90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium line thickness on surfaces with a hardness of up to 55 HRC.
- Needle MSN-90R03 Ex00 is optimal for marking with a small font (font size legible from 1.5 mm) and small, but deeper line thickness on surfaces with a hardness of up to 57 HRC.

The maximum marking speed depends on the feed rate of the machine.

### Features:

The AMF Marker Small has high-quality guides and a robust special needle. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is preferably received into 12 mm collets or Weldon holders.

### Advantage:

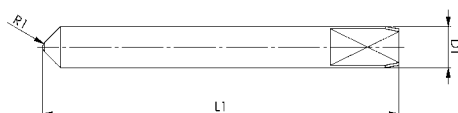
- Lightning-fast needle change: the marking needle is removed and changed with the aid of a pliers. This is an advantage even when the needle is worn or broken off.
- Maximum flexibility thanks to lightning-fast changes between various needle types
- High wear resistance
- Suitable for marking a wide variety of materials
- Very compact design

## No. 1580MSN

### Marking needle

fits AMF Marker Small No. 1580MS.

**NEW!**



| Order no. | Needle         | D1<br>[mm] | L1<br>[mm] | R1<br>[mm] | Weight<br>[g] |
|-----------|----------------|------------|------------|------------|---------------|
| 550480    | MSN-90R05 Ex00 | 3          | 36         | 0,5        | 2             |
| 550481    | MSN-90R03 Ex00 | 3          | 36         | 0,3        | 2             |

### Features:

#### Needles for rolling:

MSN-90R05 Ex00: Radius at the needle tip 0.5 mm, eccentricity 0.0 mm

MSN-90R03 Ex00: Radius at the needle tip 0.3 mm, eccentricity 0.0 mm



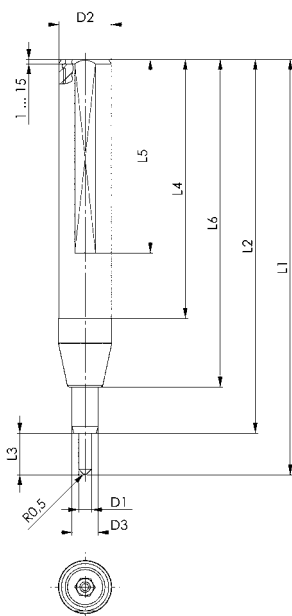
## No. 1590MSL

### AMF Marker Slimline

Marking tool with long, narrow tip, suitable for 12 mm collets and Weldon holders.

Marking needles are not included.

**NEW!**



| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | L6<br>[mm] | Weight<br>[g] |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------|
| 550226    | 3          | 12         | 6          | 95         | 86         | 9,5        | 59         | 44         | 75         | 29            |

### Application:

The tool is especially well-suited for marking in a very confined spaces. A wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc. can be marked. Workpiece unevenness of up to 9 mm is compensated for.

Two needle types are available:

- Needle MSLN-90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium line thickness on surfaces with a hardness of up to 55 HRC.
- Needle MSLN-90R03 Ex00 is optimal for marking with a small font (font size legible from 1.5 mm) and small, but deeper line thickness on surfaces with a hardness of up to 57 HRC.

The maximum marking speed depends on the feed rate of the machine.

### Features:

The AMF Marker Slimline has high-quality guides and a robust special needle. It has an outstanding narrow tip. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is preferably received into 12 mm collets or Weldon holders.

### Advantage:

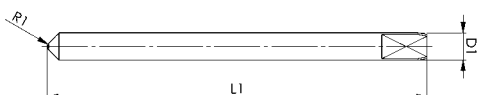
- Lightning-fast needle change: the marking needle is removed and changed with the aid of a needle. This is an advantage even when the needle is worn or broken off.
- Maximum flexibility thanks to lightning-fast changes between various needle types
- High wear resistance
- Suitable for marking a wide variety of materials
- Very compact design
- Long, narrow tip for use in confined spaces (e.g. in grooves)

## No. 1590MSLN

### Marking needle

fits AMF Marker Slimline No. 1580MSL.

**NEW!**



| Order no. | Needle          | D1<br>[mm] | L1<br>[mm] | R1<br>[mm] | Weight<br>[g] |
|-----------|-----------------|------------|------------|------------|---------------|
| 550482    | MSLN-90R05 Ex00 | 3          | 42         | 0,5        | 4             |
| 550483    | MSLN-90R03 Ex00 | 3          | 42         | 0,3        | 4             |

### Features:

#### Needles for rolling:

MSLN-90R05 Ex00: Radius at the needle tip 0.5 mm, eccentricity 0.0 mm

MSLN-90R03 Ex00: Radius at the needle tip 0.3 mm, eccentricity 0.0 mm



## No. 1400WXL

### AMF-Writer Extra Large

Marking tool,  
fits 20 mm collets and Weldon holders.

| Order no. | Needle     | R1<br>[mm] | Speed<br>[1/min] | Max. marking speed<br>[m/min] | Weight<br>[g] |
|-----------|------------|------------|------------------|-------------------------------|---------------|
| 17475     | 60R10 Ex00 | 1,0        | 0-300            | 200                           | 318           |

#### Application:

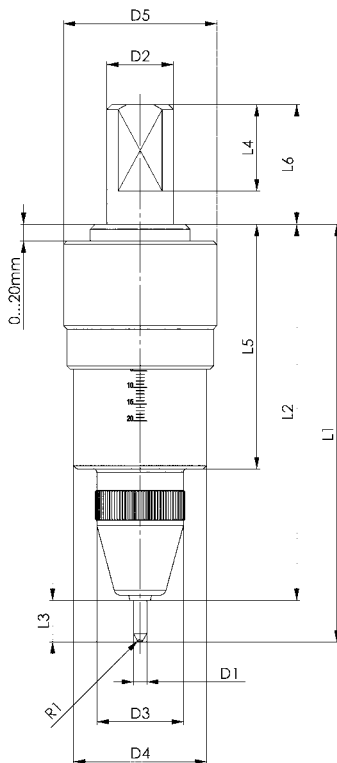
This tool is especially suitable for marking uneven or rough surfaces with a large font (font size legible from 5 mm) and wide line thickness with a hardness of up to 50 HRC. Workpiece unevenness of up to 7 mm is compensated for. The marking speed depends on the feed rate of the machine and is independent of the spindle speed. The workpiece surface can be machined either dry or wet.

#### Features:

The AMF-Writer Extra Large has reinforced guides and a broader special needle. The setting is made continuously through a knurled nut and can be determined by means of a scale. Due to this setting capability with the knurled nut, the tool is optimally suited for small and medium lot sizes. The tool is held preferably in 20 mm collets or Weldon holders.

#### Advantage:

- Extremely high wear resistance
- Suitable for marking rough and uneven materials
- Easy adjustment by means of a knurled nut (possible also when clamped)



#### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | D4<br>[mm] | D5<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | L6<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 17475     | 4          | 20         | 26         | 40         | 46         | 126        | 113        | 13         | 26         | 74         | 36         |



## No. 1410WL

### AMF-Writer Large

Marking tool,  
fits 20 mm collets and Weldon holders.

| Order no. | Needle     | R1<br>[mm] | Speed<br>[1/min] | Max. marking speed<br>[m/min] | Weight<br>[g] |
|-----------|------------|------------|------------------|-------------------------------|---------------|
| 17418     | 90R10 Ex00 | 1,0        | 0-300            | 200                           | 243           |
| 17426     | 90R05 Ex00 | 0,5        | 0-300            | 200                           | 243           |

### Application:

The tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.

Two needle types are available.

- Needle 90R10 Ex00 is optimal for marking with a large font (font size legible from 5 mm) and wide line thickness on surfaces with a hardness of up to 50 HRC.

- Needle 90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium, but deeper line thickness on surfaces with a hardness of up to 55 HRC.

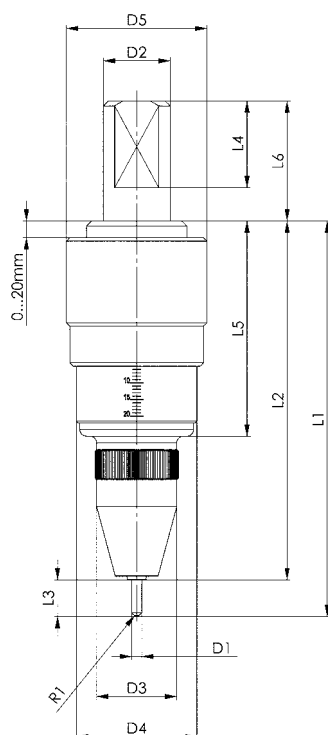
Workpiece unevenness of up to 5 mm is compensated for. The marking speed depends on the feed rate of the machine and is independent of the spindle speed. The workpiece surface can be machined either dry or wet.

### Features:

The AMF-Writer Large has high-quality guides and a robust special needle. The setting is made continuously through a knurled nut and can be determined by means of a scale. Due to this setting capability with the knurled nut, the tool is optimally suited for small and medium lot sizes. The tool is held preferably in 20 mm collets or Weldon holders.

### Advantage:

- High wear resistance
- Suitable for marking a wide variety of materials
- Easy adjustment by means of a knurled nut (possible also when clamped)



### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | D4<br>[mm] | D5<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | L6<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 17418     | 3          | 20         | 24         | 36         | 42         | 119        | 108        | 11         | 26         | 65         | 36         |
| 17426     | 3          | 20         | 24         | 36         | 42         | 119        | 108        | 11         | 26         | 65         | 36         |

## No. 1420WM

### AMF-Writer Medium

Marking tool,  
fits 20 mm collets and Weldon holders.



| Order no. | Needle     | R1<br>[mm] | Speed<br>[1/min] | Max. marking speed<br>[m/min] | Weight<br>[g] |
|-----------|------------|------------|------------------|-------------------------------|---------------|
| 17434     | 90R10 Ex00 | 1,0        | 0-300            | 200                           | 78            |
| 17442     | 90R05 Ex00 | 0,5        | 0-300            | 200                           | 78            |

### Application:

The tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.

Two needle types are available.

- Needle 90R10 Ex00 is optimal for marking with a large font (font size legible from 5 mm) and wide line thickness on surfaces with a hardness of up to 50 HRC.

- Needle 90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium, but deeper line thickness on surfaces with a hardness of up to 55 HRC.

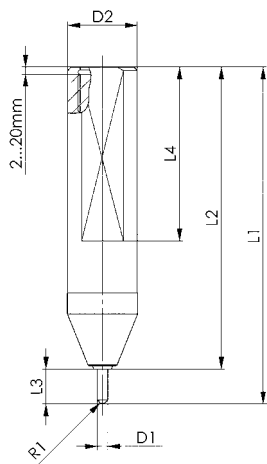
Workpiece unevenness of up to 5 mm is compensated for. The marking speed depends on the feed rate of the machine and is independent of the spindle speed. The workpiece surface can be machined either dry or wet.

### Features:

The AMF-Writer Medium has high-quality guides and a robust special needle. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is held preferably in 20 mm collets or Weldon holders.

### Advantage:

- High wear resistance
- Suitable for marking a wide variety of materials
- Compact design



### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|
| 17434     | 3          | 20         | 97         | 87         | 10         | 50         |
| 17442     | 3          | 20         | 97         | 87         | 10         | 50         |

### Examples of marking on various materials:

1. stainless steel 2. aluminium 3. plastics

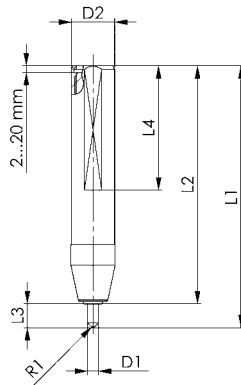


Subject to technical alterations.

## No. 1430WS

### AMF-Writer Small

Marking tool,  
fits 12 mm collets and Weldon holders.



| Order no. | Needle     | R1<br>[mm] | Speed<br>[1/min] | Max. marking speed<br>[m/min] | Weight<br>[g] |
|-----------|------------|------------|------------------|-------------------------------|---------------|
| 17459     | 90R05 Ex00 | 0,5        | 0-300            | 200                           | 24            |
| 17467     | 90R03 Ex00 | 0,3        | 0-300            | 200                           | 24            |

### Application:

The tool is ideal for marking a wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc.

Two needle types are available.

- Needle 90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium line thickness on surfaces with a hardness of up to 55 HRC.
- Needle 90R03 Ex00 is optimal for marking with a small font (font size legible from 1.5 mm) and small, but deeper line thickness on surfaces with a hardness of up to 57 HRC.

Workpiece unevenness of up to 3 mm is compensated for. The marking speed depends on the feed rate of the machine and is independent of the spindle speed. The workpiece surface can be machined either dry or wet.

### Features:

The AMF-Writer Small has high-quality guides and a robust special needle. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is preferably received into 12 mm collets or Weldon holders.

### Advantage:

- High wear resistance
- Suitable for marking a wide variety of materials
- Very compact design

### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|
| 17459     | 3          | 12         | 72         | 66         | 6          | 34         |
| 17467     | 3          | 12         | 72         | 66         | 6          | 34         |



## No. 1440WSL

### AMF-Writer Slimline

Marking tool with long, narrow tip,  
fits 12 mm collets and Weldon holders.



| Order no. | Needle     | R1<br>[mm] | Speed<br>[1/min] | Max. marking speed<br>[m/min] | Weight<br>[g] |
|-----------|------------|------------|------------------|-------------------------------|---------------|
| 535146    | 90R05 Ex00 | 0,5        | 0-300            | 200                           | 28            |
| 535161    | 90R03 Ex00 | 0,3        | 0-300            | 200                           | 28            |

### Application:

The tool is especially well-suited for marking in a very confined spaces.

A wide variety of materials such as aluminium, titanium, steel, bronze, copper, brass, plastics etc. can be marked.

Two needle types are available.

- Needle 90R05 Ex00 is optimal for marking with a small font (font size legible from 2.5 mm) and medium line thickness on surfaces with a hardness of up to 55 HRC.

- Needle 90R03 Ex00 is optimal for marking with a small font (font size legible from 1.5 mm) and small, but deeper line thickness on surfaces with a hardness of up to 57 HRC.

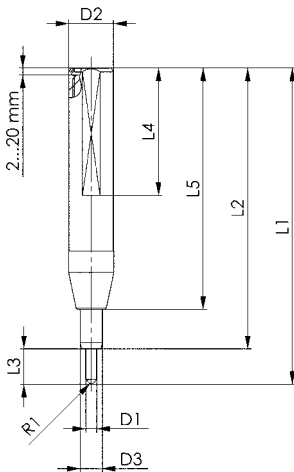
Workpiece unevenness of up to 3 mm is compensated for. The marking speed depends on the feed rate of the machine and is independent of the spindle speed. The workpiece surface can be machined either dry or wet.

### Features:

The AMF Slimline writer has high-quality guides and a robust special needle. It has an outstanding narrow tip. Setting occurs steplessly via an inside screw, which can be adjusted using a hexagon wrench. Because this tool has to be removed from the holder in order to be set, it is optimally suited for large-scale production. The tool is preferably received into 12 mm collets or Weldon holders.

### Advantage:

- High wear resistance
- Suitable for marking a wide variety of materials
- Very compact design
- Long, narrow tip for use in confined spaces (e.g. in grooves)



### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| 535146    | 3          | 12         | 6          | 85         | 76         | 9          | 34         | 65         |
| 535161    | 3          | 12         | 6          | 85         | 76         | 9          | 34         | 65         |







# AMF-CLEANER

## AND YOUR MACHINE CLEANS ITSELF

AMF-Cleaners are tools for cleaning workpieces, tools and the interior of CNC machines. They are preferably clamped in Weldon chucks and mounted in the machine spindle of a CNC machine.

AMF Cleaners use through spindle coolant or compressed air. AMF Cleaners in Stick design are available in lengths of 30, 100 and 180mm and are ideally suitable for cleaning swarf from workpieces, vices and fixtures prior to unloading the workpiece and before the next workpiece is loaded. The spindle can be static or a slow rotation may be used to improve cleaning operation.

AMF Cleaners in the Ball design are available with horizontal or vertical connection to the machine spindle and are designed for cleaning the entire interior working area of the machine tool. The user selects which nozzles to open which controls the direction and pressure of the jet. Moving and rotating the spindle under constant flow of coolant achieves excellent and systematic cleaning of the machine interior.

Our AMF-Cleaners are characterised by low acquisition costs and a long service life - their time saving will impress you.

### Your benefits at a glance:

- > repeatable, systematic and thorough cleaning
- > no aerosol pollution harmful to the health of the machine operator
- > reduction of the cleaning time
- > preserves the machine guides
- > no risk of injury due to swarf



## No. 1500CC

### AMF-Cleaner

in Clean Case.

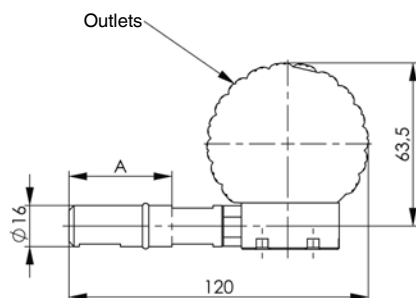
Cleaning tools for attachment to the machine spindle, fits 16 mm Weldon holders.

Components:

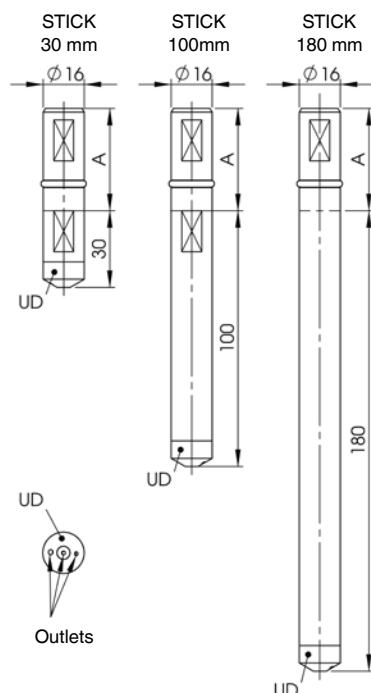
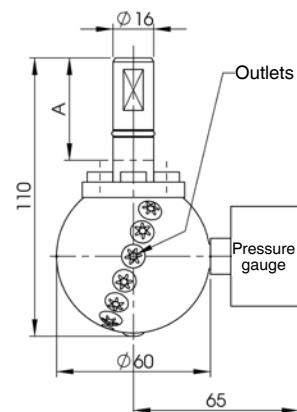
- 1 AMF Cleaner, Ball Horizontal
- 1 AMF Cleaner, Ball Vertical Control
- 1 AMF Cleaner, Stick 30 mm
- 1 AMF Cleaner, Stick 100 mm
- 1 AMF Cleaner, Stick 180 mm
- 3 multi-purpose nozzles
- 1 pressure gauge
- 1 adapter
- 1 ball joint
- 4 replacement lock screws
- 1 hexagon screwdriver

Operating Manual

#### BALL HORIZONTAL



#### BALL VERTICAL CONTROL



| Order no. | Insertion depth A<br>[mm] | Dimensions of case LxWxH | Weight<br>[g] |
|-----------|---------------------------|--------------------------|---------------|
| 17558     | 40                        | 270 x 230 x 70           | 1637          |

### Application:

#### BALL:

The cleaning range of the AMF Cleaner is 360° and can be shaped through the number of opened outlets. The horizontal version of the tool with side connection even permits cleaning of the spindle tip. The control version allows connection of a pressure gauge to monitor the condition of the pump, filter and entire supply line.

#### STICK:

This tool is essential for automation of a CNC machine.

It gives the machine the ability to mechanically clean workpieces and clamping fixtures. The effect of the AMF Cleaner is adapted to the local conditions by the selective travel to different positions with a rotating tool. Due to its shape and the different lengths, it is especially well-suited for cleaning holes, pockets, undercuts or other contours. Thanks to 3 different universal nozzles (UN), the intensity of the cleaning jet can be influenced as well.

The adapters permit 2 cleaners to be connected together and extended in order to penetrate into lower-lying working areas.

The ball joint also enables an oblique nozzle position, allowing the jet angle to be controlled. The AMF Cleaner cleans at high-speed and can be integrated into the automation cycle quickly and easily by means of a short subroutine.

### Features:

#### BALL:

|                          |                   |
|--------------------------|-------------------|
| Working range            | up to 360°        |
| KSS pressure range       | 5 to 120 bar      |
| Outlets (horizontal)     | 15                |
| Outlets (vertical)       | 14                |
| Minimum speed            | 5 rpm             |
| Maximum speed            | 100 rpm           |
| Working medium           | Cooling lubricant |
| Weight, horizontal vers. | 409 g             |
| Weight, vertical vers.   | 331 g             |

#### STICK:

|                               |                                      |
|-------------------------------|--------------------------------------|
| KSS pressure range            | 5 to 120 bar                         |
| Compressed-air pressure range | 5 to 10 bar                          |
| Outlets                       | 3                                    |
| Minimum speed                 | 30 rpm                               |
| Maximum speed                 | 400 rpm                              |
| Working medium                | Cooling lubricant,<br>Compressed air |
| Weight, vers. L=30            | 50 g                                 |
| Weight, vers. L=100           | 133 g                                |
| Weight, vers. L=180           | 208 g                                |

### Advantage:

#### BALL:

- Repeatable, systematic and thorough cleaning of the inside of the machine
- No aerosol pollution harmful to the health of the machine operator
- Reduction of cleaning time

#### STICK:

- Repeatable, systematic and thorough cleaning of the workpiece or clamping fixture
- No aerosol pollution harmful to the health of the machine operator
- Reduction of cleaning time



Subject to technical alterations.

## No. 1510CBVC

### AMF-Cleaner, Ball Vertical Control design

Cleaning tool for attachment to the machine spindle  
fits 16 mm Weldon holders.



| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | Insertion depth A<br>[mm] | max. r.p.m.<br>[1/min] | Min. KSS pressure<br>[bar] | Max. KSS pressure<br>[bar] | Weight<br>[g] |
|-----------|------------|------------|------------|---------------------------|------------------------|----------------------------|----------------------------|---------------|
| 17590     | 16         | 60         | 110        | 40                        | 100                    | 5                          | 120                        | 331           |

#### Application:

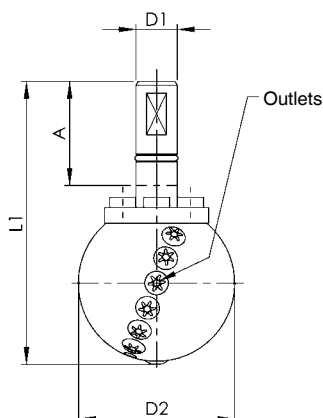
The cleaning range of the AMF Cleaner is 360° and can be shaped through the number of opened outlets. Through the optional installation of a pressure gauge, the status of the pump, filter and entire supply line can be checked.

#### Features:

Working range up to 360°  
Outlets 14  
Working medium Cooling lubricant

#### Advantage:

- Repeatable, systematic and thorough cleaning of the inside of the machine
- No aerosol pollution harmful to the health of the machine operator
- Reduction of cleaning time



## No. 1510CBH

### AMF-Cleaner, Ball Horizontal design

Cleaning tool for attachment to the machine spindle  
fits 16 mm Weldon holders.



| Order no. | D1<br>[mm] | L1<br>[mm] | L2<br>[mm] | Insertion depth A<br>[mm] | max. r.p.m.<br>[1/min] | Min. KSS pressure<br>[bar] | Max. KSS pressure<br>[bar] | Weight<br>[g] |
|-----------|------------|------------|------------|---------------------------|------------------------|----------------------------|----------------------------|---------------|
| 17582     | 16         | 120        | 64         | 40                        | 100                    | 5                          | 120                        | 409           |

#### Application:

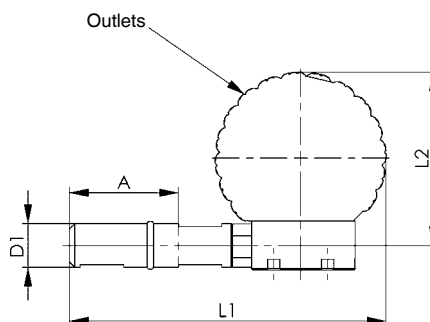
The cleaning range of the AMF Cleaner is 360° and can be shaped through the number of opened outlets. This version of the tool with side connection even permits cleaning of the spindle tip.

#### Features:

Working range up to 360°  
Outlets 15  
Working medium Cooling lubricant

#### Advantage:

- Repeatable, systematic and thorough cleaning of the inside of the machine
- No aerosol pollution harmful to the health of the machine operator
- Reduction of cleaning time



## No. 1510CZ

### Pressure gauge

Accessory for AMF Cleaner, ball design

| Order no. | D1<br>[mm] | D2<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | max. r.p.m.<br>[1/min] | Min. KSS<br>pressure<br>[bar] | Max. KSS<br>pressure<br>[bar] | Weight<br>[g] |
|-----------|------------|------------|------------|------------|------------|------------|------------------------|-------------------------------|-------------------------------|---------------|
| 17715     | 44         | G1/8       | 26         | 34         | 46         | 14         | 100                    | 5                             | 120                           | 67            |

#### Application:

The pressure gauge is screwed into the AMF Cleaner, Ball Vertical Control (CBVC) design, and serves to control the cooling lubricant pressure actually present. This is helpful for checking the necessary supply pressure of the AMF Cleaner, and the cooling lubricant pressure of the machine tool that is actually present can also be checked with this measuring tool. Based on this, conclusions can be made about the condition of the pump, filter and supply line.

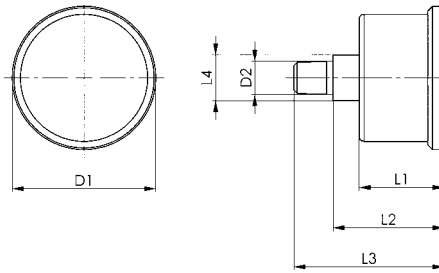
#### Features:

Working medium

Cooling lubricant

#### Advantage:

- Possibility to check the KSS pressure of the machine tool
- Pressure necessary for AMF Cleaner can be checked



Subject to technical alterations.

## No. 1520CS

### AMF-Cleaner, stick design

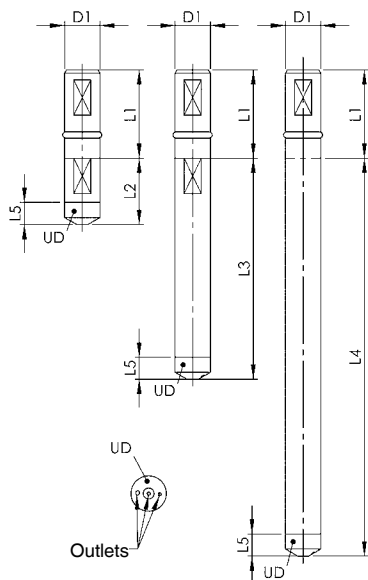
Cleaning tool for attachment to the machine spindle fits 16 mm Weldon holders.

Designs:

Order No. 17608: Short

Order No. 17616: Standard

Order No. 17624: Long



| Order no. | Pipe | D1<br>[mm] | Insertion depth L1<br>[mm] | L2<br>[mm] | L3<br>[mm] | L4<br>[mm] | Weight<br>[g] |
|-----------|------|------------|----------------------------|------------|------------|------------|---------------|
| 17608     | 30   | 16         | 40                         | 30         | -          | -          | 50            |
| 17616     | 100  | 16         | 40                         | -          | 100        | -          | 133           |
| 17624     | 180  | 16         | 40                         | -          | -          | 180        | 208           |

### Application:

This tool is essential for automation of a CNC machine. It gives the machine the ability to mechanically clean workpieces and clamping fixtures. The effect of the AMF Cleaner is adapted to the local conditions by the selective travel to different positions with a rotating tool. Due to its shape and the different lengths, it is especially suitable for cleaning holes, pockets, undercuts or other contours. Through selection from 3 different universal nozzles (UN), you can influence the intensity of the cleaning jet. The AMF Cleaner cleans at high-speed and can be integrated into the automation cycle quickly and easily by means of a short subroutine.

### Features:

|                               |                                   |
|-------------------------------|-----------------------------------|
| KSS pressure range            | 5 to 120 bar                      |
| Compressed-air pressure range | 5 to 10 bar                       |
| Outlets                       | 3                                 |
| Minimum speed                 | 30 rpm                            |
| Maximum speed                 | 400 rpm                           |
| Working medium                | Cooling lubricant, compressed air |

Put your cleaner together individually. The pipe and universal nozzle are ordered separately.

### Advantage:

- Repeatable, systematic and thorough cleaning of the workpiece or clamping fixture
- No aerosol pollution harmful to the health of the machine operator
- Reduction of cleaning time

## No. 1520CZ

### AMF-Cleaner, universal nozzles

AMF Cleaner, fits stick design.

Designs:

Order No. 17632: Low flow

Order No. 17640: Standard

Order No. 17657: High flow



| Order no. | Universal nozzle | D1<br>[mm] | L5<br>[mm] | Weight<br>[g] |
|-----------|------------------|------------|------------|---------------|
| 17632     | UD40             | 16         | 10         | 14            |
| 17640     | UD45             | 16         | 10         | 14            |
| 17657     | UD50             | 16         | 10         | 14            |



## No. 1520CZ

### Ball joint and adapter

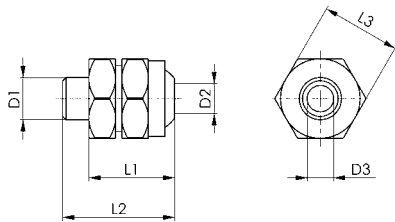
Accessory for AMF Cleaner, stick design

Order No. 17699: ball joint

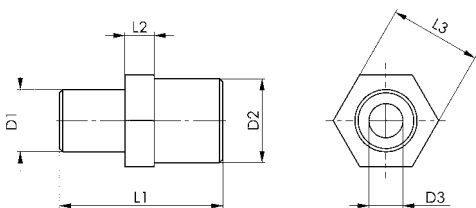
Order No. 17673: adapter



Order no. 17699: ball joint



Order no. 17673: adapter



| Order no. | max. r.p.m.<br>[1/min] | Min. KSS pressure<br>[bar] | Max. KSS pressure<br>[bar] | Min. air pressure<br>[bar] | Min. air pressure<br>[bar] | Weight<br>[g] |
|-----------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------|
| 17699     | 60                     | 5                          | 120                        | 5                          | 10                         | 66            |
| 17673     | 400                    | 5                          | 120                        | 5                          | 10                         | 13            |

### Application:

Adapter:

Adapters are used to connect 2 or more AMF Cleaners to each other. The adapter is simply screwed on instead of the universal nozzle of an AMF Cleaner. The length of the cleaning tool can thus be varied.

Ball joint:

Ball joints are used to connect movably 2 or more AMF Cleaners to each other. The universal nozzle attached to the front or an additional AMF Cleaner can be deflected up to 30 degrees through the ball joint.

Order information: To deflect an additional AMF Cleaner, the adapter is needed in addition to the ball joint.

### Features:

Working medium

Cooling lubricant, compressed air

### Advantage:

- Modular design for individual applications
- Cost savings through simple expansion possibilities

### Dimensions:

| Order no. | D1<br>[mm] | D2<br>[mm] | D3<br>[mm] | L1<br>[mm] | L2<br>[mm] | L3<br>[mm] |
|-----------|------------|------------|------------|------------|------------|------------|
| 17699     | G1/8       | G1/4       | 8          | 26         | 34         | 24         |
| 17673     | G1/8       | G1/4       | 5,2        | 25         | 4,5        | 14         |



- + Outstanding price-performance ratio
- + Drastically reduced tooling time
- + Immediate improvement of productivity
- + Repeat accuracy < 5µm
- + Stainless steel
- + Form fit



## ... BY ITEM NO.

| Article no. | Page | Article no.  | Page | Article no.  | Page | Article no. | Page | Article no.  | Page |
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| No. 1400WXL | 14   | No. 1500CC   | 22   | No. 1520CZ   | 25   | No. 1560MLN | 9    | No. 1590MSL  | 12   |
| No. 1410WL  | 15   | No. 1510CBH  | 23   | No. 1520CZ   | 26   | No. 1570MM  | 10   | No. 1590MSLN | 12   |
| No. 1420WM  | 16   | No. 1510CBVC | 23   | No. 1550MXL  | 8    | No. 1570MMN | 10   |              |      |
| No. 1430WS  | 17   | No. 1510CZ   | 24   | No. 1550MXLN | 8    | No. 1580MS  | 11   |              |      |
| No. 1440WSL | 18   | No. 1520CS   | 25   | No. 1560ML   | 9    | No. 1580MSN | 11   |              |      |

## ... BY ORDER NO.

| Order no. | Page | Order no. | Page | Order no. | Page | Order no. | Page | Order no. | Page |
|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
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| 17426     | 15   | 17608     | 25   | 535146    | 18   | 550470    | 8    | 550479    | 10   |
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| 17442     | 16   | 17624     | 25   | 548180    | 8    | 550472    | 8    | 550481    | 11   |
| 17459     | 17   | 17632     | 25   | 550223    | 9    | 550473    | 9    | 550482    | 12   |
| 17467     | 17   | 17640     | 25   | 550224    | 10   | 550474    | 9    | 550483    | 12   |
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| 17558     | 22   | 17673     | 26   | 550226    | 12   | 550476    | 9    |           |      |
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These conditions of sale apply to business conducted with companies, legal entities in the public sector, and legal entities with special budget in the public sector. Our deliveries and services are carried out exclusively on the basis of the conditions stated below. Deviating purchasing conditions of the buyer will not become part of the contract, not even through acceptance of the order, unless we have expressly accepted them.

## 1. Offer and entering into a contract

The basis of our delivery contracts is the latest edition of our catalogue. Orders are not considered as accepted until they have been confirmed by us in writing. When goods are supplied from stock and, for organisational reasons, you receive no separate confirmation, the invoice has the additional function of confirming the order. Details of dimensions and weights, and illustrations, drawings and data are not binding and may be changed by us at any time. Deviations cannot be excluded.

## 2. Prices

Prices are quoted in EUR ex-works excluding turnover tax, packing, freight, carriage, and insurance. Unless otherwise agreed, our list prices on the day of delivery apply. In order to cover our costs, orders under EUR 50.– net value are subject to a small order surcharge of EUR 10.–.

## 3. Delivery

Delivery delays are quoted to the best of our knowledge but without guarantee. Agreed delivery delays begin on the day we accept the order and refer to the completion of the goods in our works.

## 4. Transfer of risk

Risks are transferred to you when the goods are passed to a specific person, company, or organisation that is charged with the execution of carriage of the goods. This applies also to partial deliveries and when we have accepted the costs of carriage, delivery or erection. The risks are also transferred to you when you have defaulted on acceptance.

## 5. Dispatch

Goods are supplied ex-works. Dispatch is at your cost and risk. Scheduled, FOB, and CIF deliveries are also at your risk. In the absence of specific instructions concerning dispatch, we will arrange same as we think fit, but without accepting any responsibility for choosing the cheapest or most suitable method of dispatch. We make a handling charge of EUR 5.– if goods are sent at your request to a third party. You accept that your order can be supplied in partial deliveries insofar as this is reasonable.

## 6. Reservation of proprietary rights

Goods delivered remain our property until payment of all claims has been received in full or until redemption of cheques given in payment. The cancellation of individual positions in an open invoice and the drawing of a balance and its acceptance do not affect proprietary rights. You have the right to dispose of the goods as a normal commercial transaction, but you are forbidden to pawn, mortgage, or transfer ownership of them in settlement of a debt or debts. You surrender to us herewith your right to payment for goods for which we reserve our proprietary rights. You have the right to collect these payments as long as you meet your obligations to us. If we request it, you are obliged to name the third party and we have the right to publish this information and the transfer of rights.

## 7. Cancellation rights due to late payment or insolvency

If you do not pay for the goods by the time payment is due, and if you have not paid after expiry of a reasonable time limit set by us, we have the right to withdraw from the contract and demand the return of goods already supplied. Rights under § 323 BGB (BGB = German civil law code) remain otherwise unaffected. Application for the opening of insolvency proceedings gives us the right to withdraw from the contract and demand the immediate return of goods supplied before the bankruptcy court orders protective measures.

## 8. Packaging

Packages comply with the German packaging regulations (WO). Disposable packaging is charged at cost. The packaging is not returnable.

## 9. Tooling costs

In the absence of any agreement to the contrary, tooling made for the execution of an order remains our property in all cases. This applies even if we have made a charge for a proportion of the tooling costs.

## 10. Payment

Our invoices are payable net within 30 days of the date of the invoice, or with 2% discount if paid within 10 days. Invoices below EUR 50.– are payable immediately without discount. Our credit notes and your charges on us reduce the amount subject to discount. Late payment entitles us to interest at the rate the bank charges us for a current account overdraft but at least 8 percent above the current base rate of the European Central Bank. If payment is overdue, we are entitled, after giving you notice in writing, to cease fulfilling our obligations under the contract until payment is received.

## 11. Offsetting exclusion

You can only offset payments with legally-established or unopposed counter claims.

## 12. Guarantee

If you come to an agreement with us on properties of the goods, we include this agreement in our technical specifications. If we have to supply to your drawings, specifications, samples, etc., you accept the risk associated with suitability for the intended purpose. The point in time at which risk is transferred is decisive for the contractual condition of the goods. The deterioration of parts subject to wear in the course of normal use does not constitute a defect. If the goods supplied are defective, we will – at our choice and within a reasonable time limit set by you – supply a replacement or repair the goods. If such repair or replacement is not satisfactory, you have the right to reduce the price or withdraw from the contract. Any further guarantee claims are excluded. Recognisable defects must be notified at the latest within 10 days of receipt and defects that are not recognisable must be notified as soon as they are discovered. The guarantee period is 24 months and starts with dispatch of the goods from our works.

## 13. Hindered or impossible performance

If we are prevented from meeting our obligation by some unforeseeable event (e.g. disruption of our plant, or delay in the delivery of important raw materials), which, in spite of taking all reasonable care appropriate to the circumstances of the case, we have been unable to avert, and it has become impossible to execute the delivery or service punctually, the delivery delay will be extended to an appropriate extent.

## 14. Liability

Except in the case of injury to life or limb, or damage to health caused by our breach of duty, we are only liable in the event of intent or culpable negligence on our part.

## 15. Customer specials

Orders for customer specials must be in writing and include binding details of execution, quantities etc. For technical reasons we reserve the right to supply 10% more or less than the quantity specified. If technical changes or cancellation are required, the costs incurred will be charged to the customer.

## 16. Deliveries of samples and return of goods

Samples will be charged. When goods have been sent for testing or as samples, we will credit you with the additional price against subsequent orders, as long as the net contract value is at least EUR 125.–. The return of goods is only possible with prior agreement. Customer specials may not be returned. For goods returned for reasons outside our responsibility (e.g. wrongly ordered), we charge 10% of the value of the goods but at least EUR 7.50, to cover administration costs.

## 17. Place of fulfilment, court of jurisdiction

The place of fulfilment for all obligations arising from this contract is D-70707 Fellbach. The court of jurisdiction for any legal dispute arising from this contract is D-71332 Waiblingen. (All disputes that arise from this contract or about its validity will be decided by a court of arbitration according to the Arbitration Rules of the German Committee for Arbitration Courts/Settlement and Arbitration Procedure of the International Chamber of Commerce. Such decisions will be final and normal legal procedures are excluded.) German law applies (BGB and HGB = civil and commercial codes). The application of UN purchasing law (CISG) is excluded.

## 18. Validity clause

If individual conditions should be found to be not legally valid, the remaining conditions continue to apply. The invalid conditions will be replaced by conditions which fulfil as closely as possible the commercial intent of the contract with reasonable consideration of the interests of both parties. With the publication of these Conditions for Sales, Deliveries and Payment, all previous versions become invalid. This does not apply to contracts agreed before publication.

This image shows a full page of blank graph paper. The grid consists of small, uniform squares formed by thin, light gray lines. There are no margins, text, or other markings on the page.



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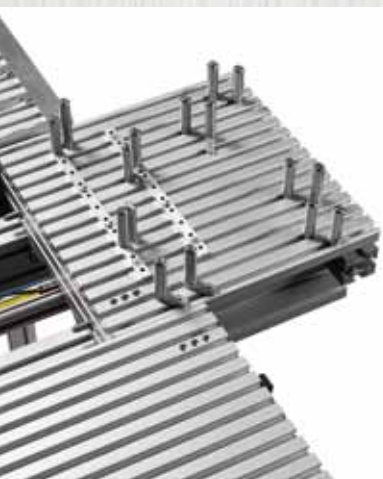
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