





## [ A High-Tech Profile

Superfine structures and ultra-tight tolerances:  
precision is our business

**Your specifications are extraordinary, our standards are industry-leading.** MICROMETAL specializes in industrial production of highly accurate metal micro-components. MICROMETAL customers value the globally unique precision of our photochemical etching processes. Our wet chemical etching technologies offer you a matching solution for all your challenges.

- We etch metal in high volumes: **inline**
- We etch exotic metals: **stepline<sup>ultra</sup>**
- We etch metal surfaces: **stepline<sup>3D</sup>**

MICROMETAL is: microsystem technology know-how accumulated over decades, at home in the frontier area of Germany, France, and Switzerland. We are certified to ISO TS 16949 and ISO 13485.

This is where we start: 25  $\mu\text{m}$  is the thinnest standard material with which we work. The outer dimensions of our products range from fractions of a millimeter all the way to continuous processing of entire metal coils.

# 25



# Applications and Uses

High-Tech solutions for all industries and challenges

**The core of our competency is your possibilities!** MICROMETAL is at home in the world of ultra-tight tolerances, superfine structures, extra-thin materials, and exotic metals.

We supply customers worldwide and embrace new challenges – even in industries we do not yet serve or involving materials that we would like to get to know.

## Products:

- Filters
- Screens
- Grids
- Pins
- Contacts
- Functional surfaces
- Diffusers
- Implants
- Technical springs

## Industries:

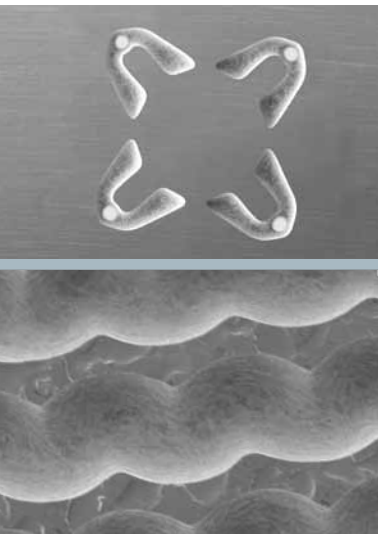
- Automotive
- Medical technology
- Chemical industry
- Aerospace industry
- Research and development
- Diagnostics and analysis
- Engineering industry
- Photovoltaics
- Building engineering

## Etch lines

	inline	stepline <sup>ultra</sup>	stepline <sup>3D</sup>
Quantity	high volumes	small and medium batches	small and medium batches
Materials	steels, Cu & alloys	almost any metal	almost any metal
Dimensions	up to 330 mm width	up to 150 mm width	parts from Ø 1 – 100 mm length up to 330 mm
Material thickness	0.025 – 0.5 mm	0.01 – 3 mm	—

# [inline

A one-of-a-kind production line for tailored customer solutions



**Our knowledge is your cost-effectiveness.** MICROMETAL's **inline** is capable of processing metal in thicknesses ranging from 0.025 mm to 0.500 mm. The source material can have a width of up to 330 mm. Our **inline** process enables us to produce large volumes especially cost-effectively – also reel-to-reel.

The know-how developed by MICROMETAL is considerably different from conventional etching processes, laser processing, or fine stamping. Customer data are processed via CAD to produce a glass tooling. The metal alloy desired by the customer – which is provided in the form of a coil – is first cleaned and then coated on both sides with photoresist. Already here, our process departs from standardized approaches. While it is common to use a relatively thick dry film resist, MICROMETAL's specialists employ a special liquid resist system

to obtain ultra-thin photoresist layers enabling a higher degree of precision. As in lithography, the metal coil is exposed through glass toolings that are specially produced for the customer. Our process enables ultra-precise contours to take shape in the developer. Afterwards the metal coil passes through an etching process that allows a wide range of geometries.

After cleaning and drying, agreed-upon controls are performed which can be based on random samples or comprehensive automatic checks. Depending on the customer's needs, the finished metal coil is packaged either reel-to-reel or in sheets.

[inline  
stepline<sup>ultra</sup>  
stepline<sup>3D</sup>



# 800

A continuous coil with etched parts can be as long as 800 meters. This enables an uninterrupted etching process that provides exceptional stability.



## Dimensions

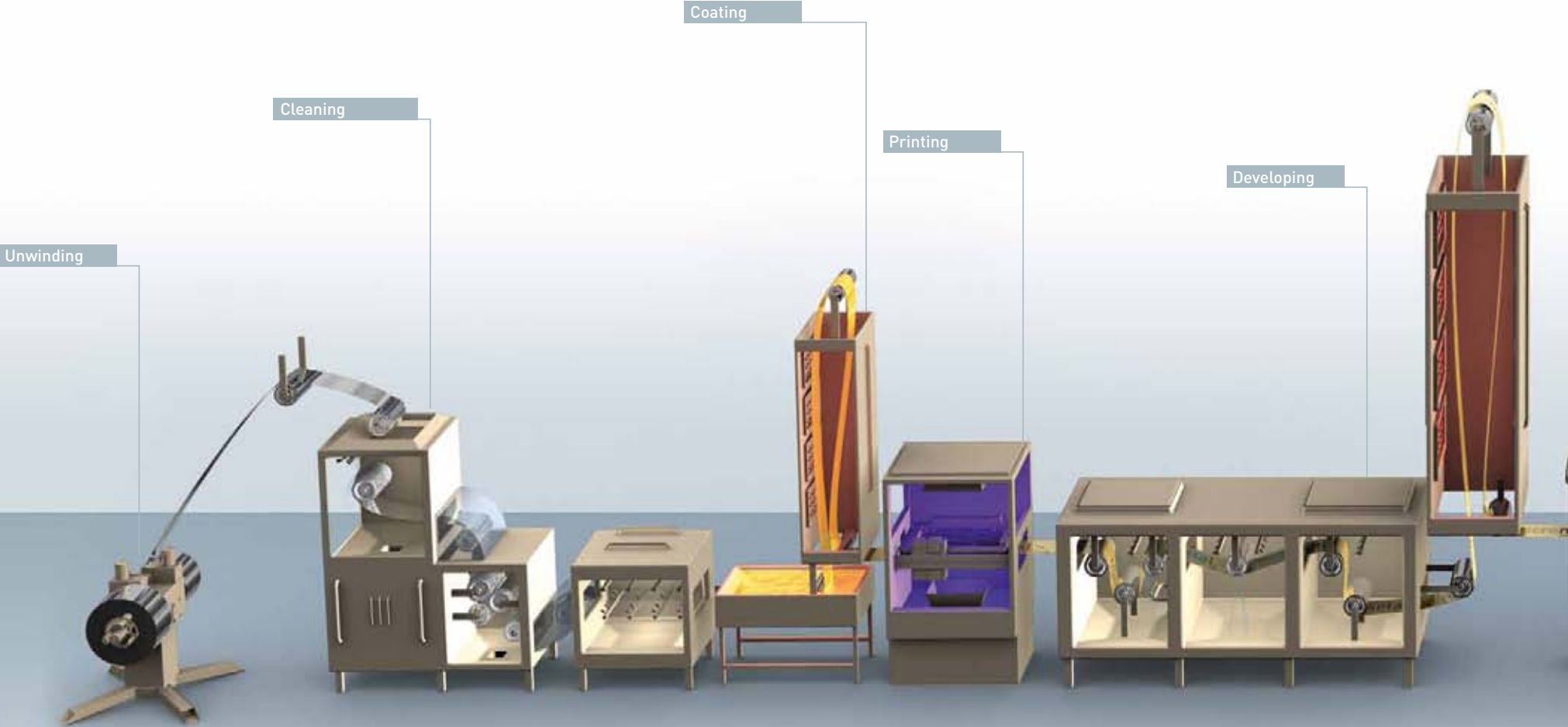
Flexibility made possible by variations in coil thickness, hole diameter, or slot width

### Overview [mm]

Coil thickness	Smallest hole diameter	Diameter tolerance	Smallest slot width
0.025	0.02	+/-0.005	0.018
0.050	0.04	+/-0.007	0.035
0.100	0.08	+/-0.010	0.070
0.150	0.12	+/-0.012	0.115
0.200	0.16	+/-0.020	0.150
0.250	0.20	+/-0.030	0.185
0.300	0.24	+/-0.035	0.210
0.350	0.28	+/-0.040	0.245
0.400	0.32	+/-0.040	0.280
0.450	0.36	+/-0.050	0.315
0.500	0.40	+/-0.050	0.350

1 mm  $\approx$  0.04 inch

# inline-Etching Process



Etcher

Stripping

Rinsing

Inspection

Winding





# [ stepline<sup>ultra</sup>

## Exclusive Etching Process for Various Alloys

**stepline<sup>ultra</sup> – etching technology for most metals and alloys.** With the **stepline<sup>ultra</sup>** process, MICROMETAL utilizes all degrees of freedom to etch your component in exotic materials. As with our **inline** process, we place particular emphasis on the perfection of technology and quality. Our guiding principles are professionalism, uniqueness, and 100% customer satisfaction. Discover the various benefits of our **stepline<sup>ultra</sup>** technology.

- Etching of exotic materials and alloys
- Etching of extremely thin films and sheets
- Allows for further finishing

## Exotic Materials with Maximum Precision

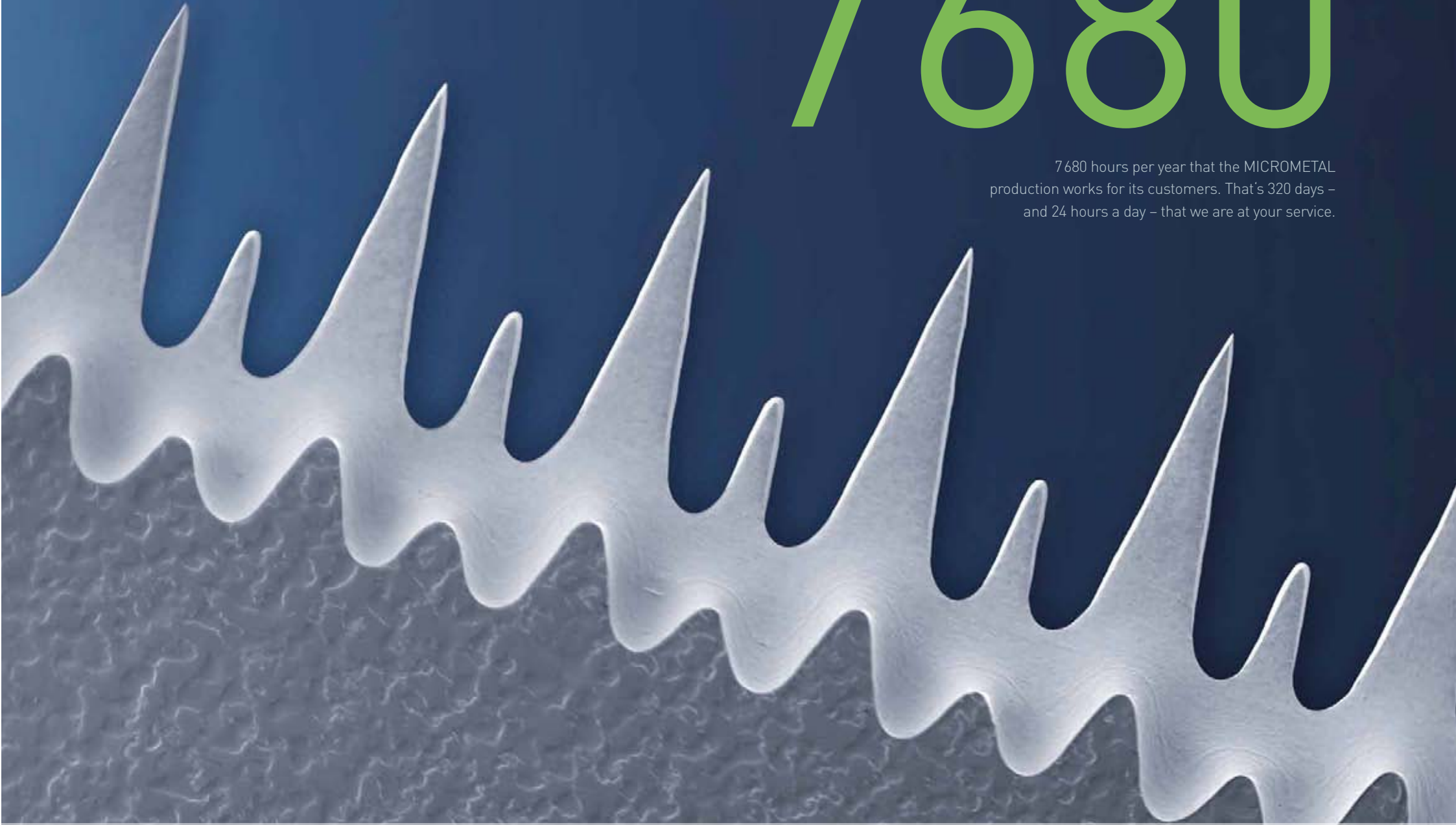
**Your product in your material.** High reproducibility, design flexibility, and maximum precision together with high-tech materials. Application range from nanocrystalline metals to highly corrosion-resistant metals.

- Material thickness: from 0.010 mm
- Product dimensions: up to 150 x 150 mm<sup>2</sup> (additional dimensions in preparation)
- Single-part and serial production
- Fully biocompatible
- Infinite range of materials\*



# 7680

7680 hours per year that the MICROMETAL production works for its customers. That's 320 days – and 24 hours a day – that we are at your service.





# [ stepline<sup>3D</sup>

## A New Dimension in Etching Shapes and Surfaces

**stepline<sup>3D</sup> is a specialized etching technology for shapes and surfaces.** The **stepline<sup>3D</sup>** process provides product-specific solutions, while enabling us to process complex components. Discover the many benefits of our etching technology for three dimensional components.

- Three-dimensional component etching
- Etching of virtually any alloy
- Allows for further finishing
- No adverse effect on material structure

## Microscopically Formed Surfaces Enable Completely New Products

**We form surfaces in your material.** MICROMETAL processes components weighing anywhere from a few grams to several kilograms. We are able to produce surfaces with roughness to meet your specifications. We can process a variety of materials, from simple steels all the way to high-quality metals and alloys. Both, single-part and serial production are possible.

- Part diameter from 1.0 – 100 mm and length up to 300 mm
- $R_a$  values 0.02  $\mu\text{m}$  – 8.0  $\mu\text{m}$ , depending on material,  $R_z$  up to 100  $\mu\text{m}$
- Fully biocompatible
- Single-part and serial production
- Infinite range of materials\*

\* **High-grade steels and other steel alloys such as** 7C27Mo2, Invar, and Alloy 42 ▪ **Nickel and cobalt base materials such as** Ni, Mu Metal, HyMu 80, Alloy 52, Elgiloy (Phynox), Kovar, Hastelloys, Inconels, Haynes Alloys, and Nicrofer ▪ **Amorphous /nanocrystalline materials such as** Vitrovac 6025 or Vitroperm 500 ▪ **Copper and copper alloys such as** copper beryllium, bronzes, and brass ▪ **Other non-ferrous metals such as** molybdenum, tungsten, and titanium grades 1 – 5 ▪ **Flexible materials / laminated films ▪ By agreement:** aluminum, silver, gold, tantalum, niobium and others.

inline

stepline<sup>ultra</sup>

[ stepline<sup>3D</sup>



# Infinite

An infinite array of possibilities for your ideas. Take advantage of our decades-long experience.

**Be** [4]  
9,01

**Al** [13]  
26,98

**Ti** [22]  
47,87

**Ni** [28]  
58,69

**Mo** [42]  
95,94

**Ag** [47]  
107,87

**W** [74]  
183,84

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