CMT Rickenbach SA
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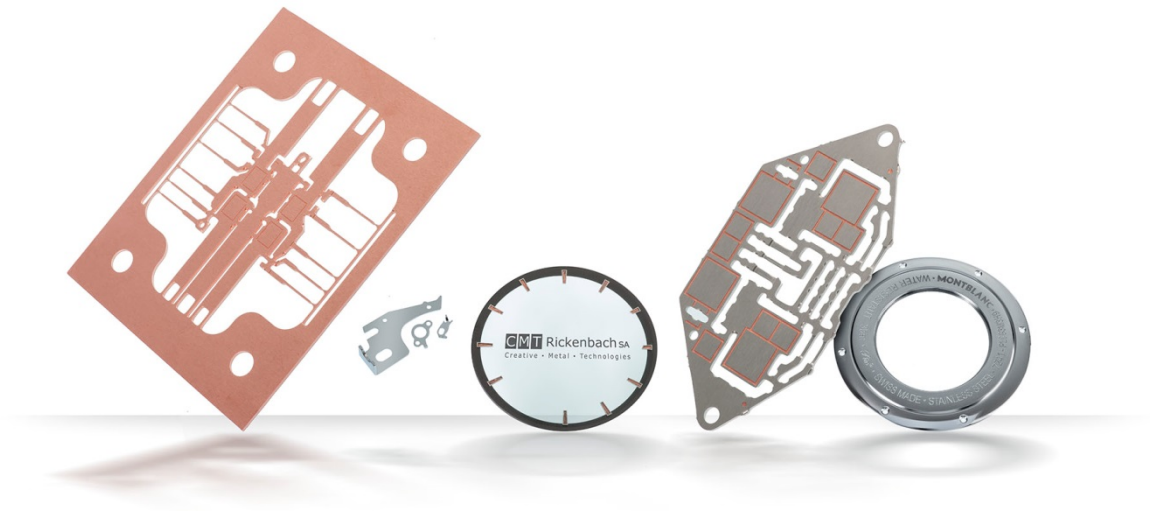
Technical Guide



ETCHING TECHNOLOGIES | GALVANICS | LASER TECHNOLOGIES | DECORATIONS HORLOGERES

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+41 32 910 03 03 - info@cmtrickenbach.com – www.cmtrickenbach.com

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1. General Information

We suggest that you browse through this technical guide in order to provide you with a maximum of technical data concerning our technologies and the advantages we can offer you.

Technical files:

In order to be able to produce your parts, please provide us with vectorized files in one of the following formats:

- DWG, DXF, Step, Gerber, IGES, CorelDraw, or Adobe Illustrator.

Material:

Please provide us with the following information if it is not shown on the plan.

- Material
- Thickness, condition and tolerances
- Size of the material if supplied by you (min. dim. to be agreed)

You can consult us at any time for further information. We have among other things a stock of materials allowing us to produce your parts more quickly.

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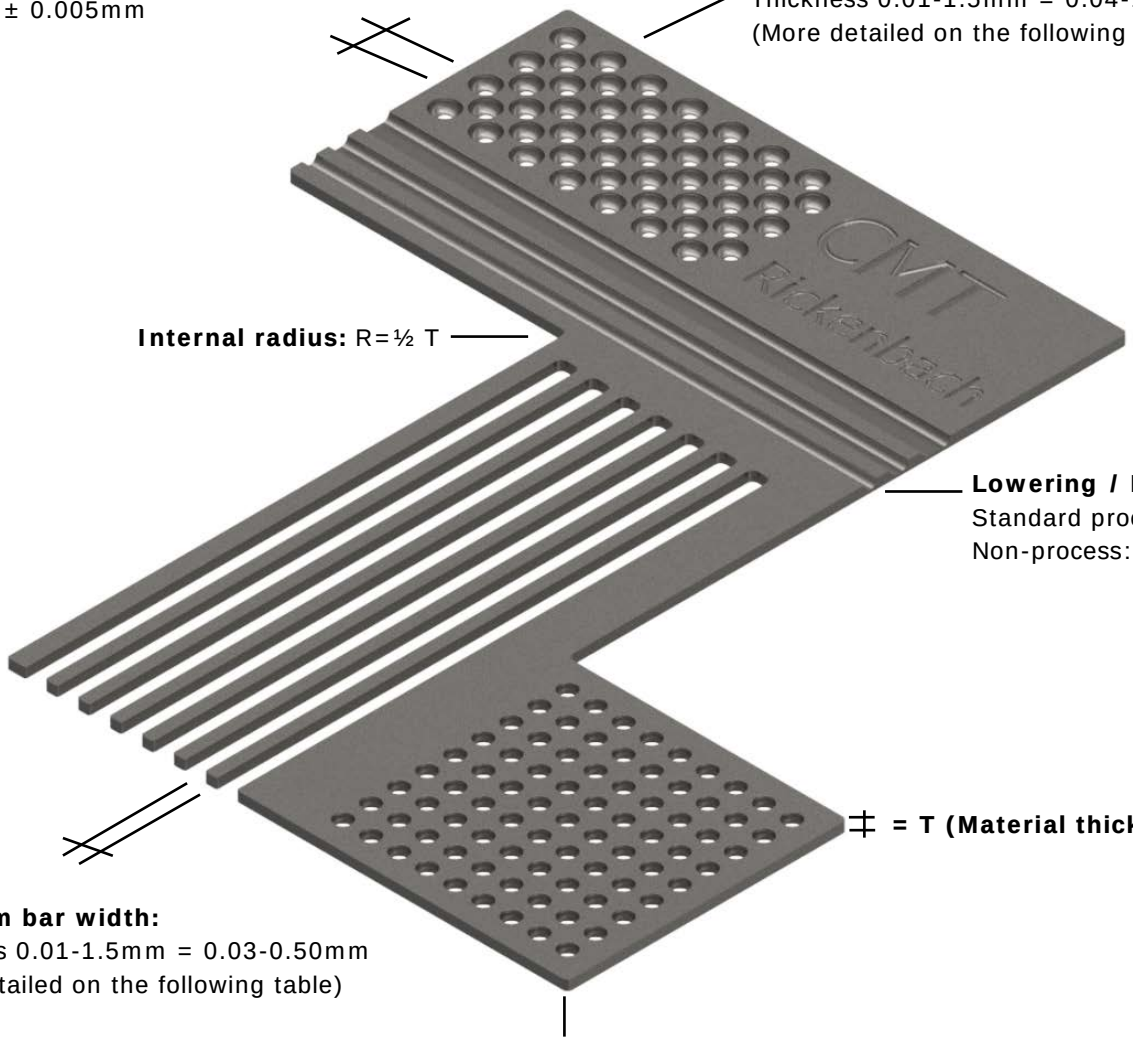
2. General rules for photochemical etching

Positioning tolerance :
± 0.005mm

Minimum opening:
Thickness 0.01-1.5mm = 0.04-1.5mm
(More detailed on the following table)



Internal radius: R=½ T

Lowering / Engraving :
Standard process: 2/3 T
Non-process: depending on

= T (Material thickness)

Minimum bar width:
Thickness 0.01-1.5mm = 0.03-0.50mm
(More detailed on the following table)

External radius: R= min. 0.05mm

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2.1. Materials and dimensions machinable by photochemical etching

- Stainless steel, Steel, Durinox, Durnico...
- Copper and its alloys: Brass, Copper-Beryllium, Arcap, Nickel Silver...
- Molybdenum, Tungsten, Nickel, Mu-metal, Gold...
- Titanium (on request, max. thickness 0.15mm)
- Other materials on request

Material thickness [mm]	Standard tolerances [mm]	Minimum opening [mm]	minimum width of a bar [mm]
0.010 - 0.025	±0.010	0.04 - 0.05	0.03
0.025 – 0.050	±0.010	0.05 - 0.10	0.04
0.050 - 0.150	±0.010 – ±0.020	0.10 - 0.20	0.10
0.150 - 0.250	±0.020 – ±0.025	= material thickness	0.10
0.250 - 0.500	±10% material thickness	= material thickness	0.20
0.500 - 1.000	±10% material thickness	= material thickness	0.30
1.000 - 1.500	±10% material thickness	= material thickness	0.50

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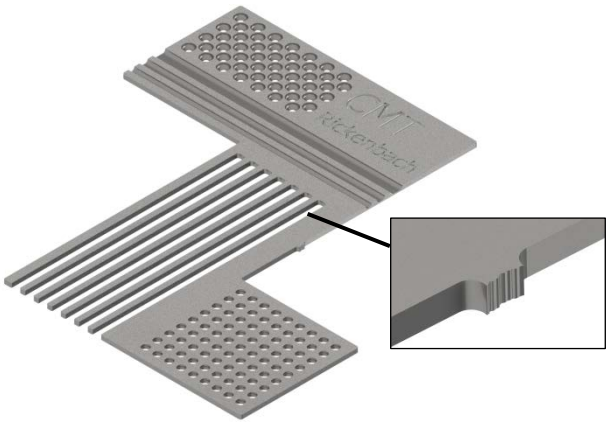
2.2. Types of fasteners

Fasteners are the parts that hold the components together during manufacture. They may be necessary to facilitate handling during production but also to allow the part to be finished later. Once the part has been manufactured, it can be supplied still attached to the plate or detached.

Depending on your requirements, we can, among other things, offer to produce the parts without attachment or in strip form with reworking holes, subject to feasibility.

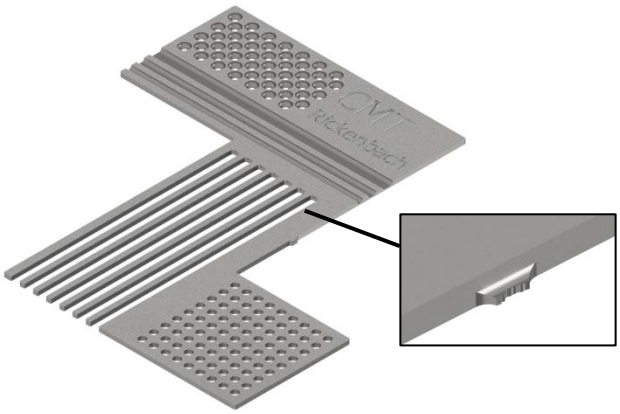
External fastener:

This attachment does not affect the part



Half engraved external fastener:

This fastener does not affect the part and makes it easy to remove it from the plate.



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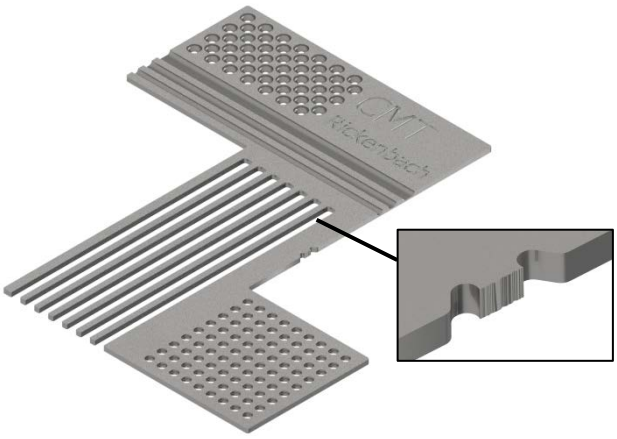
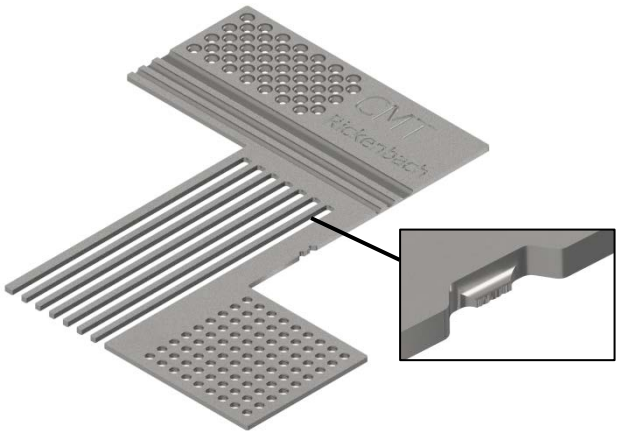
Internal fastener:

This fastener is used when
no protrusions are allowed



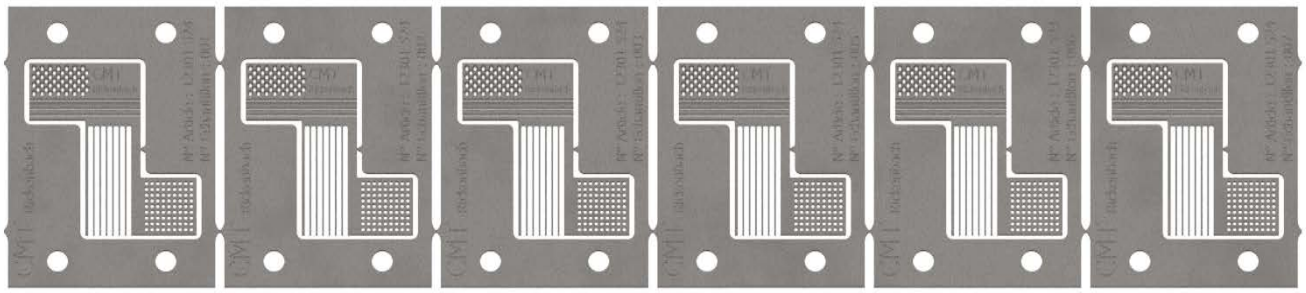
Half Engraved Internal attachment:

This fastener is used when
no protrusions are allowed.
and it makes it easier to detach from the plate.



Strip form:

This type of production is carried out to enable parts to be reworked or finished.



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2.3. Hole and flank geometries

Photochemical etching generates special flanks. CMT Rickenbach SA offers you by its mastery, different types of cutting.

Standard double-sided photochemical cutting and engraving

Obtaining a profile with parallel flanks

Double-sided photochemical cutting

Obtaining a profile with concave flanks

Conical photochemical cutting

Obtaining a tapered hole and possible reduction of standard cutting tolerances

Asymmetrical double-sided photochemical cutting

Specific photochemical cutting

Specific profiles on request

Single-sided photochemical etching

Double-sided photochemical etching

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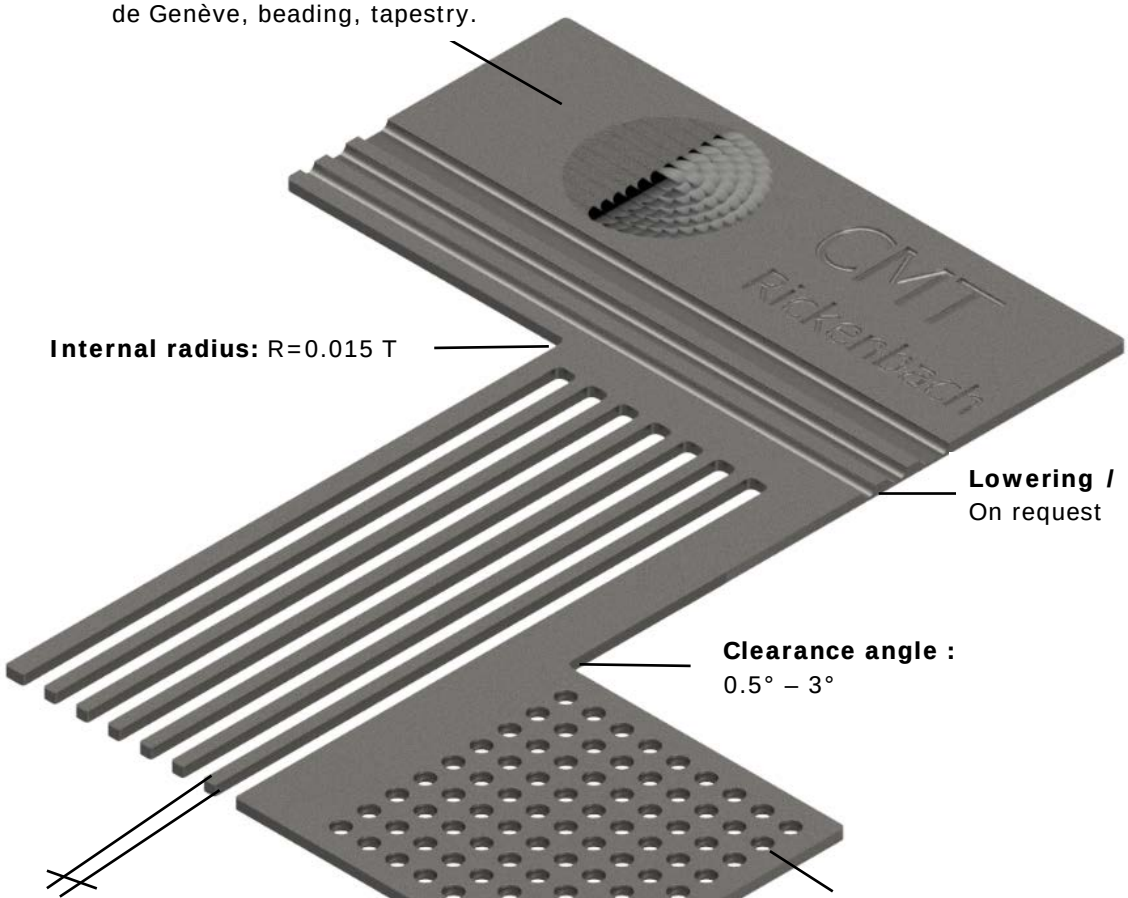
3. General rules for laser cutting

Laser texturing :
On request: sandblasting, cote de Genève, beading, tapestry.



Internal radius: R=0.015 T

Lowering / Engraving :
On request

Clearance angle :
0.5° – 3°

Minimum bar width :
Thickness 0.010- 2mm = 0.03-0.50mm
(More detailed on the following table)

Minimum opening :
Thickness 0.010- 2mm = 0.04-1mm
(More detailed on the following table)

External radius: R= 0

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3.1. Laser machinable materials and dimensions

- Stainless Steel, Steels, Durinox, Durnico, Phinox...
- Copper and its alloys: Brass, Copper-Beryllium, Arcap, Nickel Silver...
- Molybdenum, Tungsten, Nickel, Mu-metal, Gold, Silver, Titanium, Polyimide, Aluminium...
- Other materials on request

Epaisseur de la matière [mm]	Tolérance standard [mm]	Ouverture minimum [mm]	largeur minimum d'un barreau [mm]
0.010 - 0.025	±0.005 – ±0.010	0.04	0.03
0.025 – 0.050	±0.005 – ±0.010	0.05	0.04
0.050 - 0.150	±0.005 – ±0.020	0.05 – 0.1	0.10
0.150 - 0.250	±0.005 – ±0.025	0.1 – 0.2	0.10
0.250 - 0.500	±0.010 - ±0.050	0.15 – 0.25	0.20
0.500 - 1.000	±0.020 - ±0.050	0.25 – 0.5	0.30
1.000 - 2	±0.050 - ±0.100	0.5 - 1	0.50

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4.1. Types of finishes available

Types of finishes	Made by CMT	External at CMT
Galvanic treatment	X	X
Selective galvanic treatment	X	X
Bending	X	X
Laser welding	X	
Mechanical decoration	X	
Polishing	X	X
Tribo-finishing	X	X
Sanding, bead blasting	X	X
Identification	X	
Epilamage	X	
Heat treatment		X
Other treatment on request	X	X

The team of CMT Rickenbach SA will be pleased to answer your questions.

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