

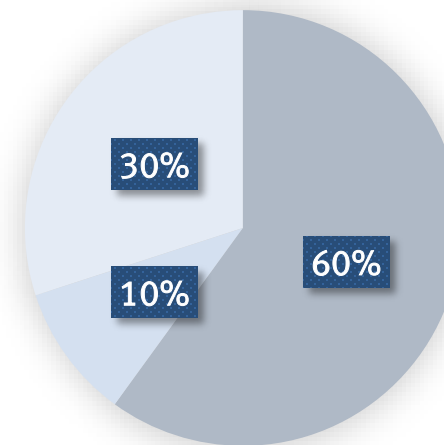


Stratégies et outils de coupe adaptés
au micro-centres d'usinage



HQ – Vendlincourt

3'300 m²



Nos marchés

- Horlogerie
- Industrie médicale
- Autres

Porrentruy

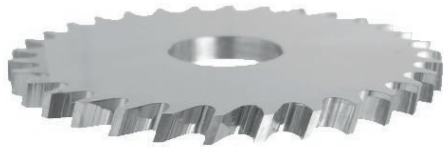
2'500 m²



Locations

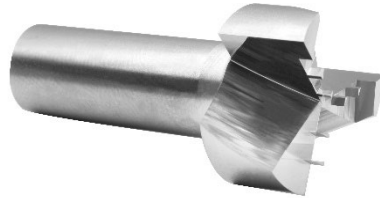
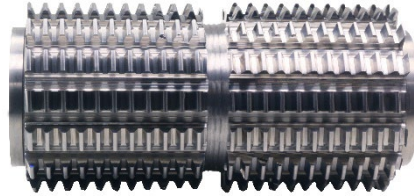
2 sites
150 employés
800'000 outils par an

Standard



LB LOUIS BELET®
Swiss Cutting tools

Spécial



Services

LOUIS BELET®

Consulting

Re Grinding

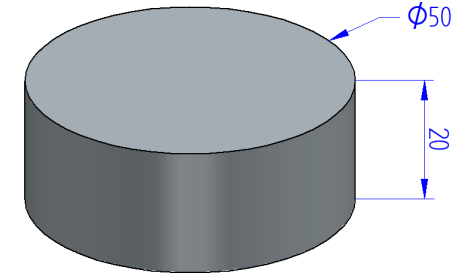
Research
Development &

 **SWISSMEM**

MCU

Micro Centre d'Usinage

- Machine de dimensions réduites
- Broches très hautes fréquences, jusqu'à 80 000 tours par minute
- 3 à 5 axes
- Grande accélérations et G0 élevé
- Grandes avances en travail
- Courses des axes courtes
- Peu de masse en mouvement lors de l'usinage



Pièce type ébauche

39 cm³

Inox: 315 g

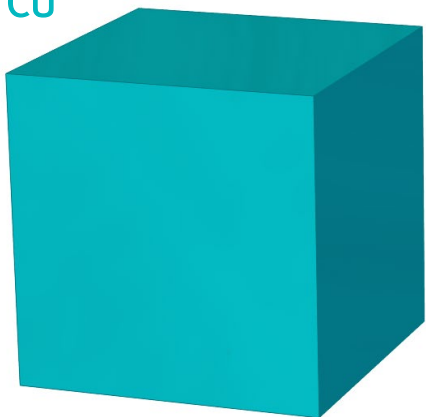
Titane: 177g

Laiton sans plomb: 333g

Avantages	Inconvénients
Place	Petit volume de travail
Consommation énergétique	Petit magasin d'outils
Mouvements de la machine très dynamiques	Broches à puissance limitée (Selon machine)
Basse consommation de lubrifiant	Polyvalence moindre
	Pas d'arrosage par le centre (Pour le moment)
Technologie encore jeune, mal maîtrisée par les utilisateurs	

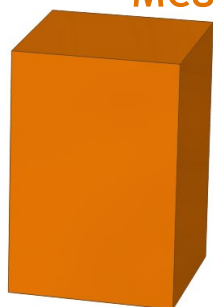
CU $\Leftrightarrow$ MCU

CU

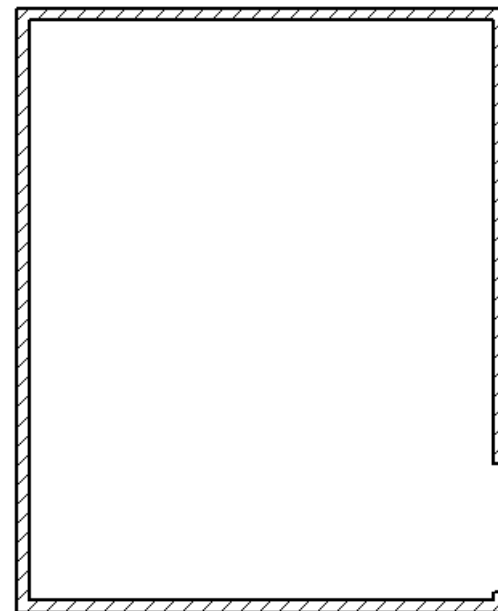


4m² au sol
Volume 8m³
Conso ~8kW

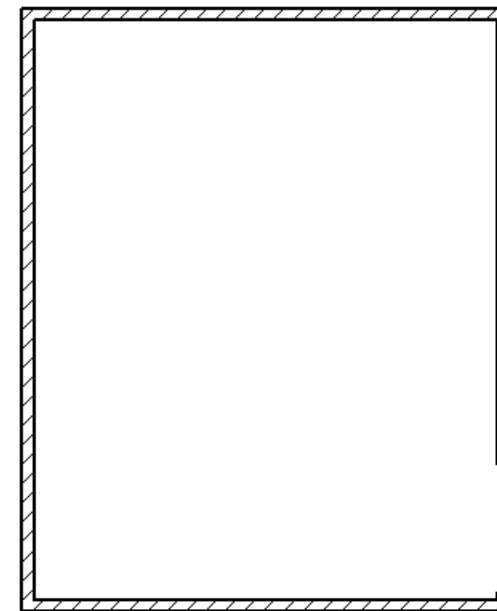
MCU



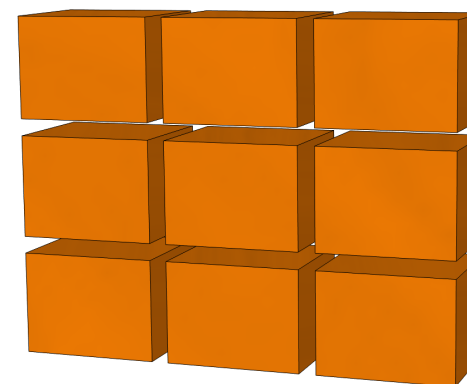
1m² au sol
Volume 1.5m³
Conso <2kW



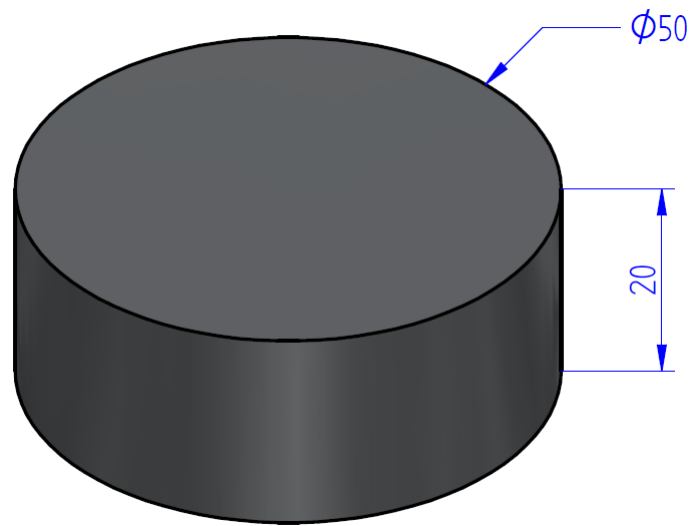
2 machines
8m² (+2m²) au sol
Conso ~16kW



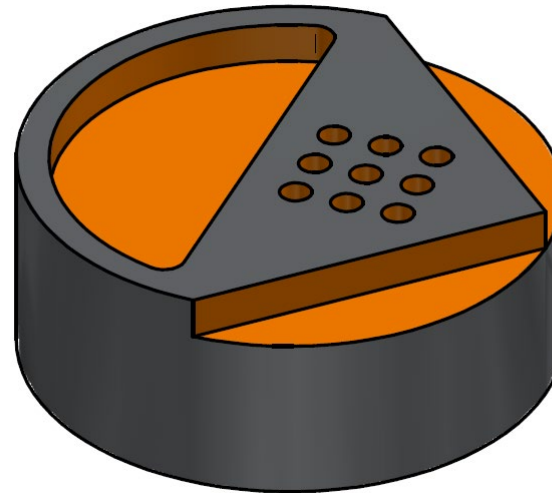
7 machines
7m² au sol
Conso ~14kW



Pièce modèle



Inco 316L



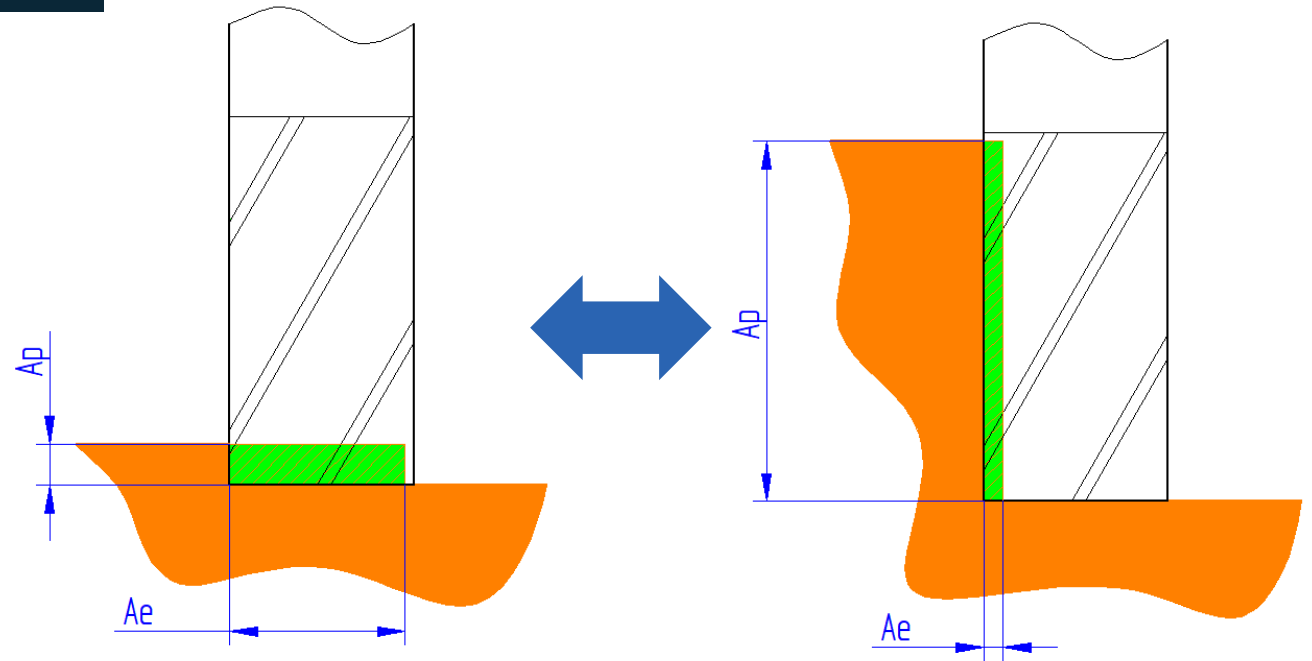
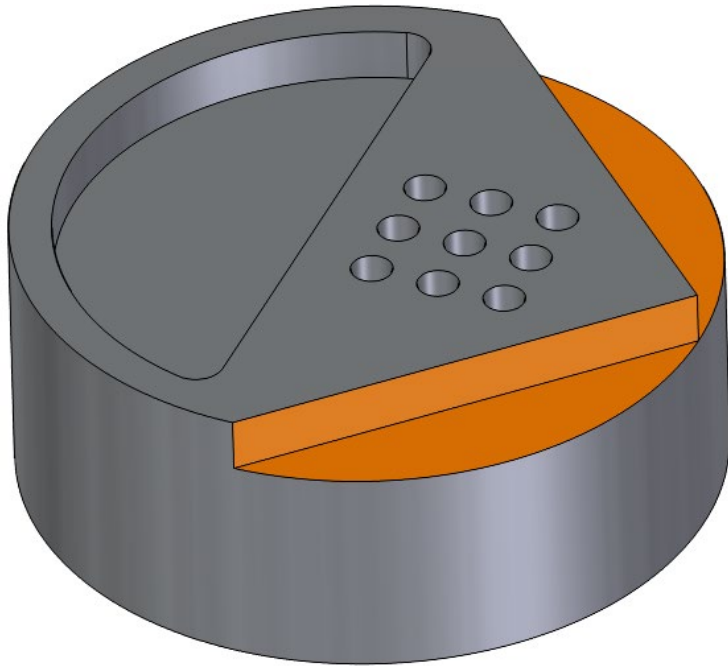
1. Fraisage en épaulement
2. Perçages $\varnothing 3 \times 4$
3. Poche

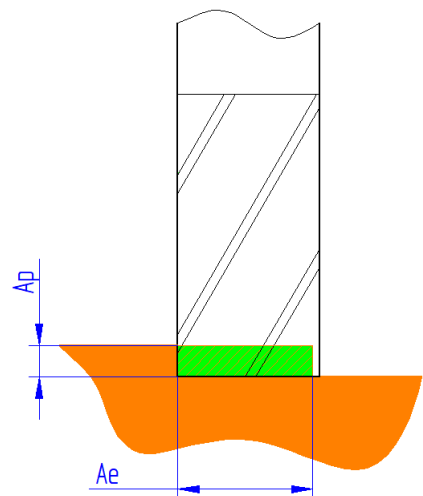


Fraise en bout $\varnothing 2 \times 4$
4 dents
Revêtement TiSi

$V_c = 350 \text{ m/min}$
 $N = 55700 \text{ tr/min}$

Fraisage épaulement





Paramètres de coupe :

Vc	350	m/min
n	55700	tr/min
d ₁	2.000	mm
Z	4	dents
Fz	0.0500	mm/z
Vf	11140	mm/min

ap 0.1 mm

ae 2.000 mm

Q 2.2280 cm³/min

hm 0.0354 mm

E_{max} 0.0500 mm

Paramètres de coupe :

Vc	350	m/min
n	55700	tr/min
d ₁	2.000	mm
Z	4	dents
Fz	0.05	mm/z
Vf	11140	mm/min

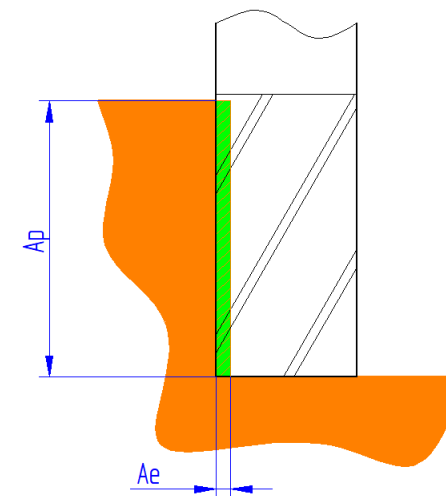
ap 4.000 mm

ae 0.050 mm

Q 2.2280 cm³/min

hm 0.0079 mm

E_{max} 0.0156 mm



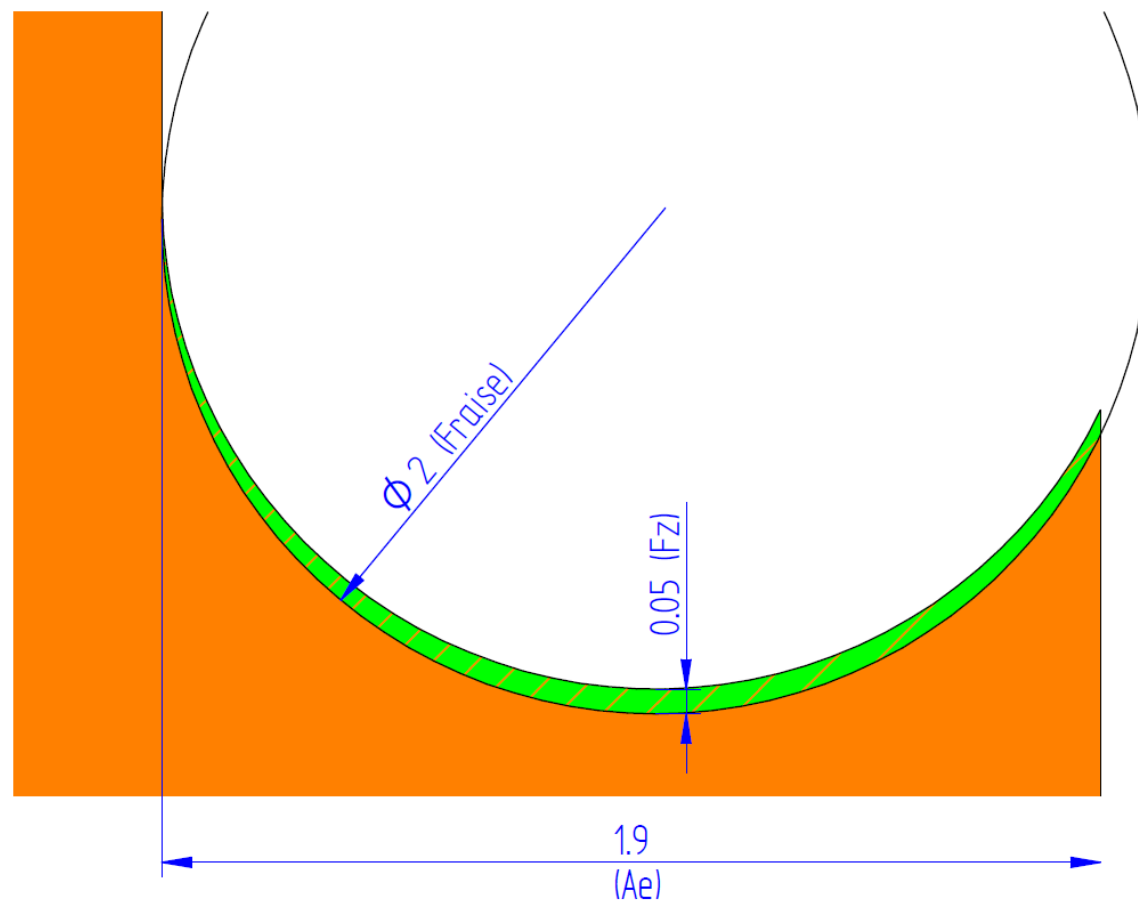
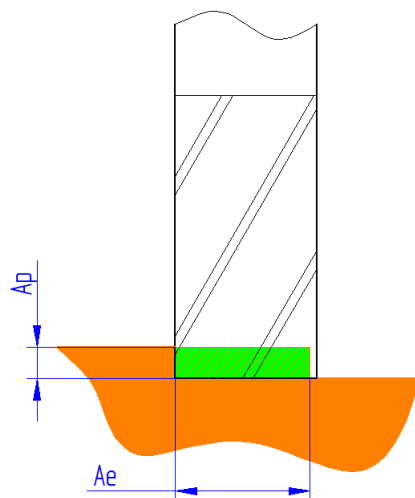
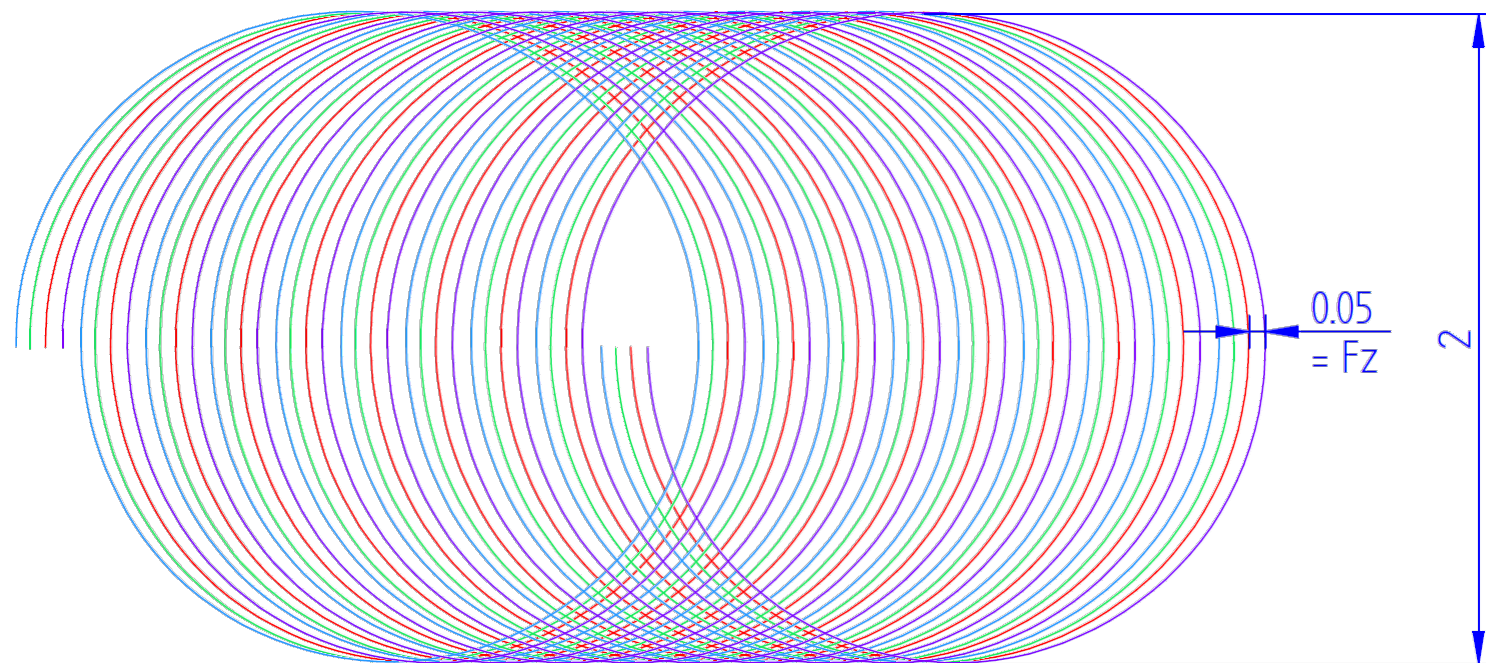
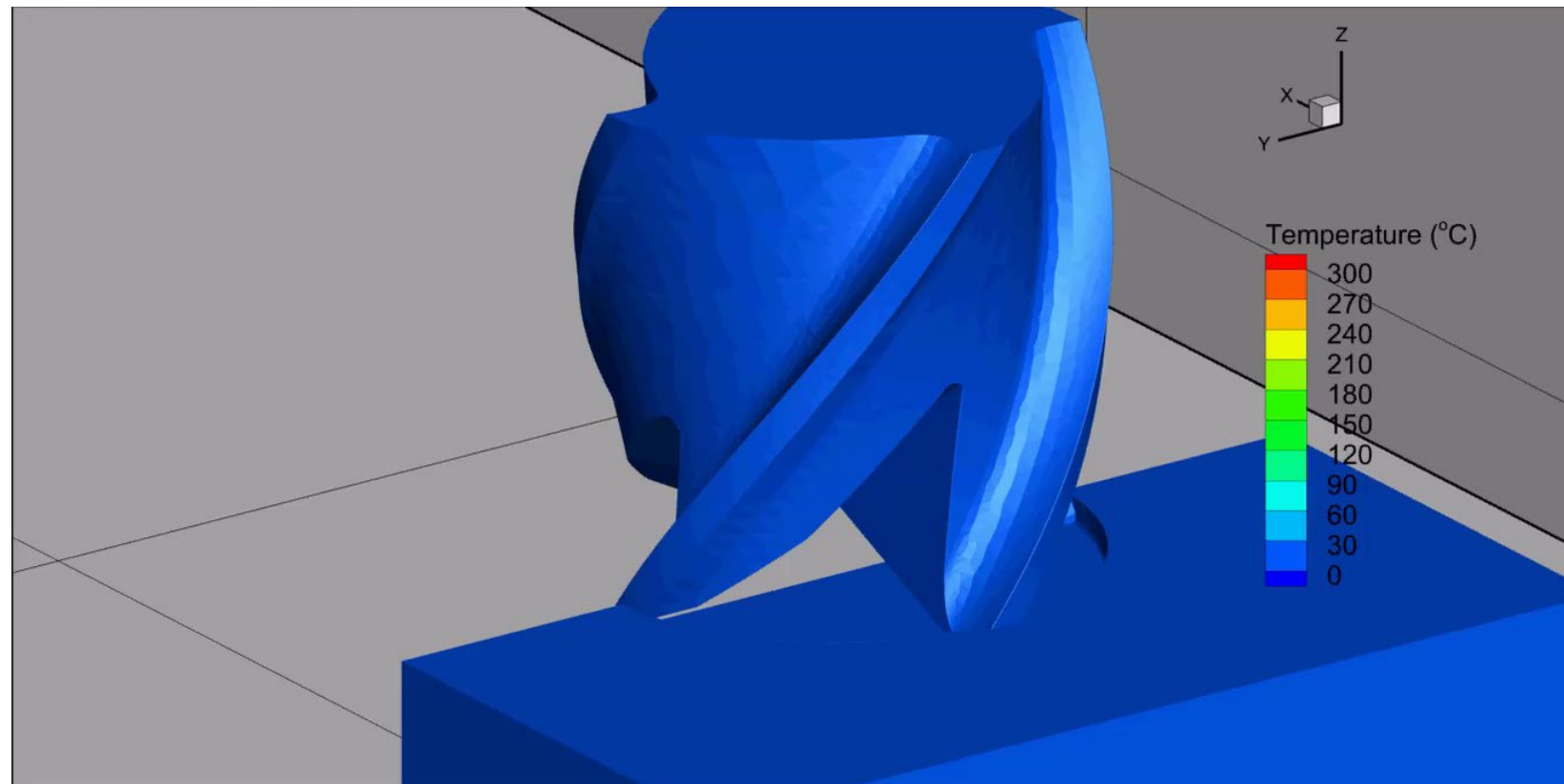
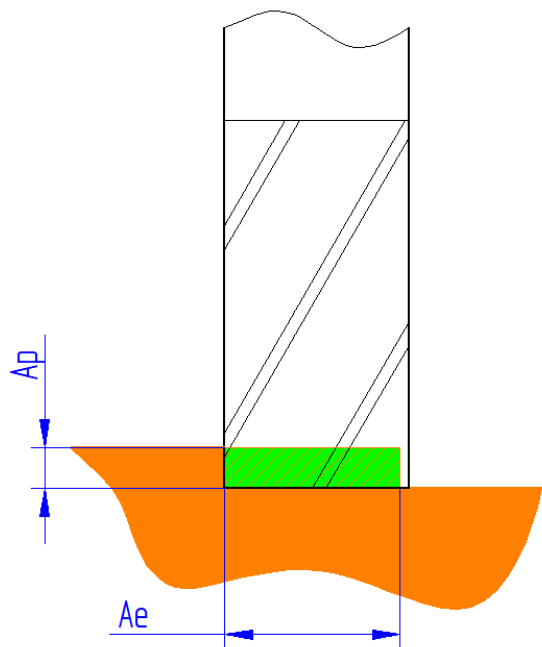
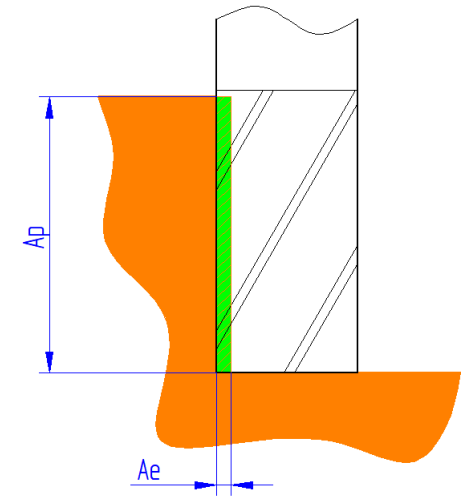
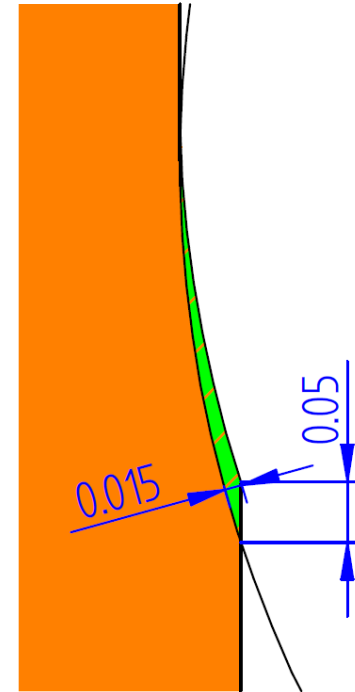
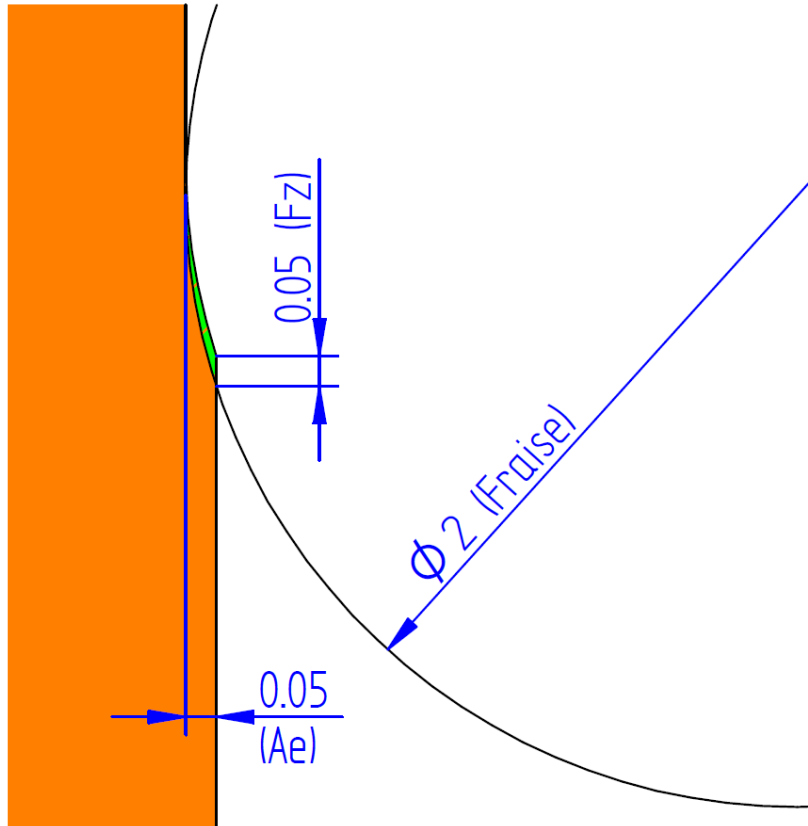


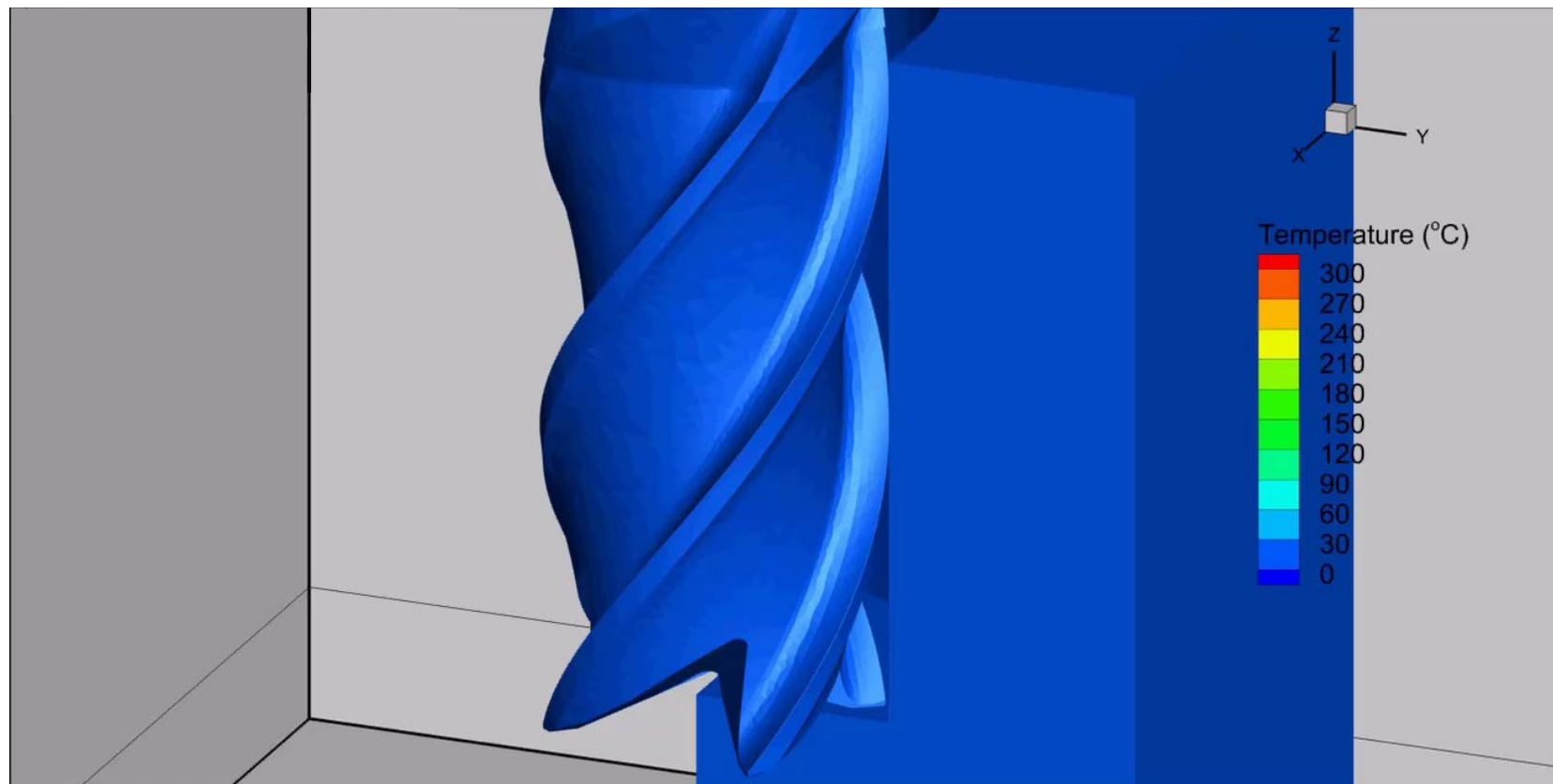
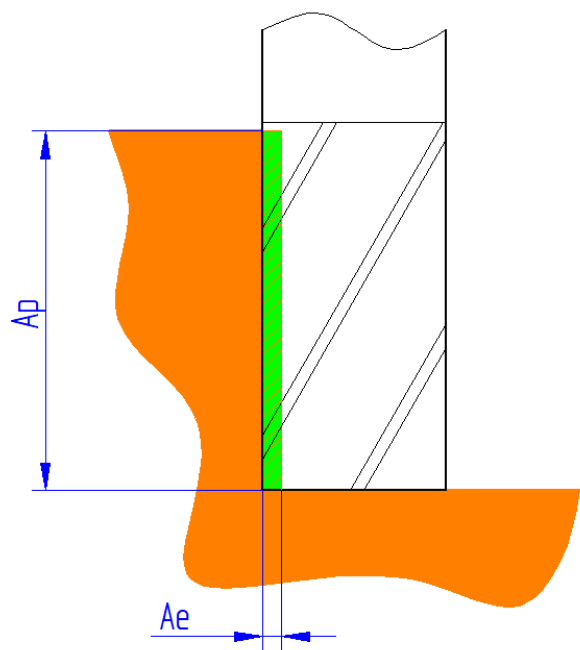
Illustration: mathcurve.com

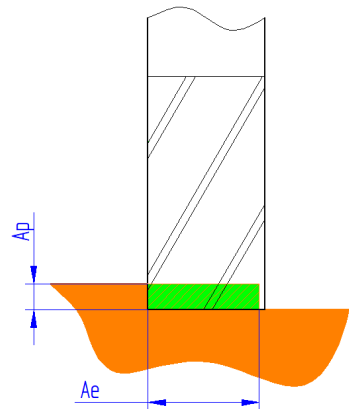


Fraise en bout Ø2
4 dents
 $F_z = 0.05$

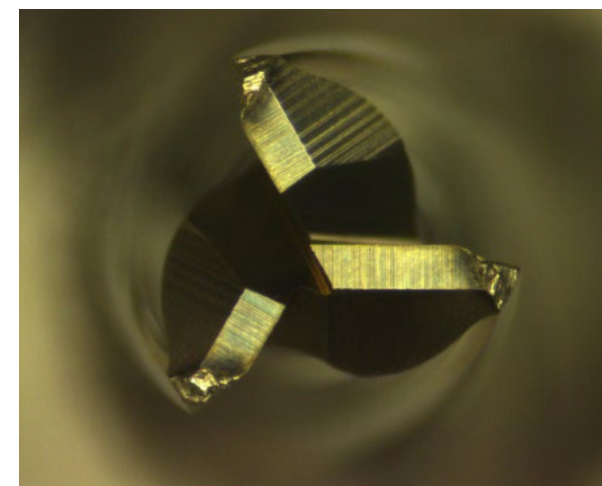
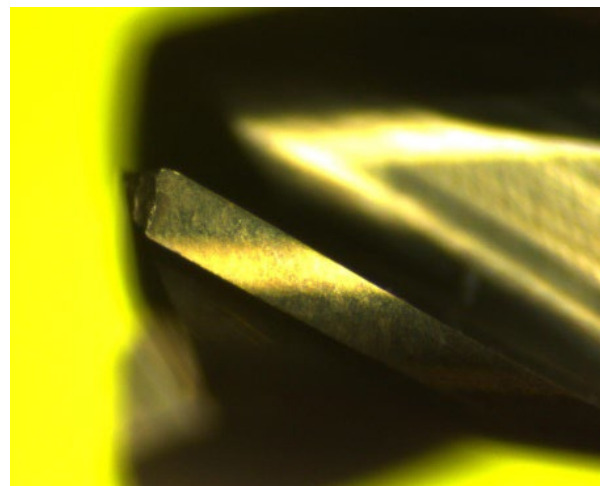
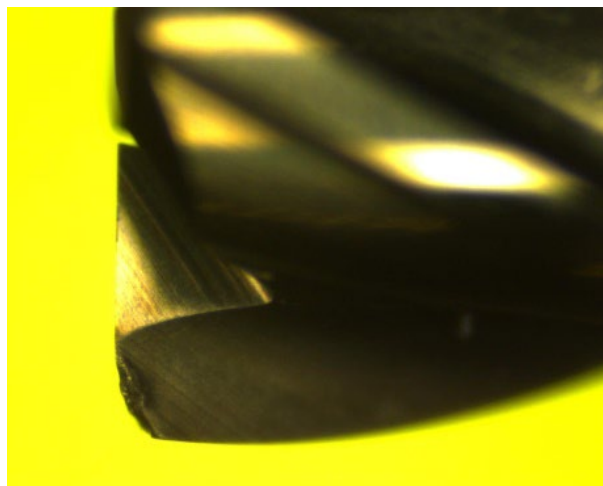
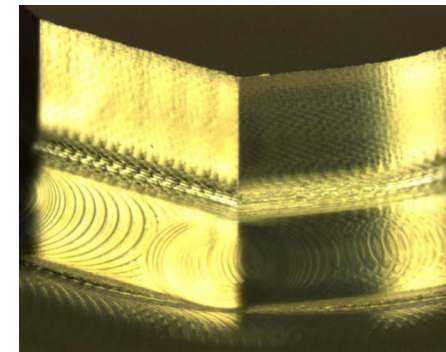
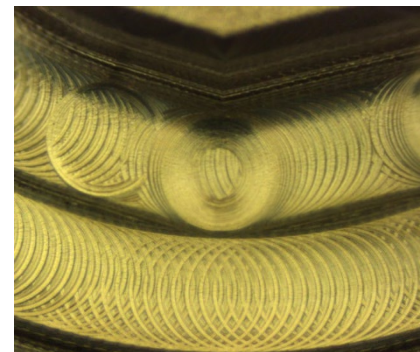


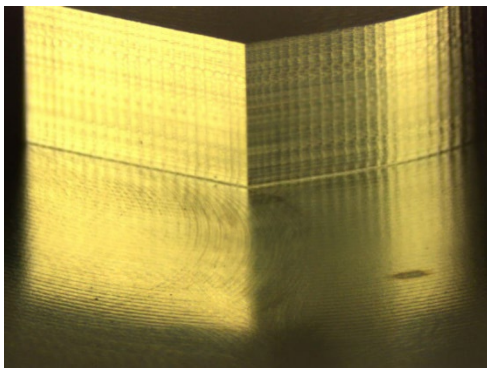




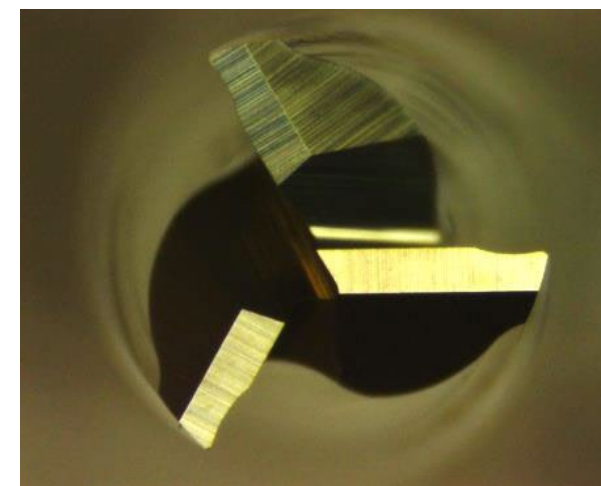
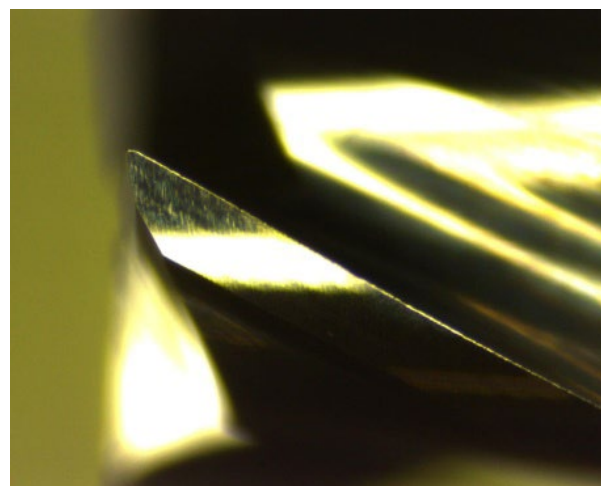
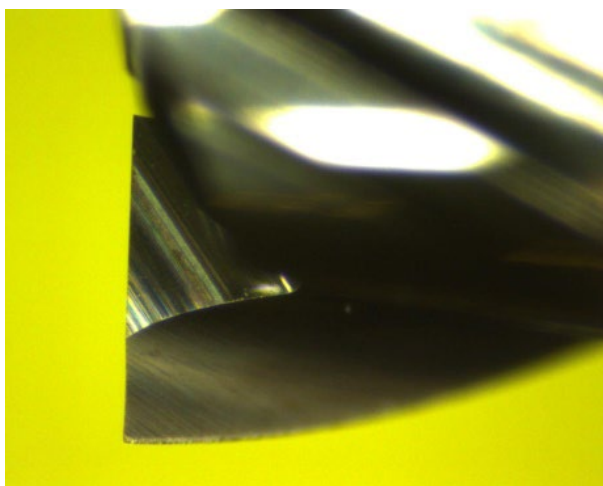
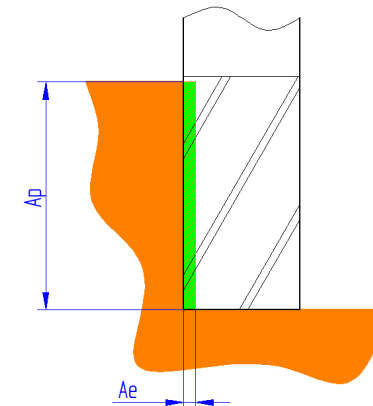


Vc1		
Vc	250	m/min
D	1.8	mm
n	44210	tr/min
Z	3	dents
Fz	0.05	mm/z
Vf	6631	mm/min
ap	0.05	mm
ae	1.62	mm
Q	0.537148	cm ³ /min
hmoy	0.04743	mm
hmax	0.05000	mm

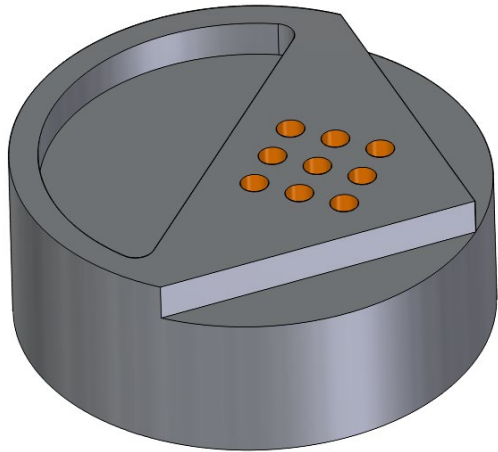




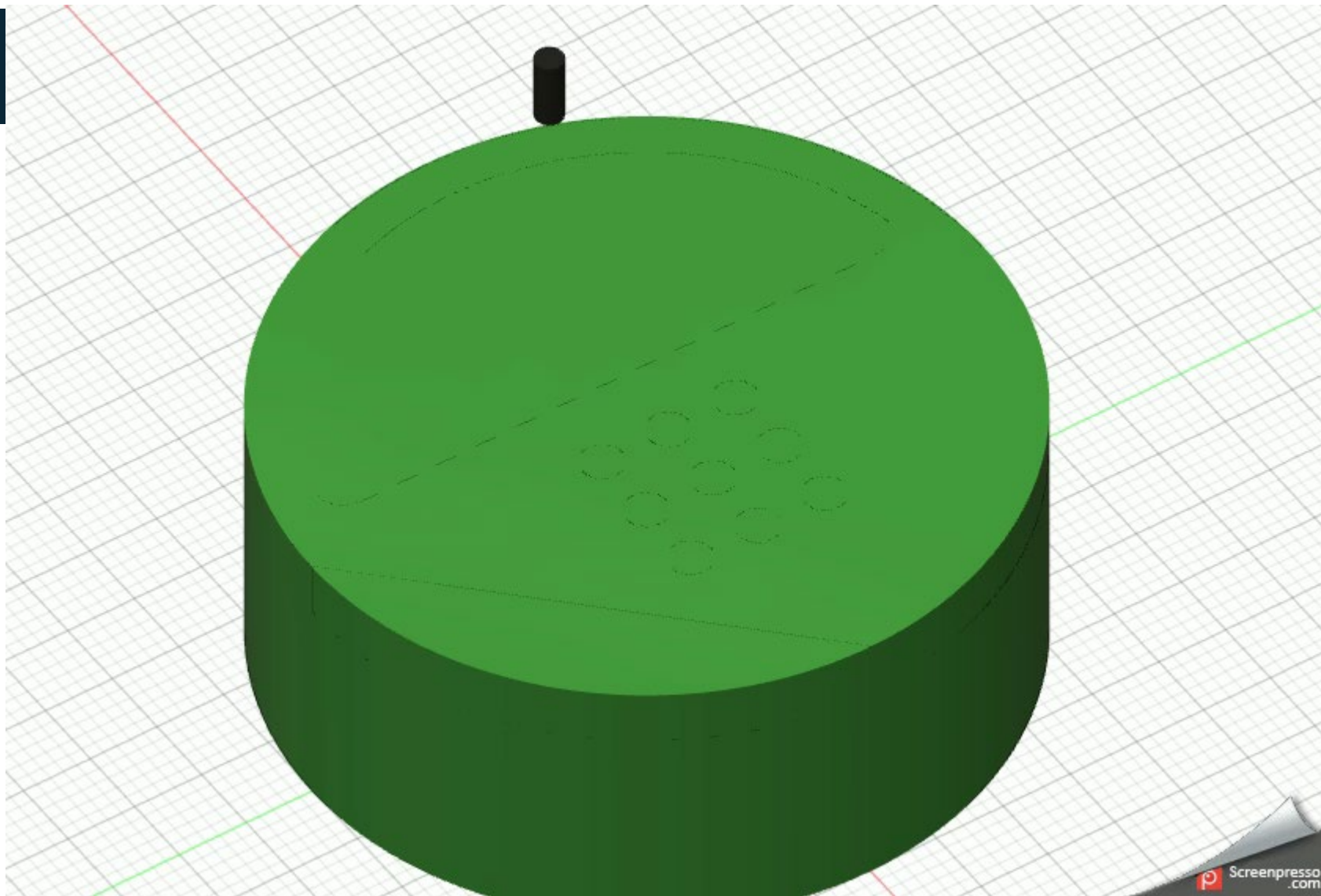
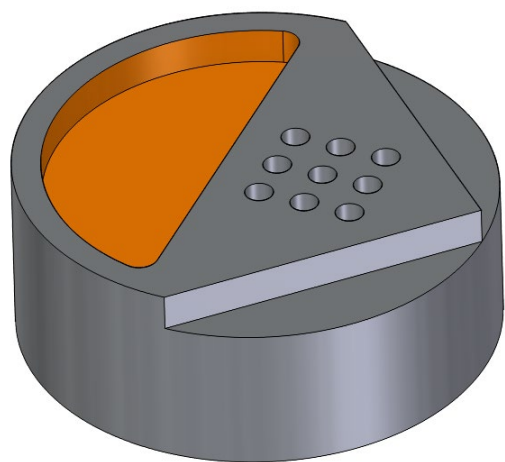
Vc3		
Vc	400	m/min
D	2	mm
n	63662	tr/min
Z	3	dents
Fz	0.05	mm/z
Vf	9549	mm/min
ap	2	mm
ae	0.05	mm
Q	0.954930	cm3/min
hmoy	0.00791	mm
hmax	0.01561	mm



Perçage



Poche



Fraisage en volume constant



Outils spécifiques pour MCU

Ref 3520

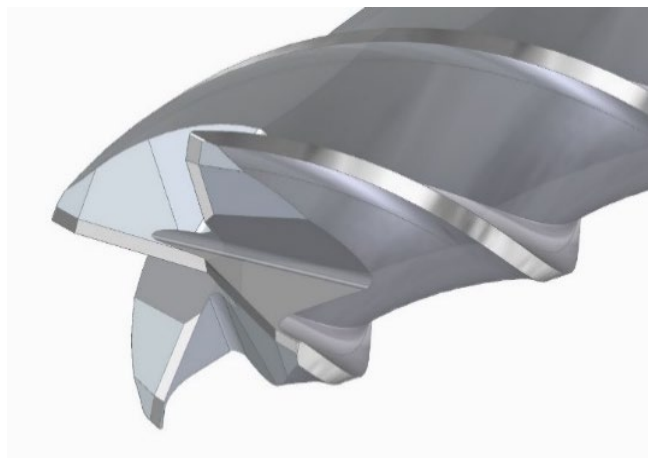


Ref 73520



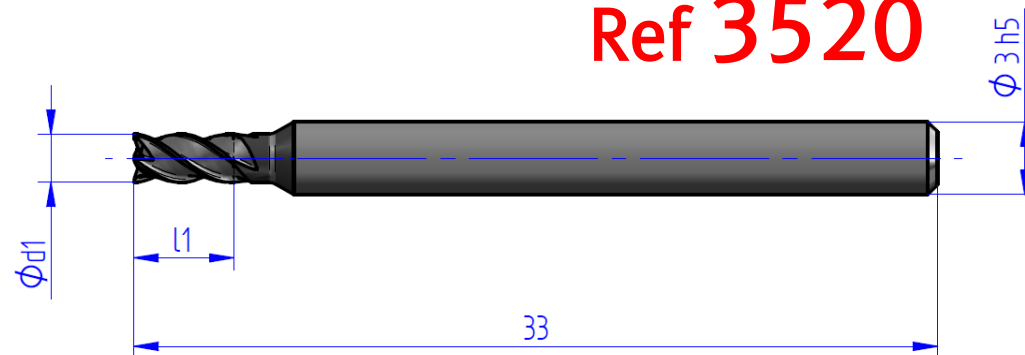
Outils spécifiques pour MCU

- Outils polyvalents
- Z4
- Multi-matières

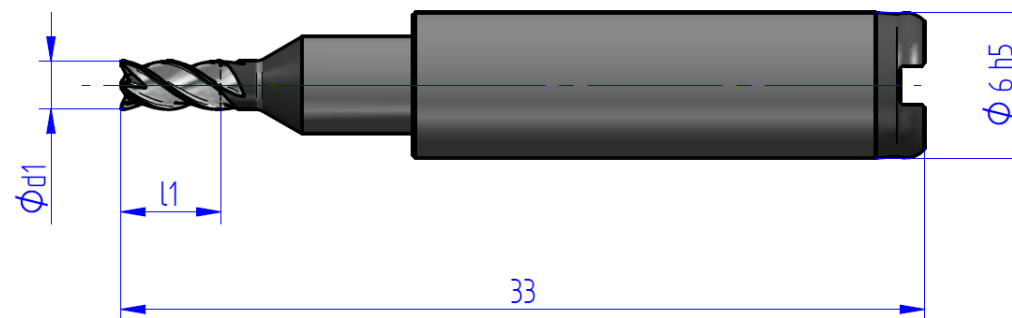


	$\varnothing d1$	$l1$
1.	$\varnothing 0.50$	1.0
2.	$\varnothing 0.70$	1.4
3.	$\varnothing 1.00$	2.0
4.	$\varnothing 1.50$	3.0
5.	$\varnothing 2.00$	4.0
6.	$\varnothing 3.00$	6.0

Ref 3520



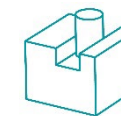
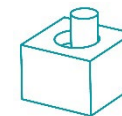
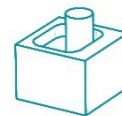
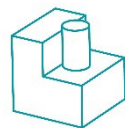
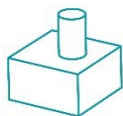
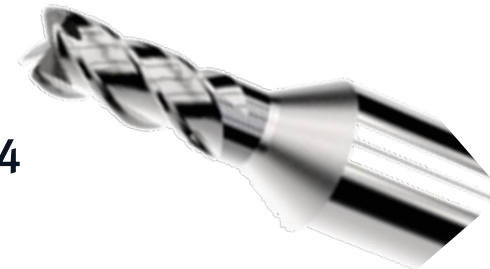
Ref 73520



Paramètres de coupe MCU

Ref **3520**
73520

Fraise en bout Ø2x4
4 dents



Laiton sans plomb	SOLO	Vc = 370	Ap = 0.222	Vc = 370	Ap = 4	Vc = 370	Ap = 4	Vc = 370	Ap = 0.25	Vc = 370	Ap = 0.2
		Fz = 0.02	Ae = 1.9	Fz = 0.05	Ae = 0.10	Fz = 0.05	Ae = 0.10	Fz = 0.007	Ae = 1.5	Fz = 0.05	Ae = 2.0
Inox	TISI	Vc = 350	Ap = 0.20	Vc = 350	Ap = 4	Vc = 350	Ap = 4	Vc = 350	Ap = 0.15	Vc = 350	Ap = 0.12
		Fz = 0.02	Ae = 1.0	Fz = 0.05	Ae = 0.05	Fz = 0.05	Ae = 0.05	Fz = 0.007	Ae = 1.5	Fz = 0.05	Ae = 2.0
Titane	-/TISI	Vc = 300	Ap = 0.10	Vc = 300	Ap = 4	Vc = 300	Ap = 4	Vc = 300	Ap = 0.125	Vc = 300	Ap = 0.095
		Fz = 0.02	Ae = 1.0	Fz = 0.05	Ae = 0.05	Fz = 0.05	Ae = 0.05	Fz = 0.007	Ae = 1.5	Fz = 0.05	Ae = 2.0

Vos contacts



Suisse romande



Hubert Choulat

+41 (0)78 708 54 01
hchoulat@louisbelet.ch



Loïc Yerly

+41 (0)79 445 53 07
lyerly@louisbelet.ch

France



Fabrice Berche

+33 (0)6 30 17 32 87
fberche@louisbelet.ch