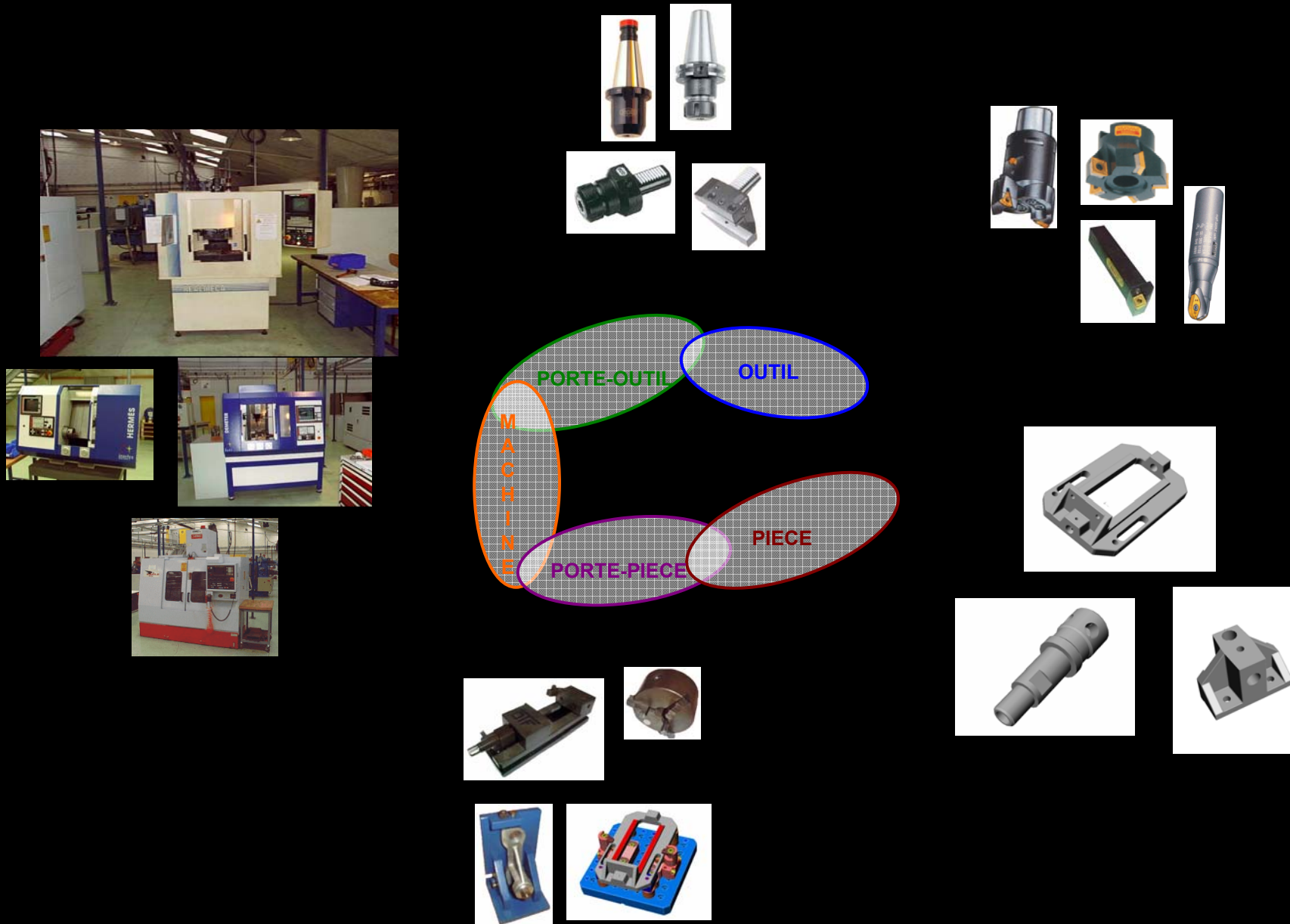


SYSTÈME DE PRODUCTION



VIDEOS D'USINAGE



Fraisage



Tournage

Tournage / Fraisage

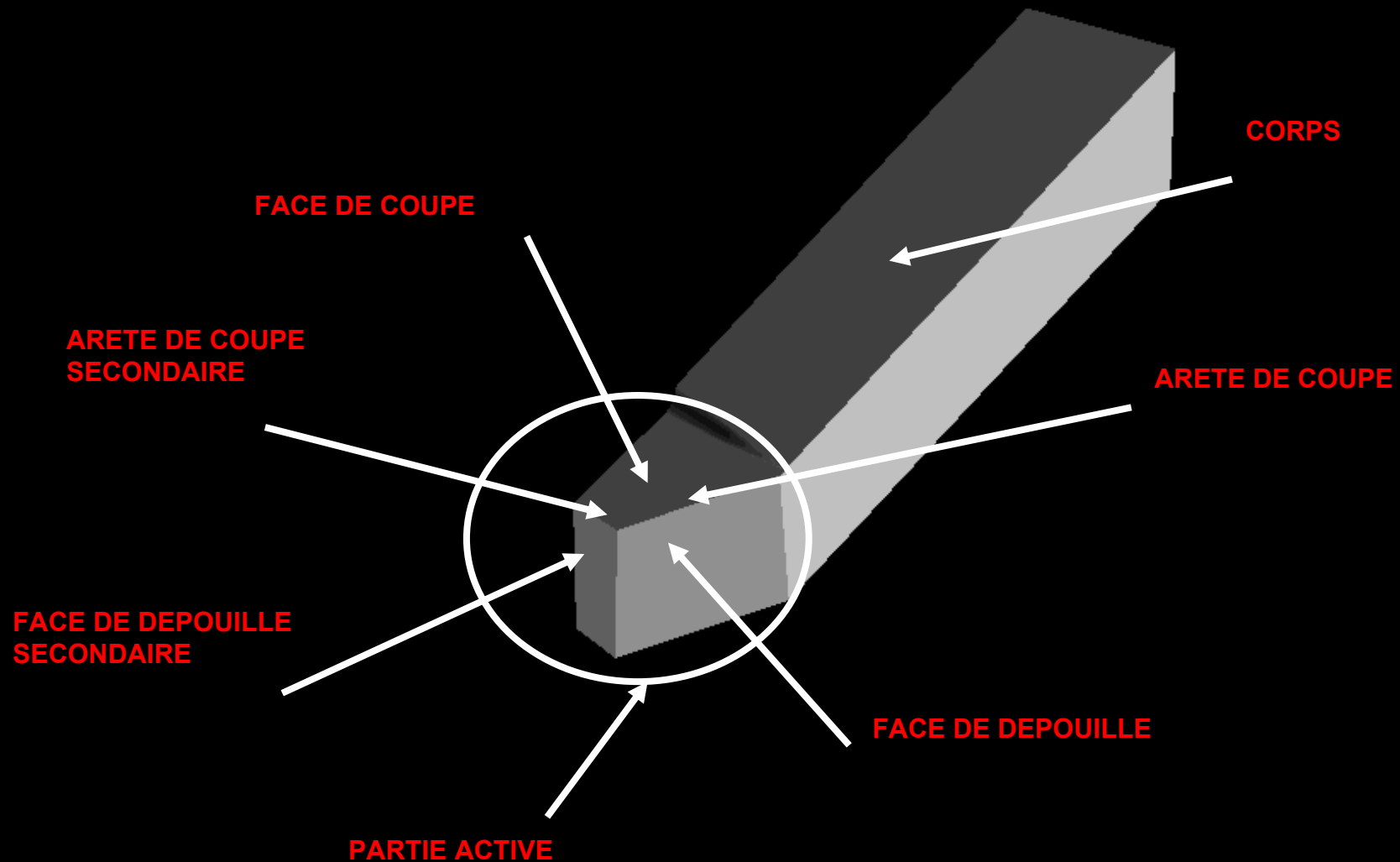


Perçage



Tournage Dur

OUTIL DE TOURNAGE



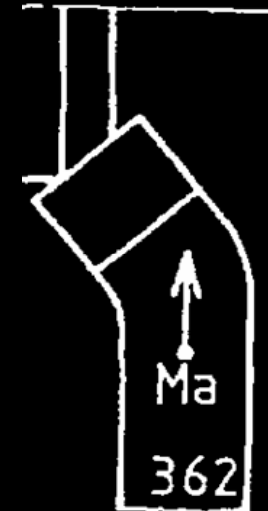
OPERATIONS D'USINAGE

USINAGE DE FORME

C'est une ligne de l'arête qui enlève la matière.

C'est la forme de l'arête coupante qui donne sa forme à la pièce.

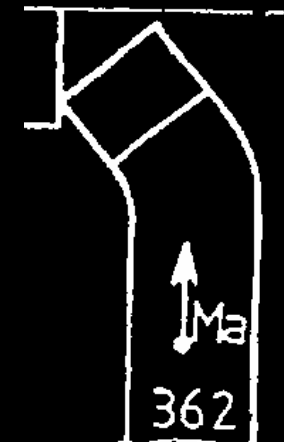
Dans ce cas tout défaut de l'arête sera reproduite sur la pièce.



USINAGE D'ENVELOPPE

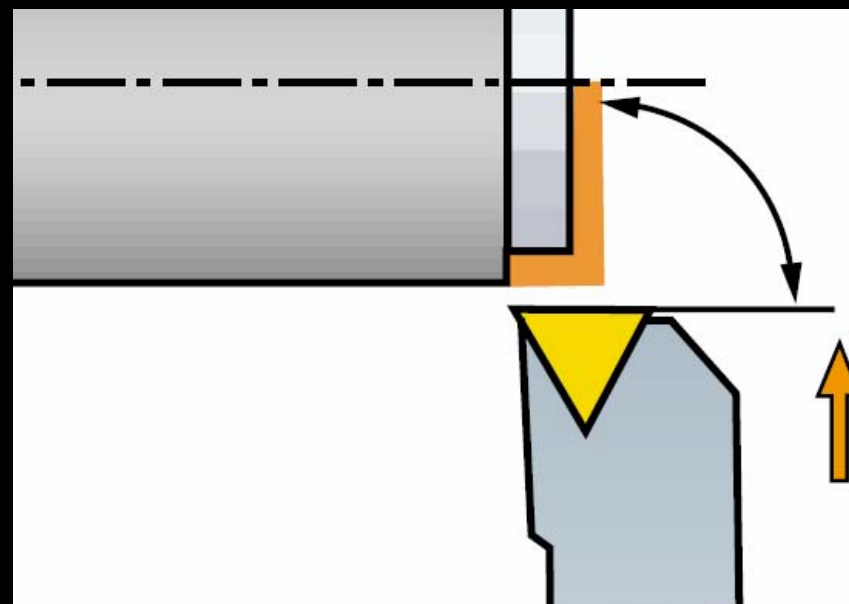
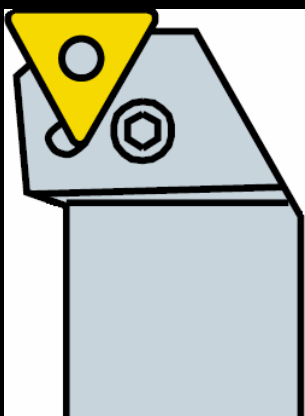
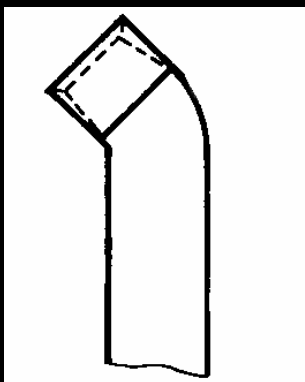
L'usinage d'enveloppe lorsque c'est un point de l'arête qui enlève la matière.

C'est la trajectoire de l'outil qui donne sa forme à la pièce.



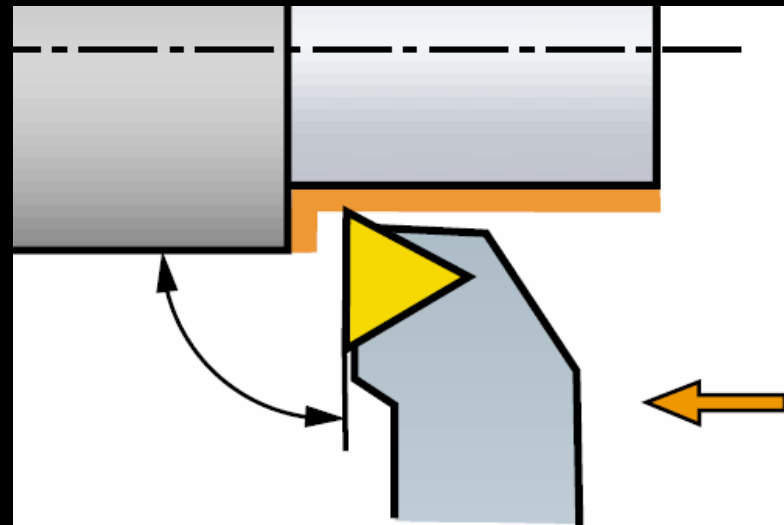
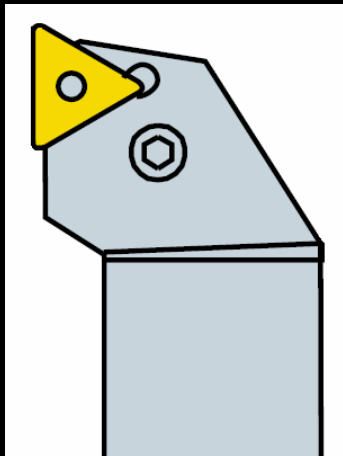
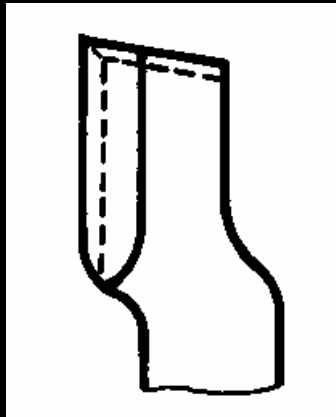
OPERATIONS D'USINAGE EN TOURNAGE

Le Dressage



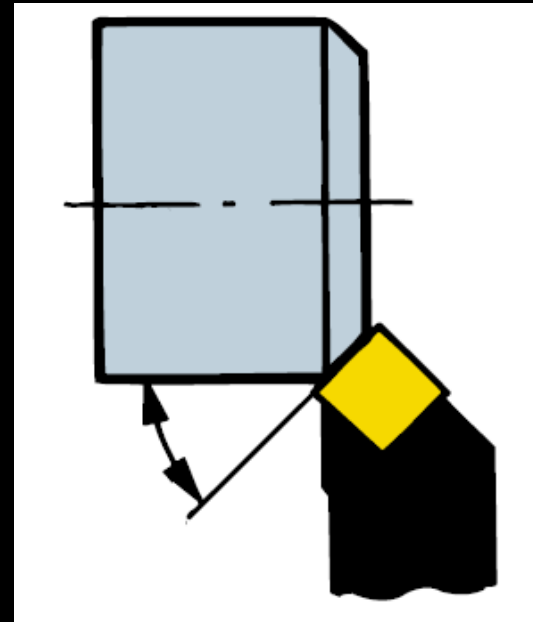
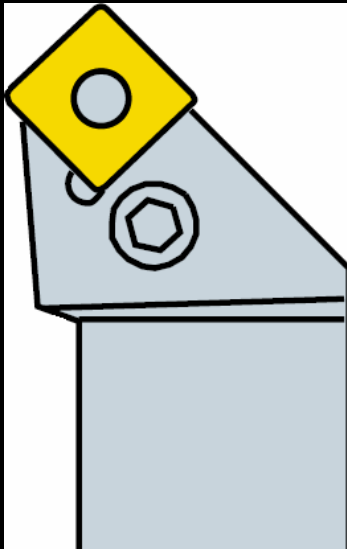
OPERATIONS D'USINAGE EN TOURNAGE

Le Chariotage



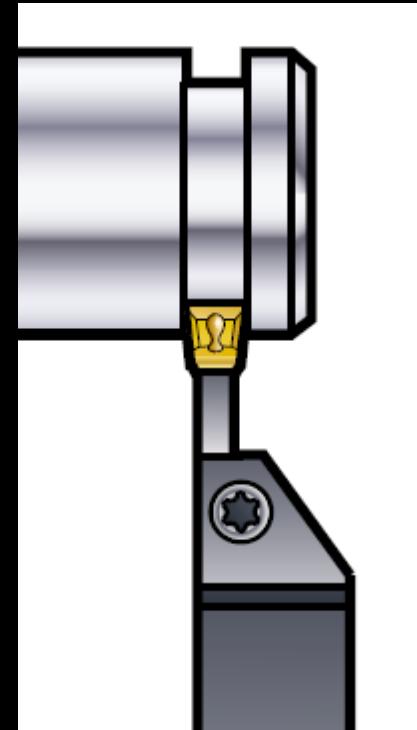
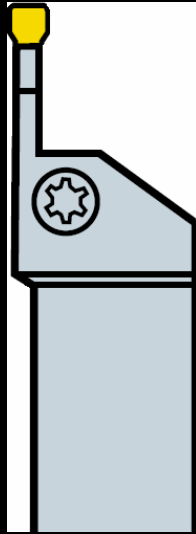
OPERATIONS D'USINAGE EN TOURNAGE

Le Chanfreinage



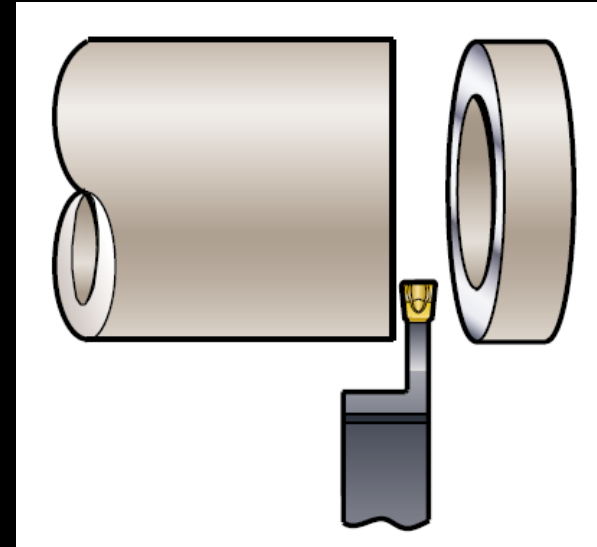
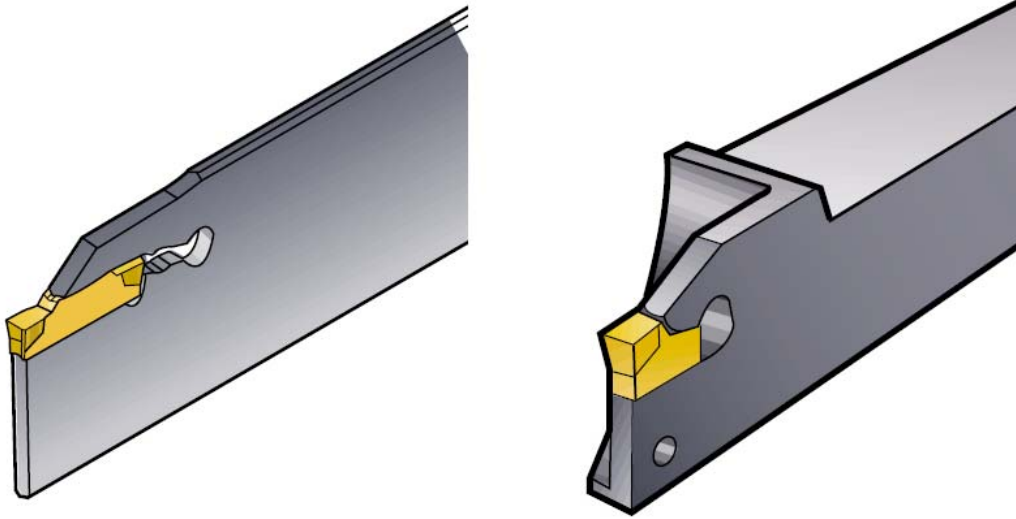
OPERATIONS D'USINAGE EN TOURNAGE

Usinage d'une gorge



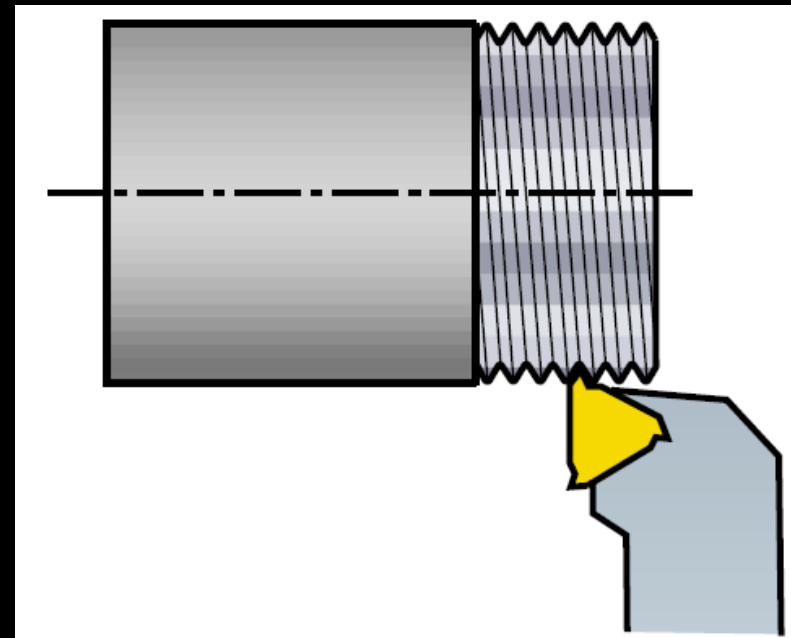
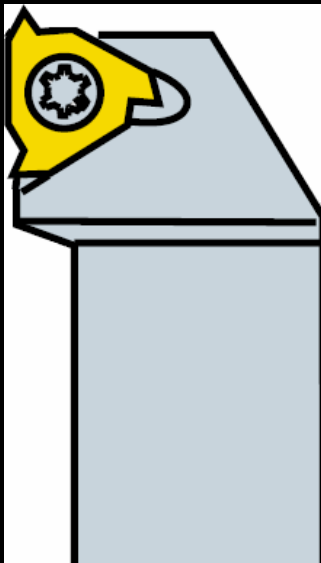
OPERATIONS D'USINAGE EN TOURNAGE

Tronçonnage



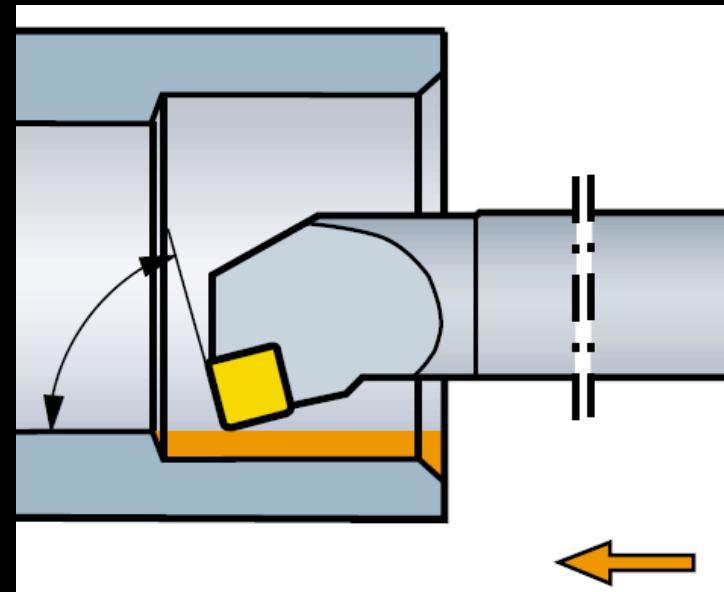
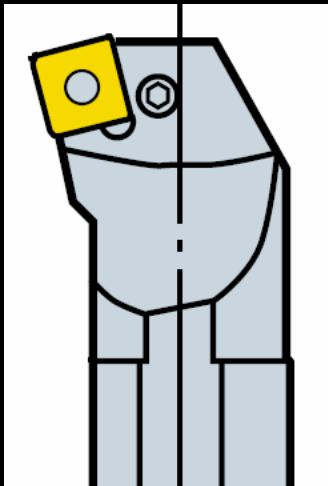
OPERATIONS D'USINAGE EN TOURNAGE

Filetage extérieur



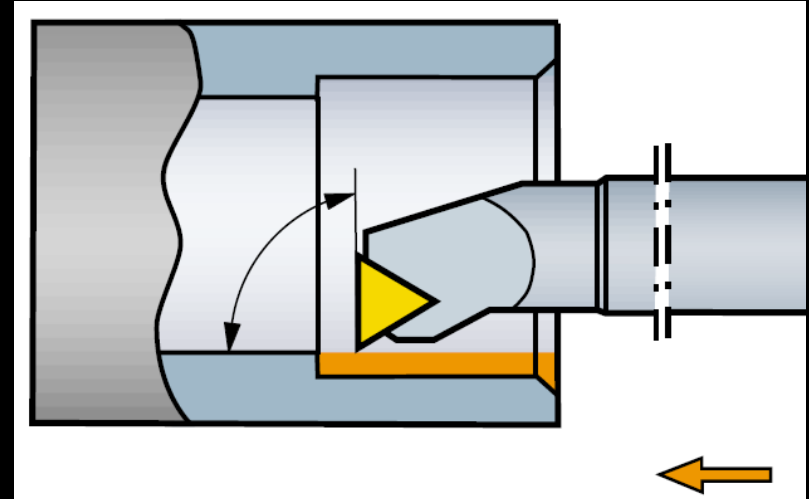
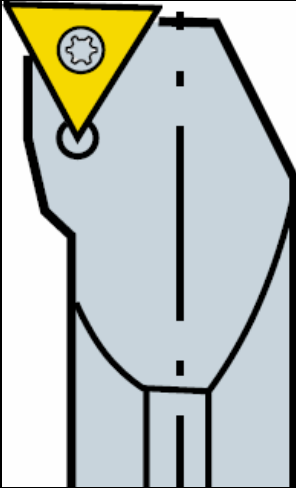
OPERATIONS D'USINAGE EN TOURNAGE

Alésage



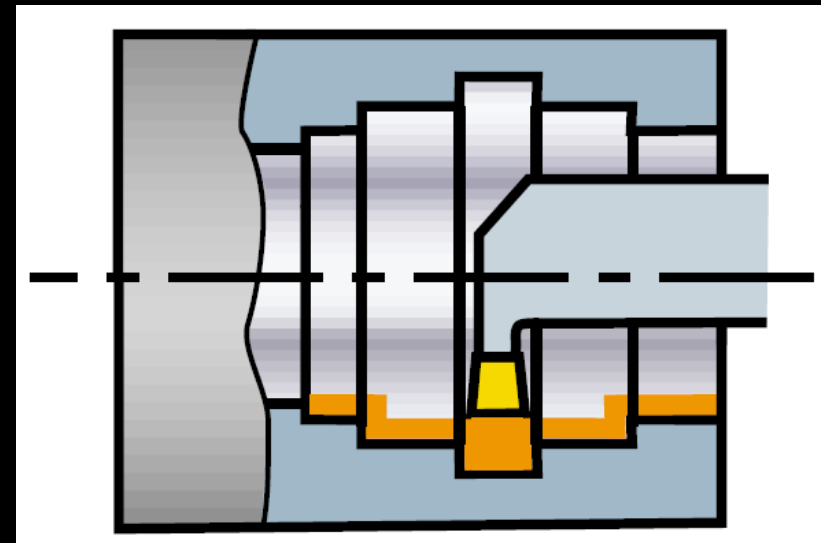
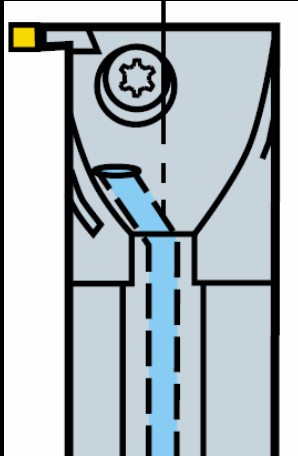
OPERATIONS D'USINAGE EN TOURNAGE

Dressage intérieur



OPERATIONS D'USINAGE EN TOURNAGE

Réalisation d'un Chambrage



OUTIL DE FRAISAGE

PREMIERE FACE DE DEPOUILLE
PRINCIPALE

DEUXIEME FACE DE
DEPOUILLE PRINCIPALE

FACE DE DEPOUILLE
SECONDAIRE

ARETE PRINCIPALE

CORPS

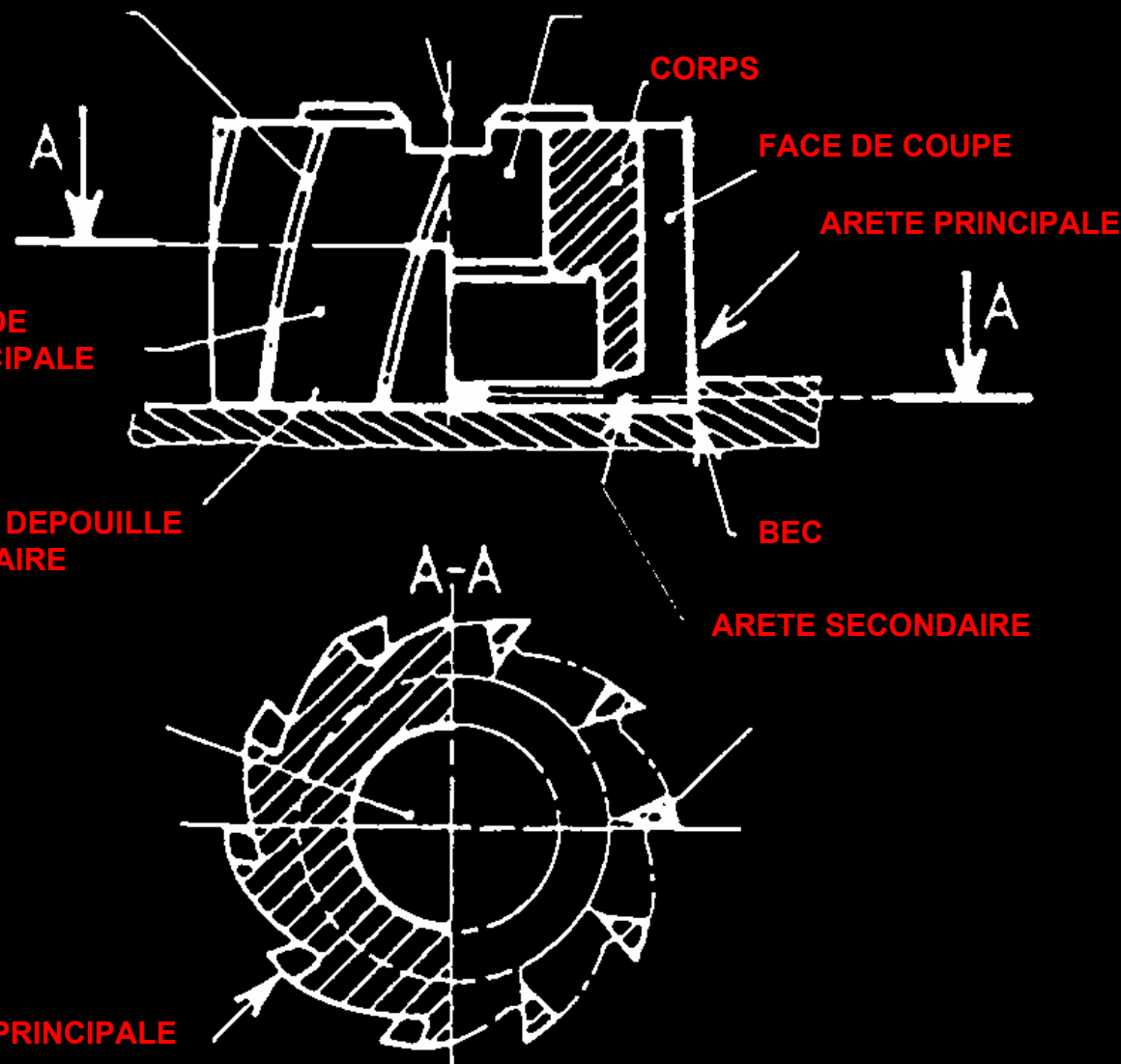
FACE DE COUPE

ARETE PRINCIPALE

BEC

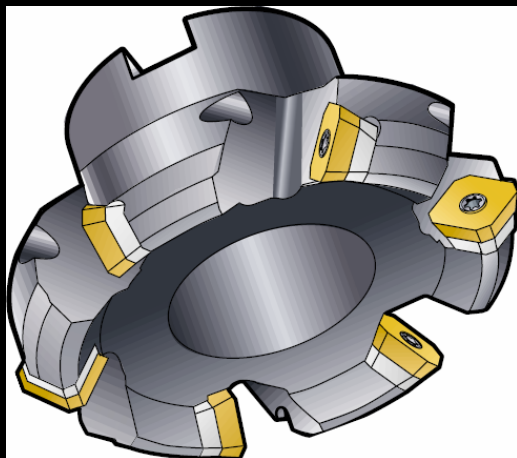
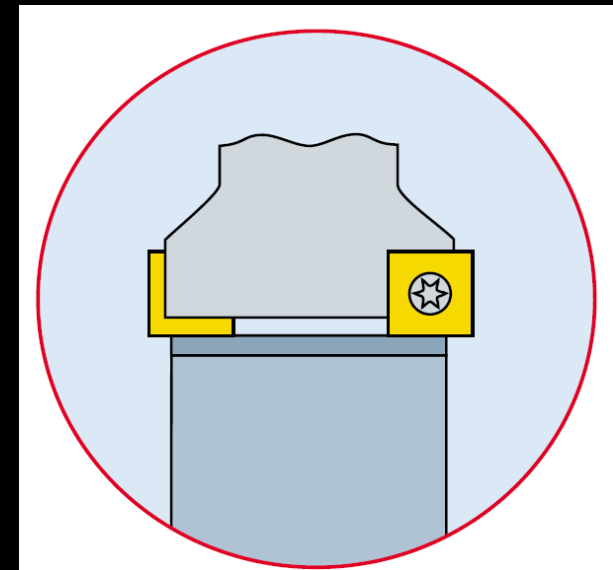
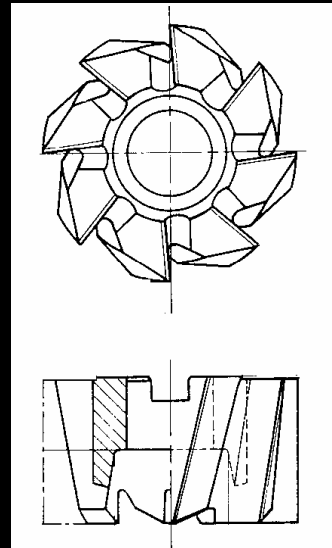
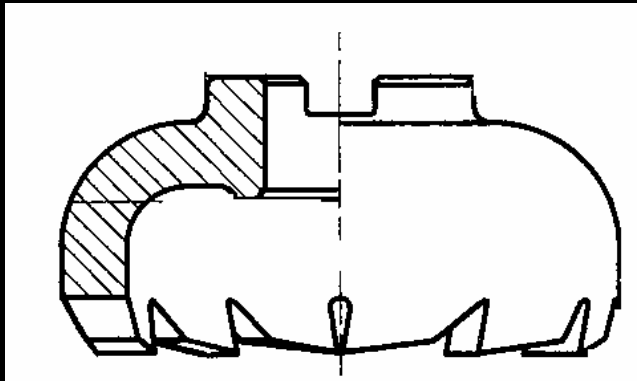
ARETE SECONDAIRE

A-A



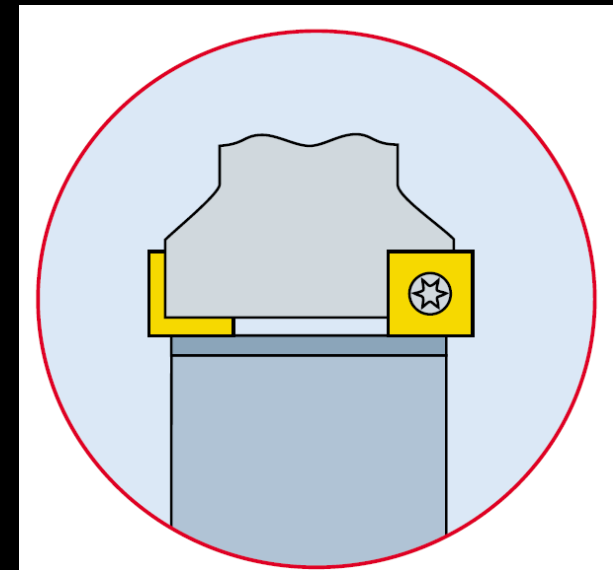
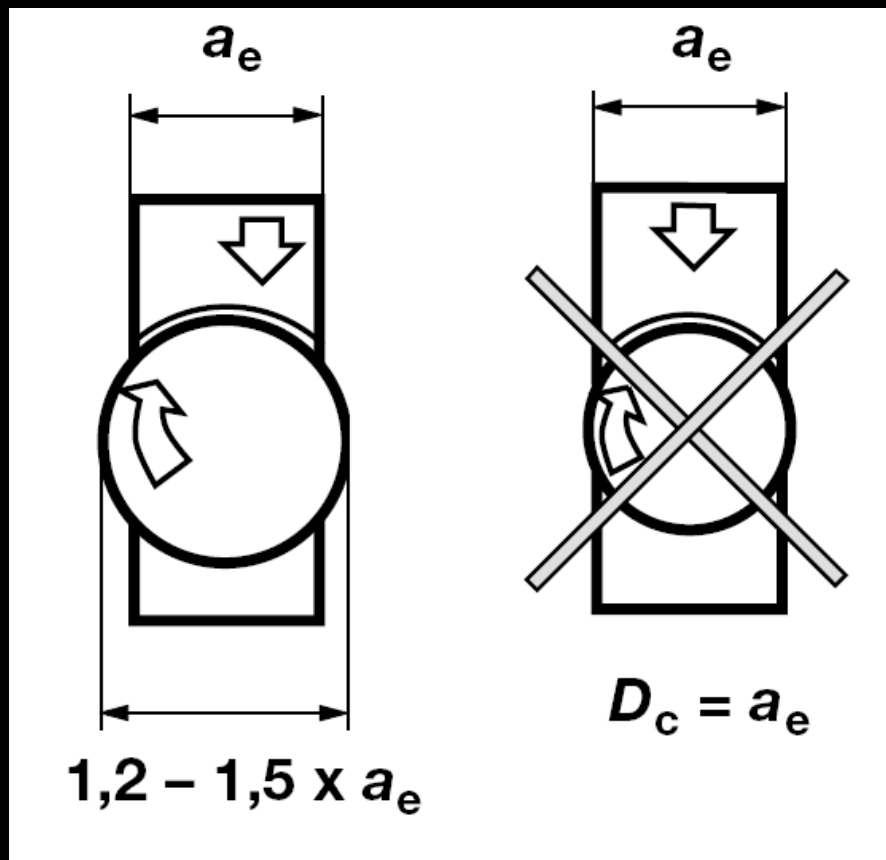
OPERATIONS D'USINAGE EN FRAISAGE

Surfaçage en bout



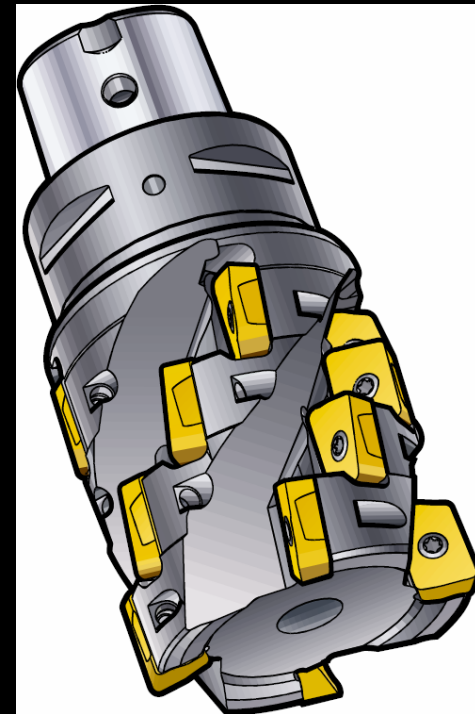
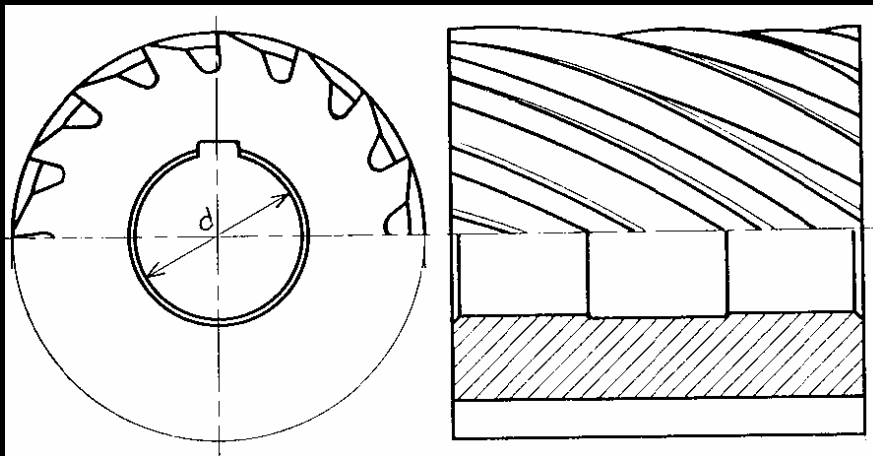
OPERATIONS D'USINAGE EN FRAISAGE

Surfaçage en bout



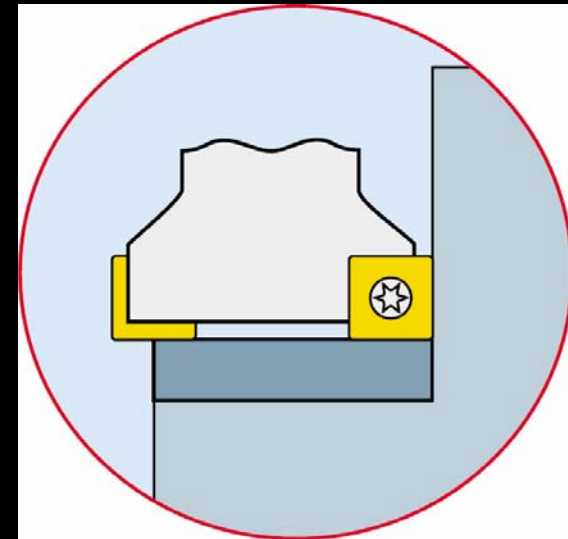
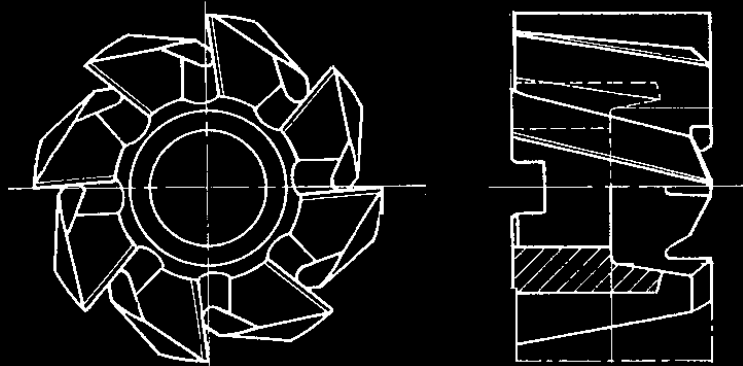
OPERATIONS D'USINAGE EN FRAISAGE

Surfaçage de profil



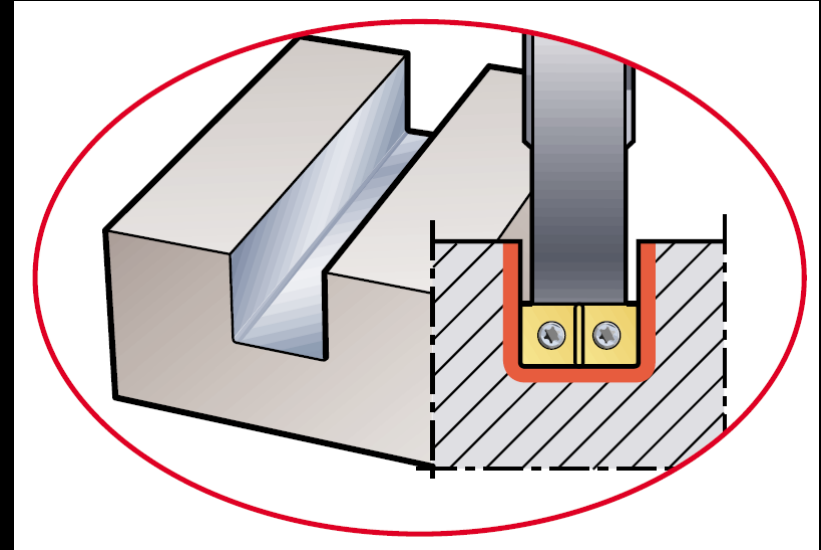
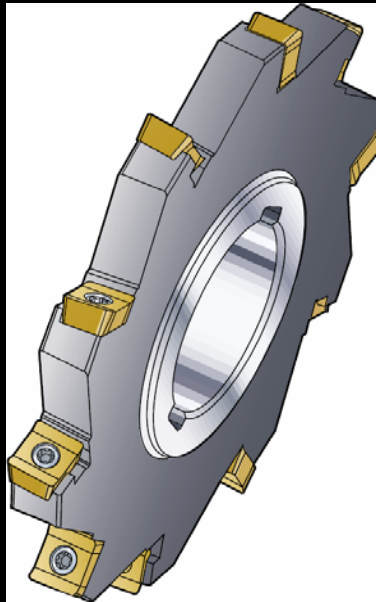
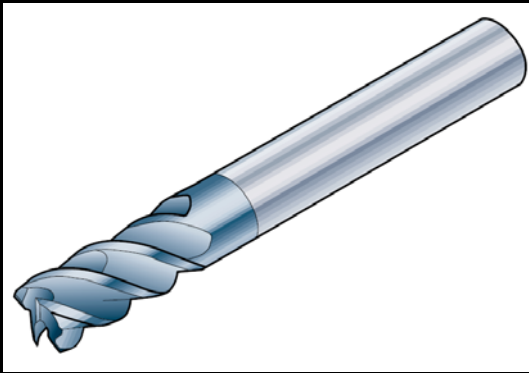
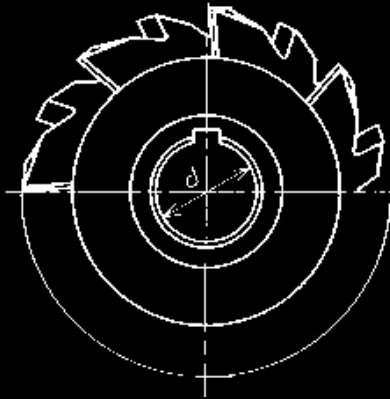
OPERATIONS D'USINAGE EN FRAISAGE

Surfaçage - dressage



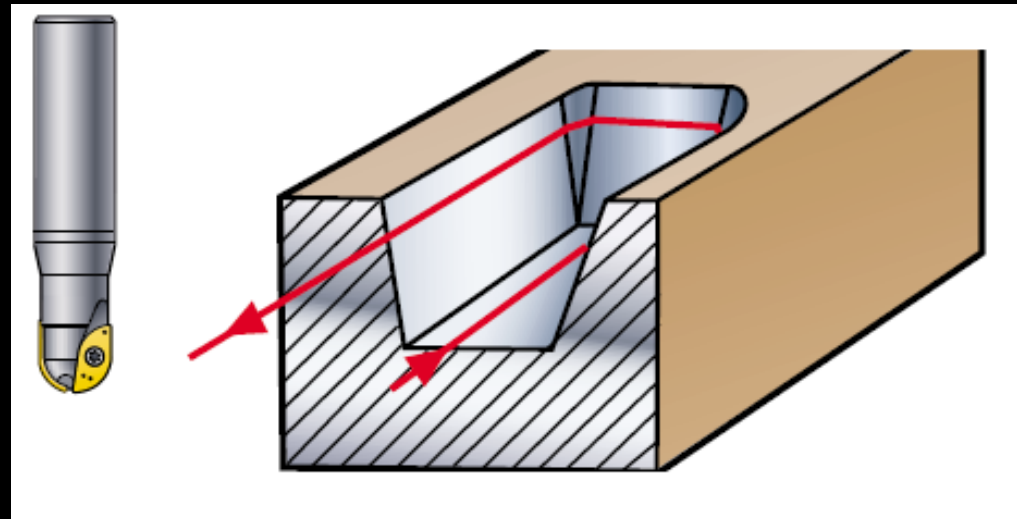
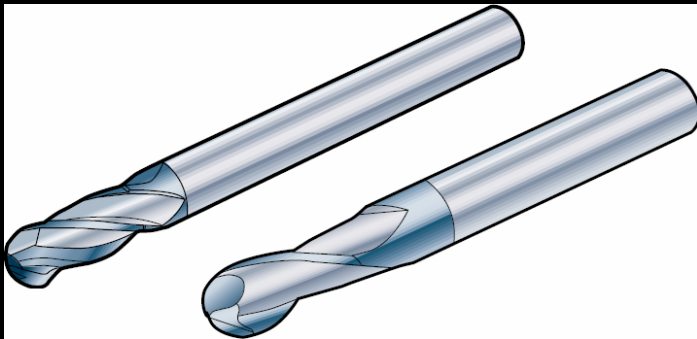
OPERATIONS D'USINAGE EN FRAISAGE

Rainurage

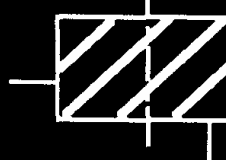
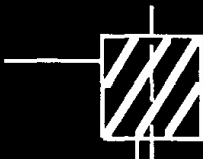
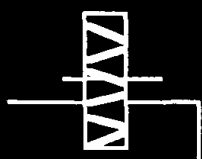


OPERATIONS D'USINAGE EN FRAISAGE

Contournage

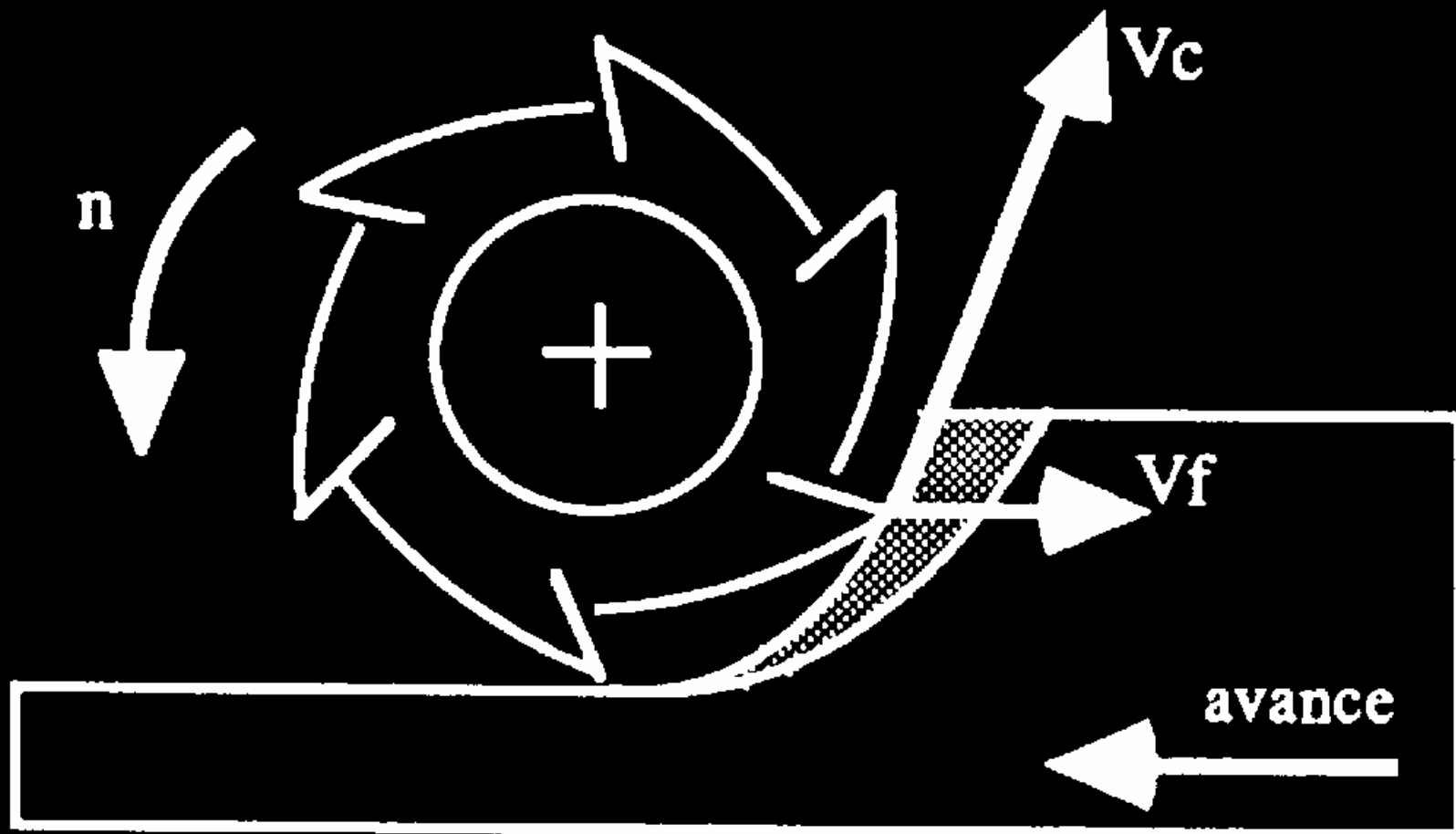


TYPE D'USINAGE EN FRAISAGE

Désignation		Shéma	Fraises		Matériaux de l'outil
SURFACAGE	en bout (enveloppe)		Tourteau à plaquettes		carbure métallique
			2 tailles cylindrique à trou		A.R.S ou CM monobloc lame brasée en CM
			1 taille Antoine		A.R.S
	de profil (en roulant)		1 taille à surfacer		A.R.S
FRAISAGE COMBINE	dominante en bout		Tourteau 2 tailles à plaquettes		Carbure métallique
			Cylindrique 2 tailles à trou		A.R.S ou CM monobloc
	dominante de profil		Cylindrique 2 tailles à plaquettes		Carbure métallique
			Cylindrique 2 tailles à queue ou à trou		A.R.S CM monobloc Lames CM brasées
	en bout (plongée et non débouchant)		2 tailles taille en bout	plaquettes	Carbure métallique
	débouchant			monobloc	A.R.S CM monobloc
	de profil		Cylindrique 2 tailles à queue		A.R.S CM monobloc
	combiné		Fraise disque	1 taille	Plaquettes amovibles en carbure métallique
				3 tailles	A.R.S Lames brasées en carbure métallique

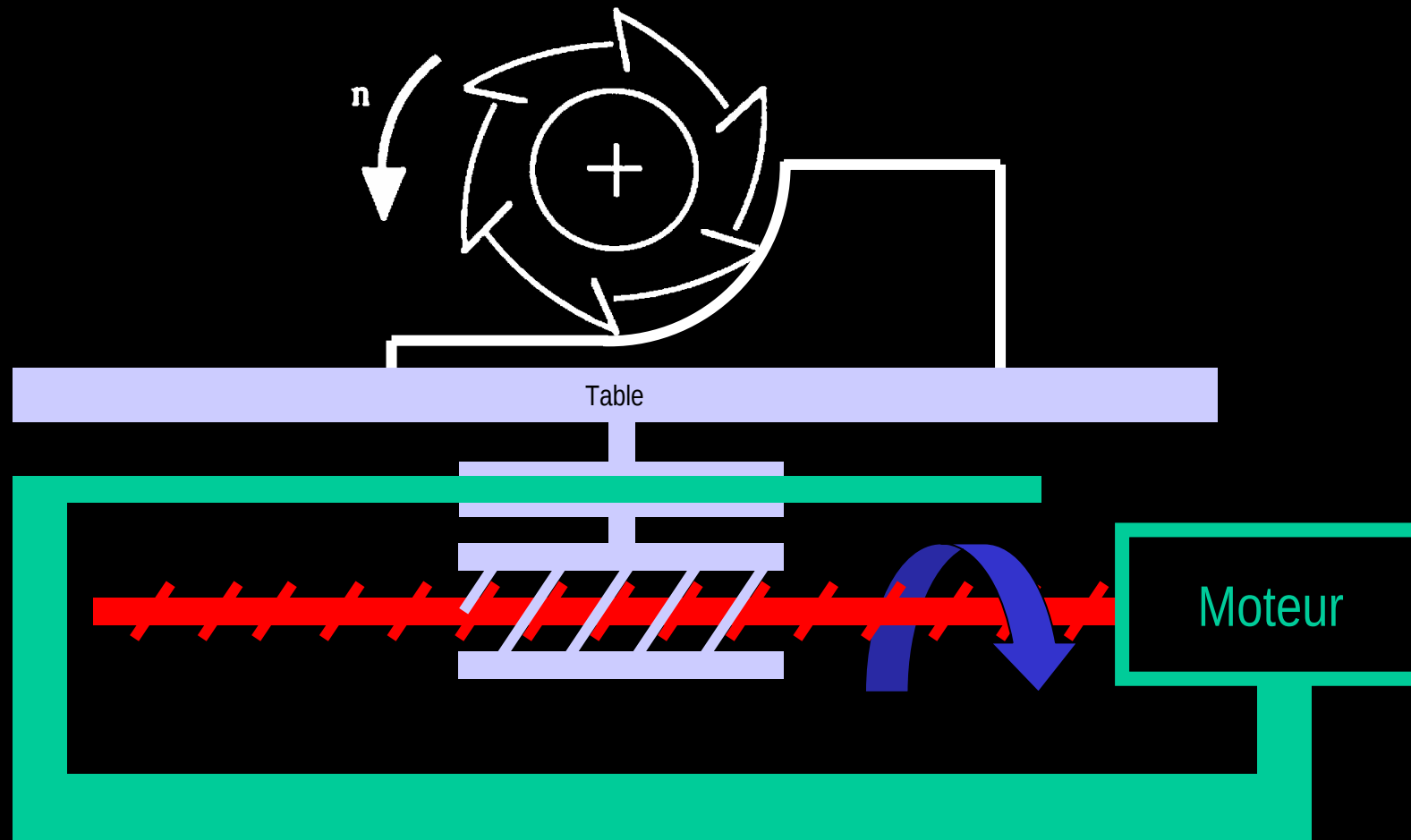
TYPE D'USINAGE EN FRAISAGE

USINAGE EN OPPOSITION



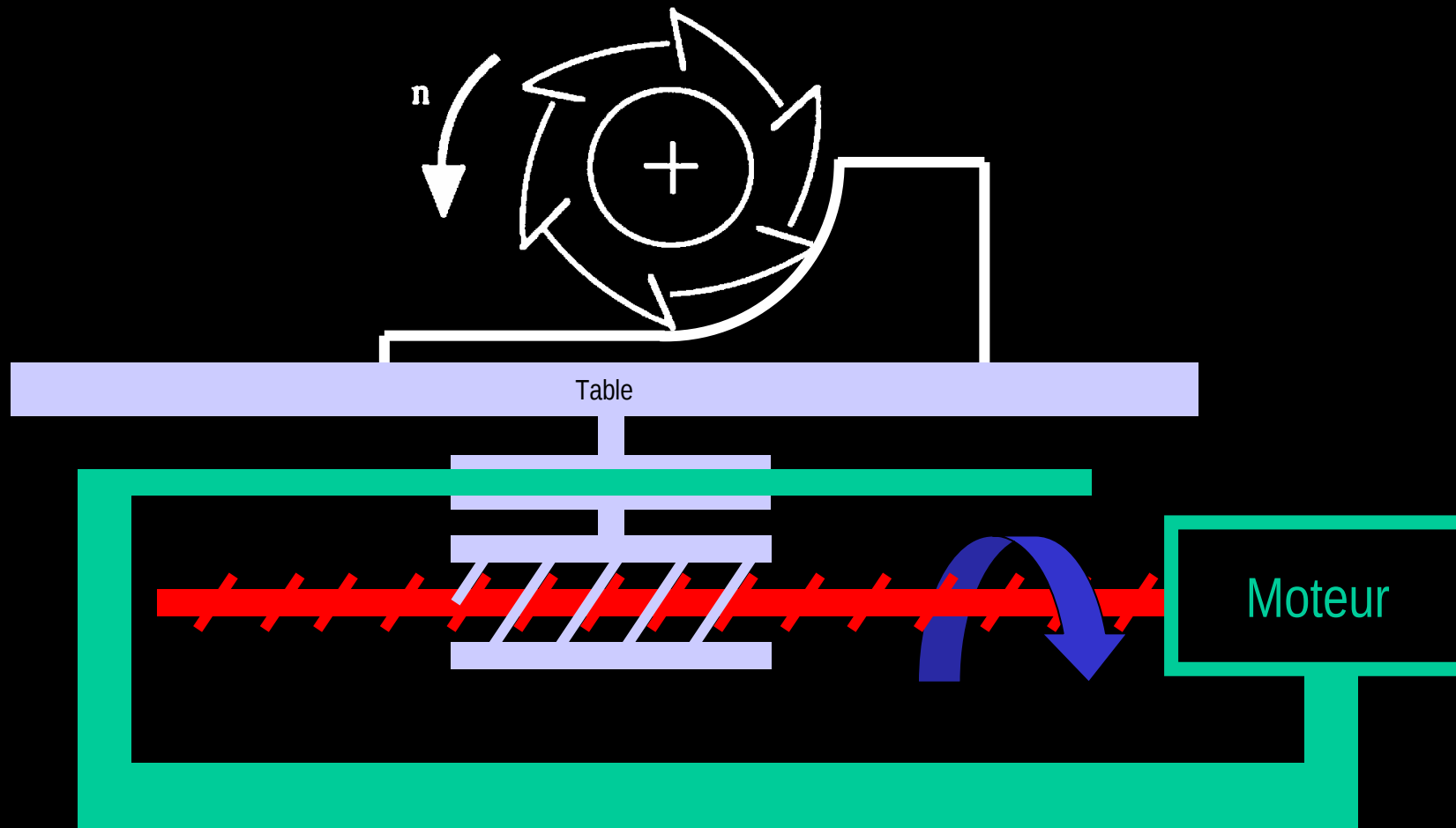
TYPE D'USINAGE EN FRAISAGE

USINAGE EN OPPOSITION



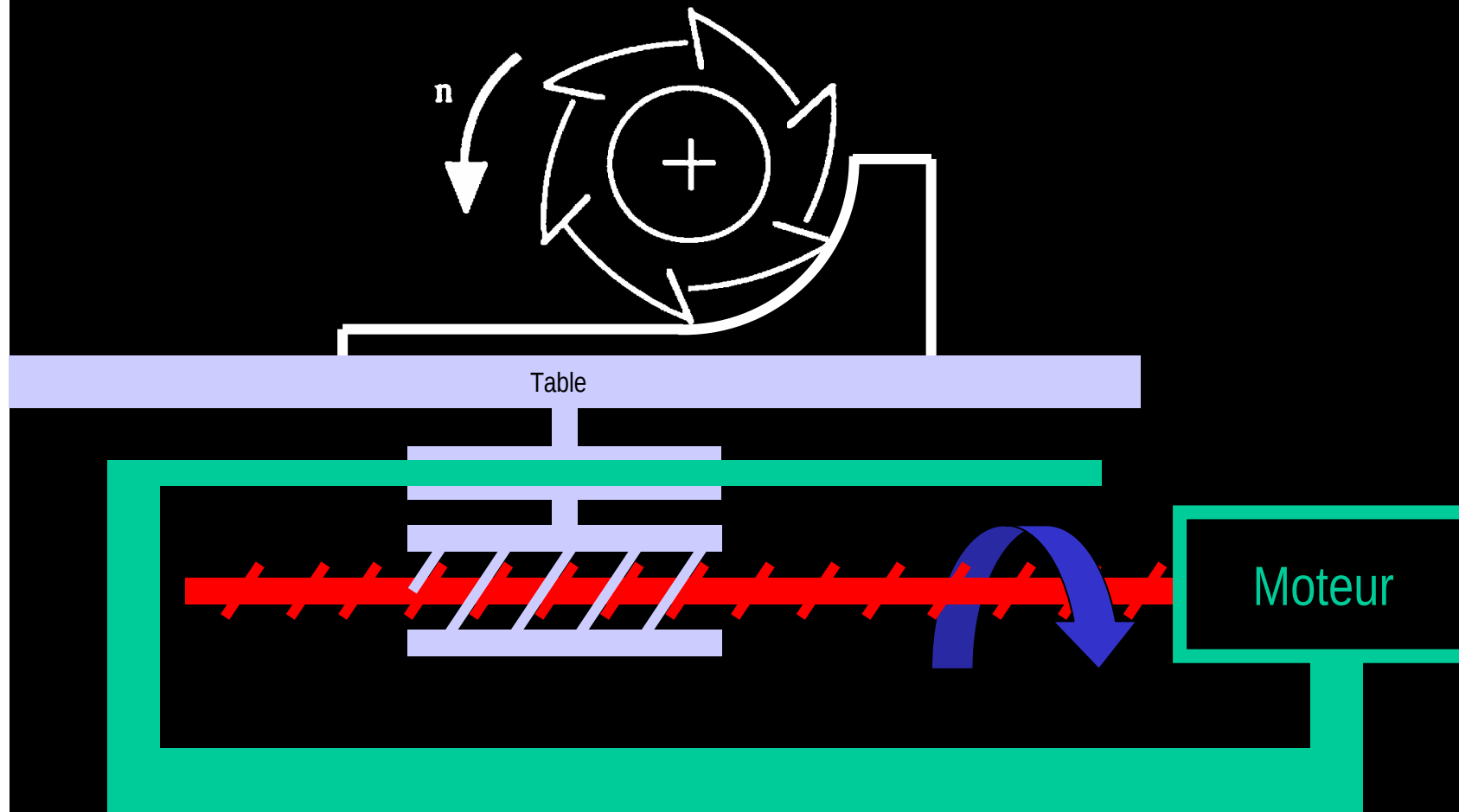
TYPE D'USINAGE EN FRAISAGE

USINAGE EN OPPOSITION



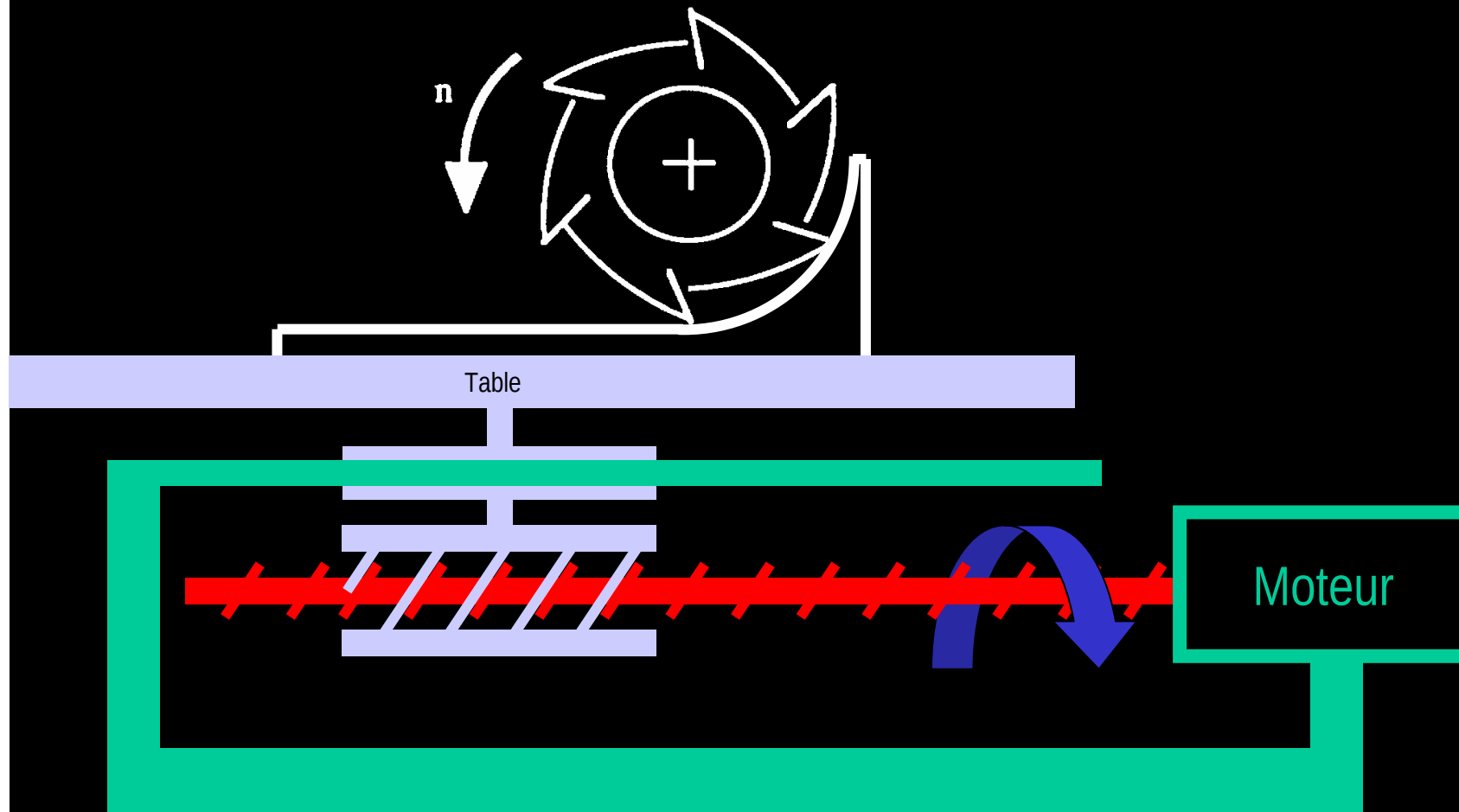
TYPE D'USINAGE EN FRAISAGE

USINAGE EN OPPOSITION



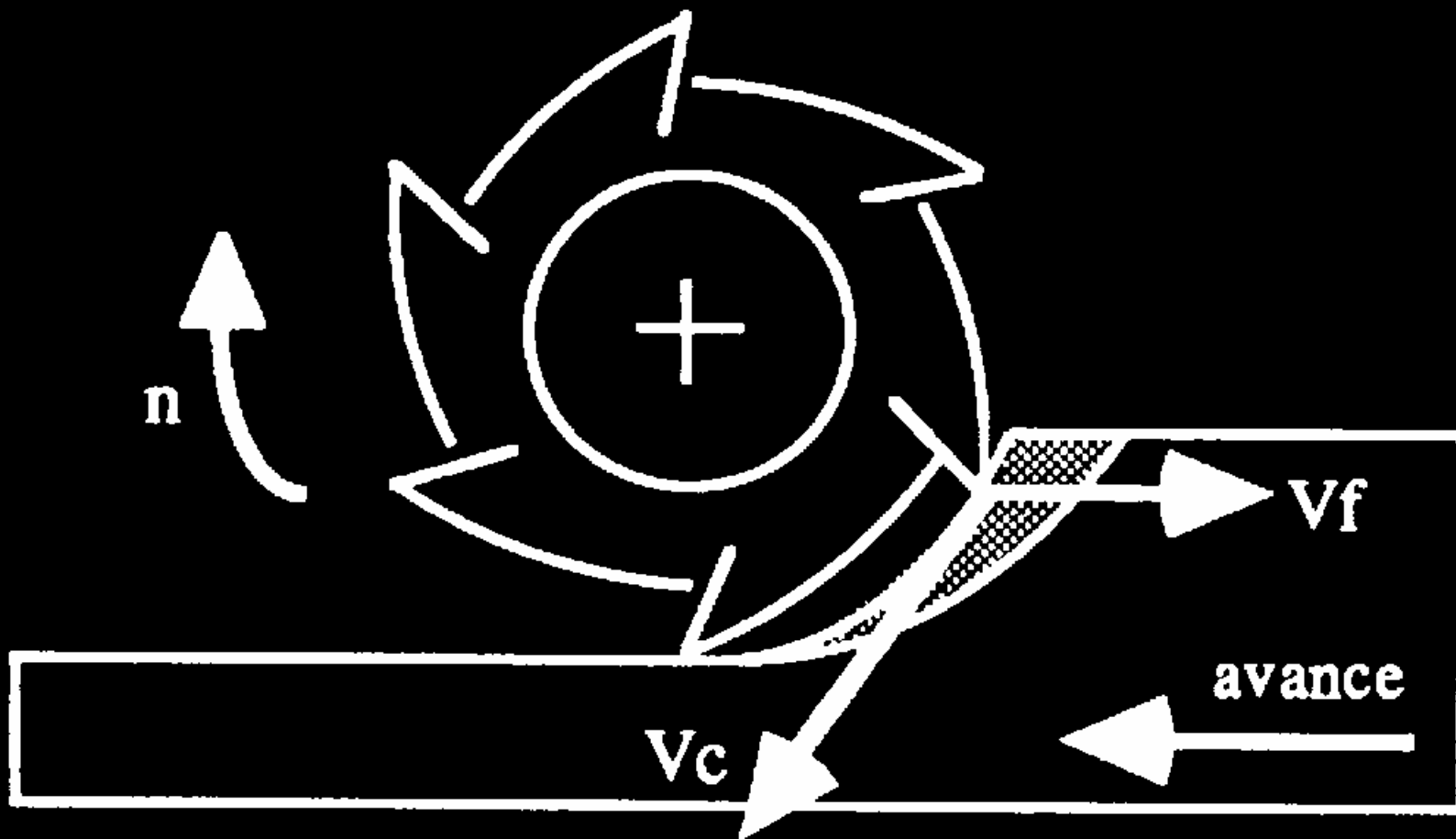
TYPE D'USINAGE EN FRAISAGE

USINAGE EN OPPOSITION



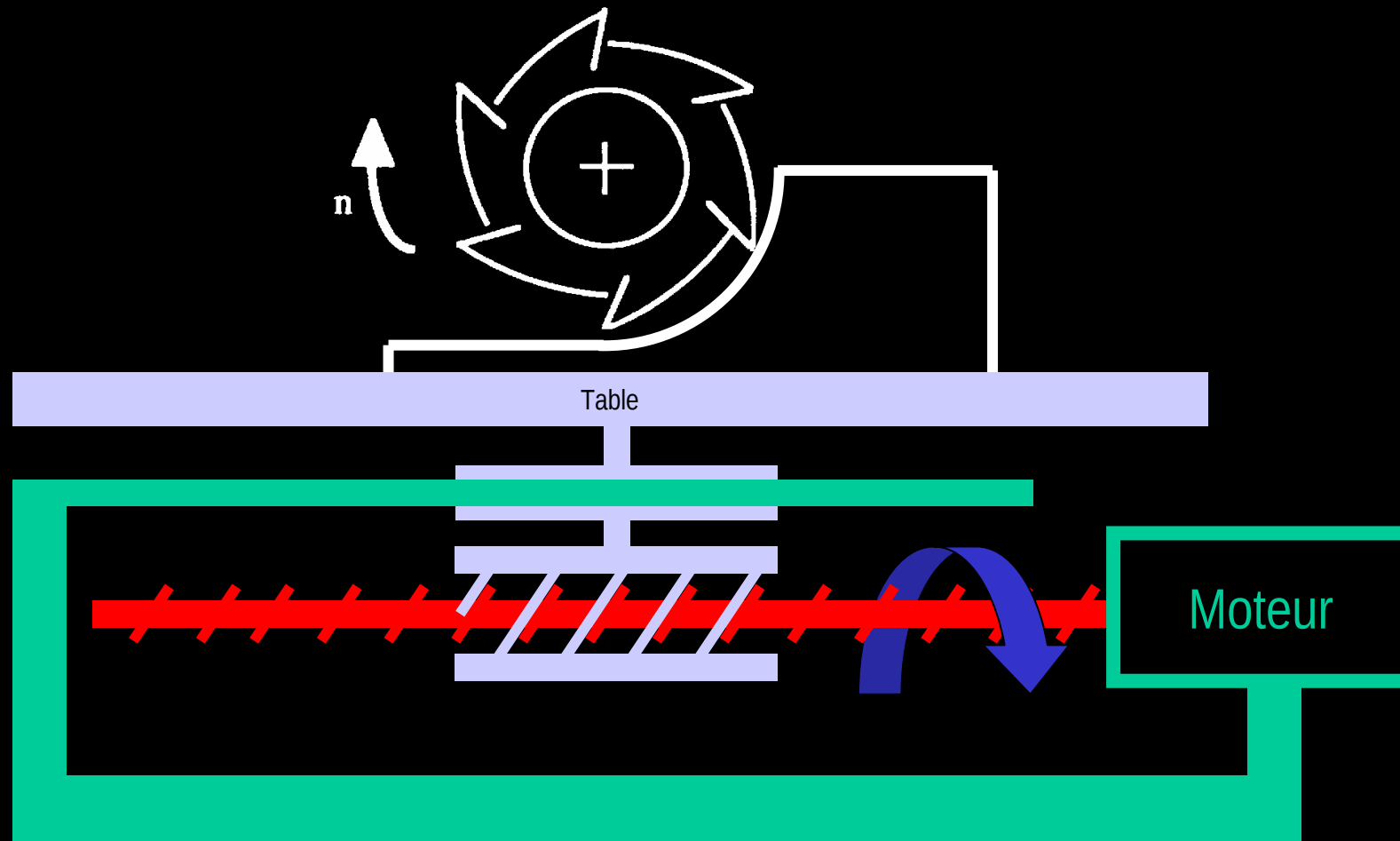
TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE



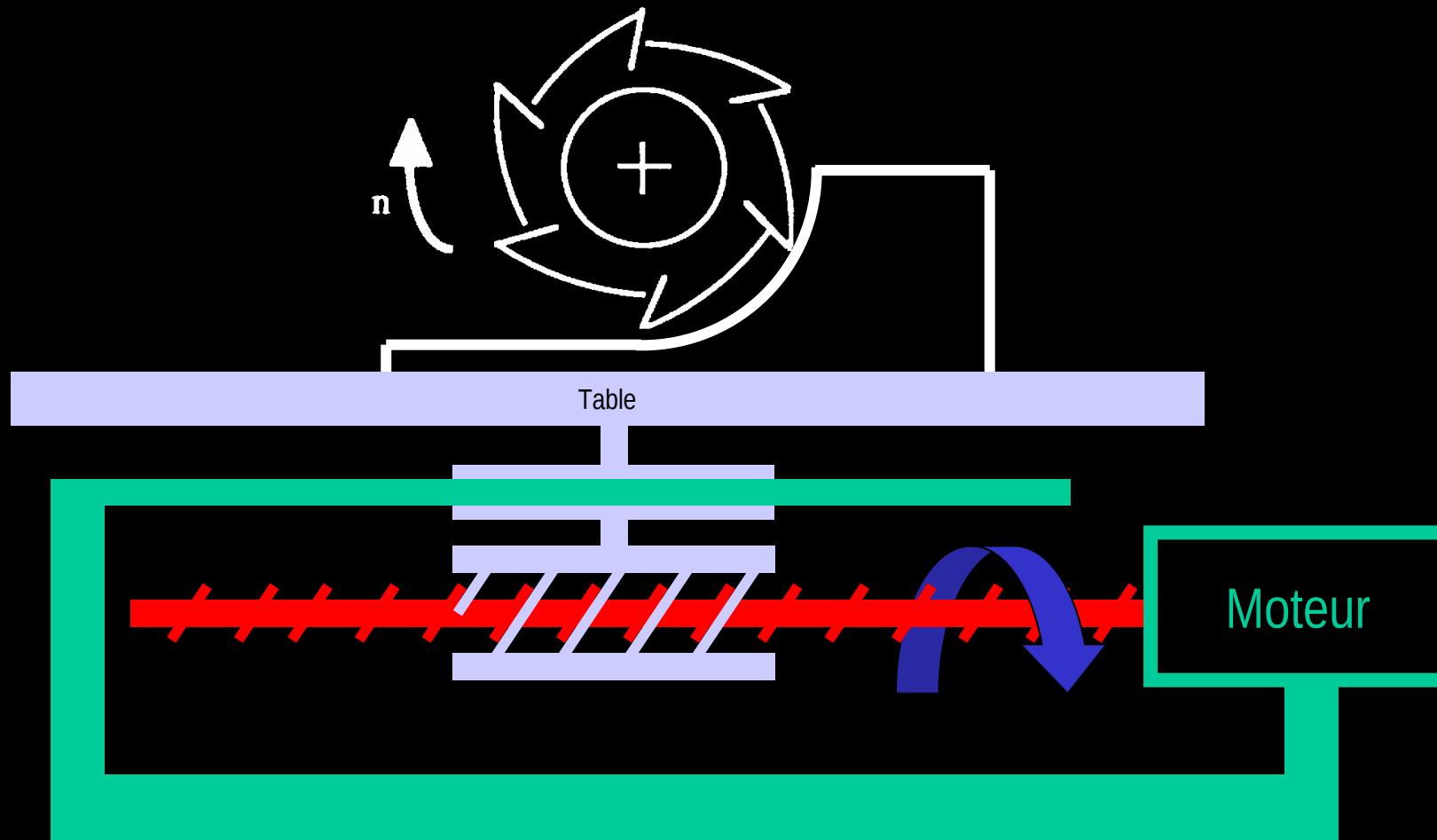
TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE



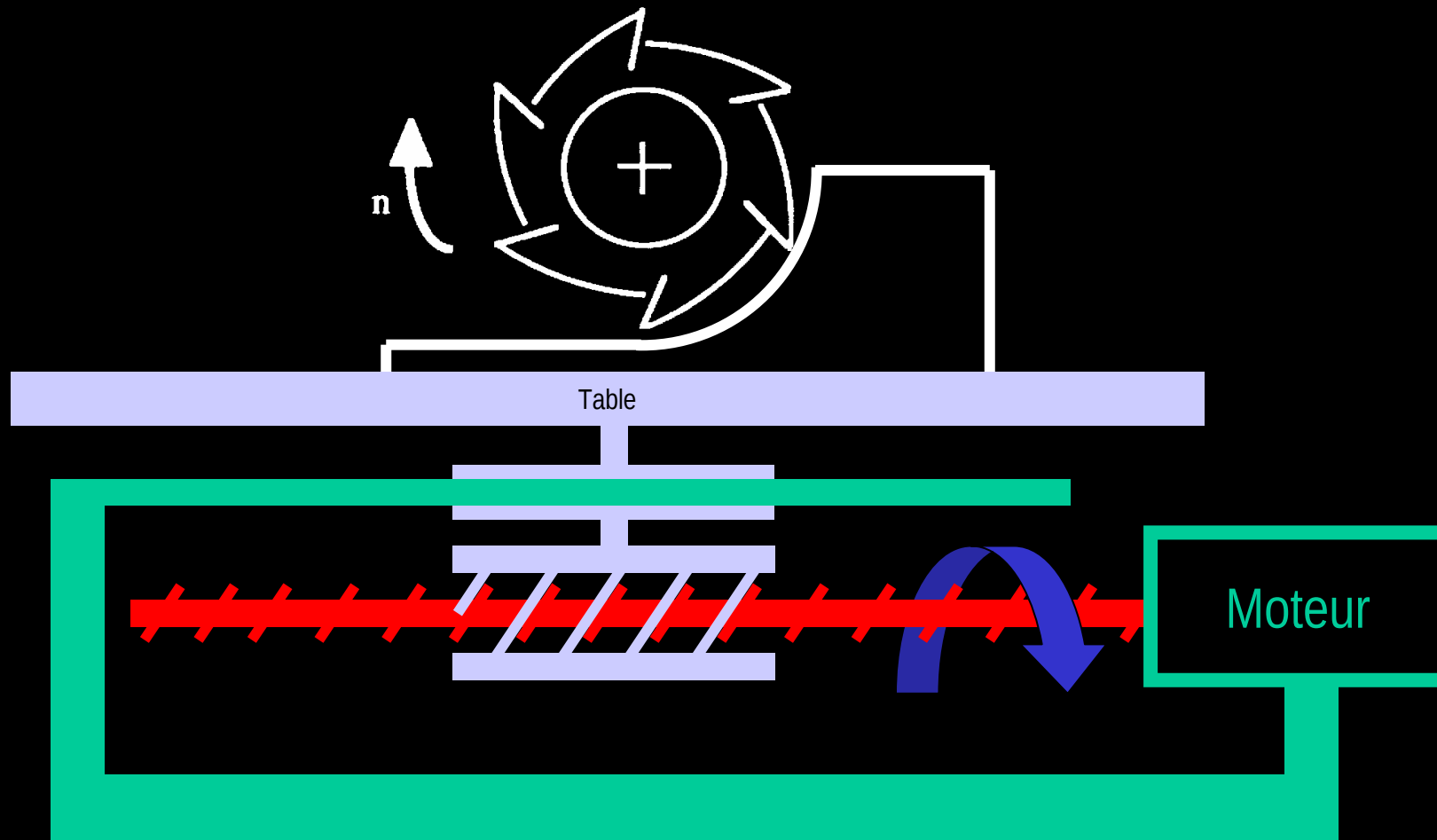
TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE



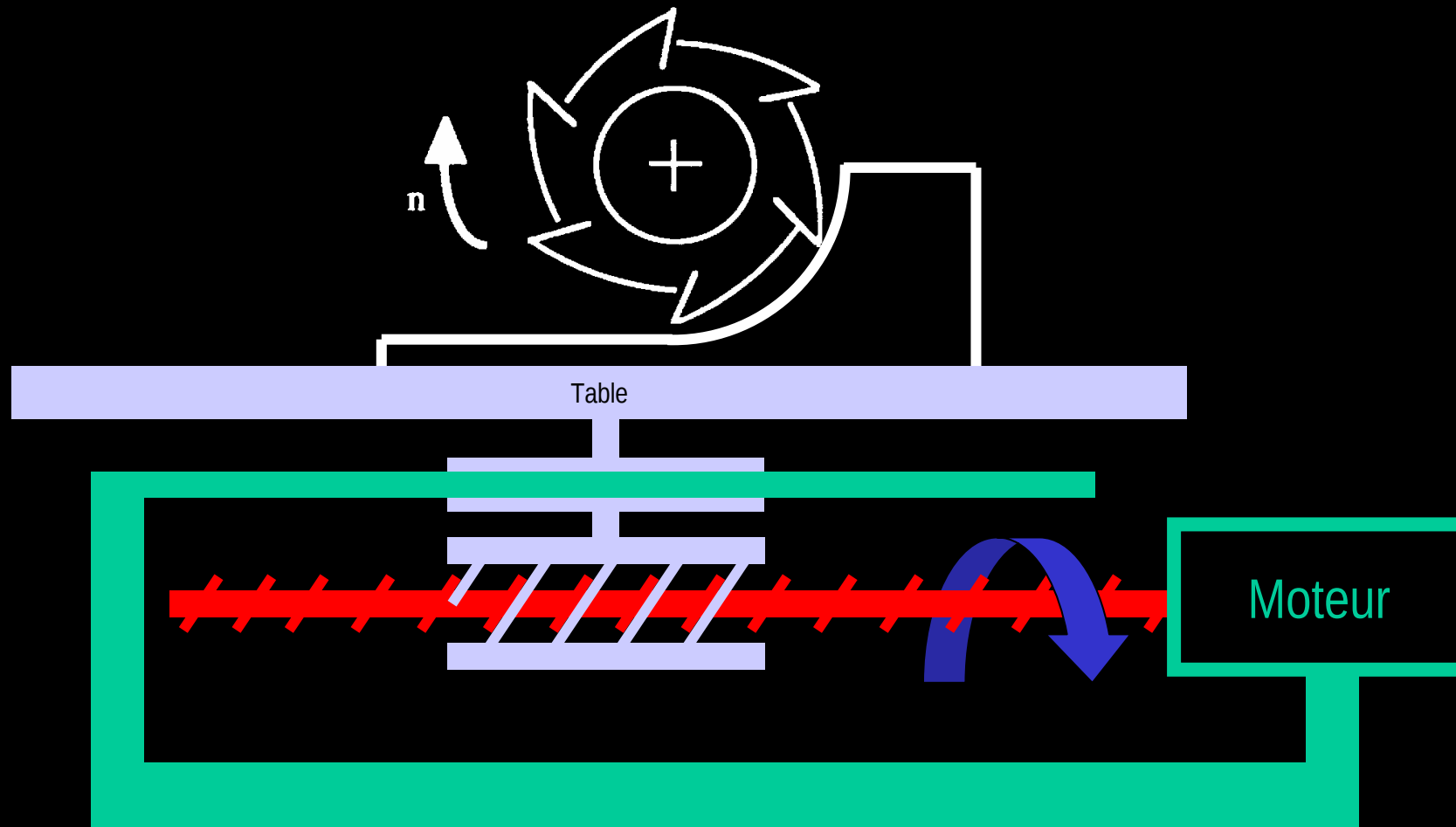
TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE



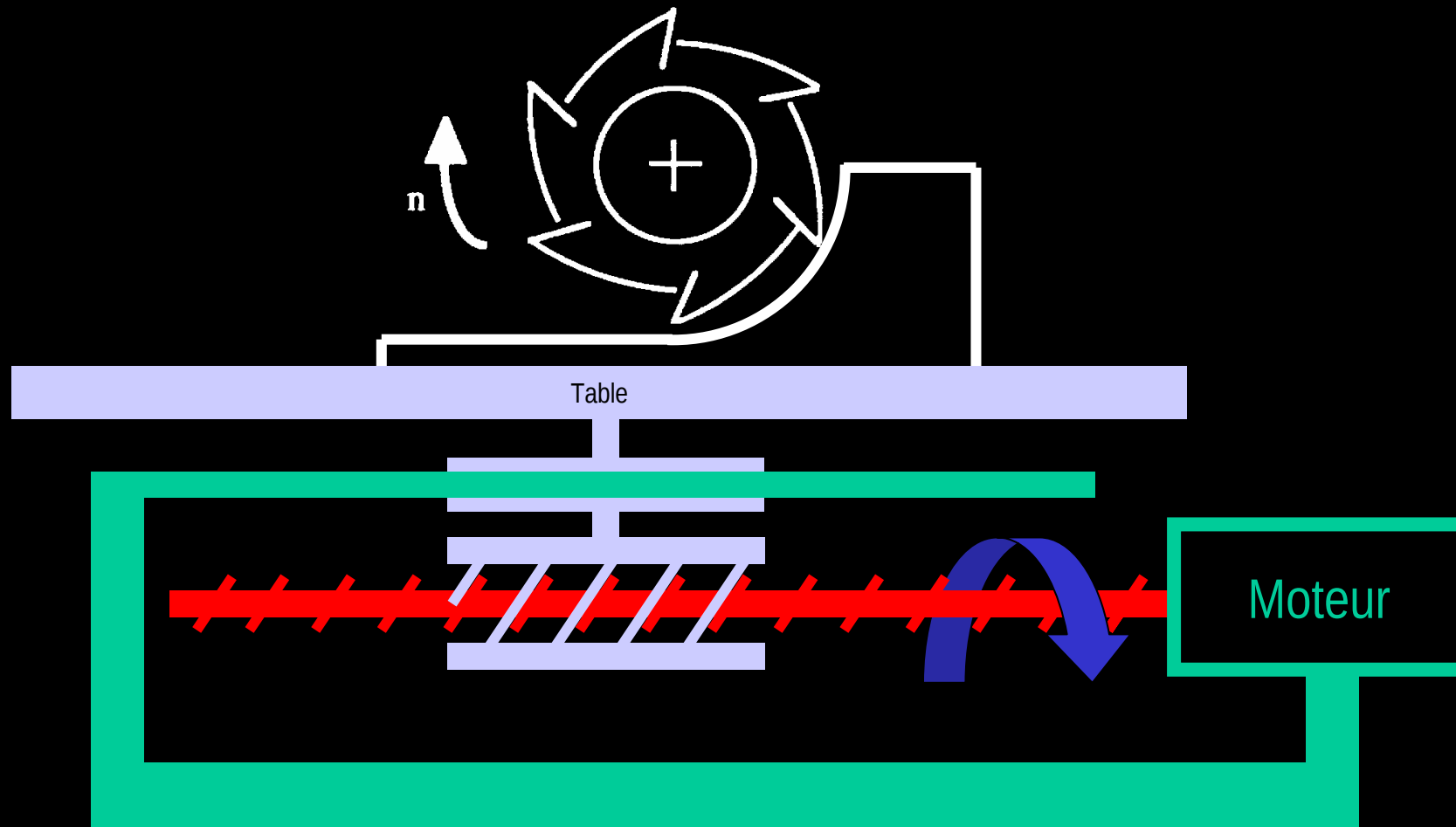
TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE

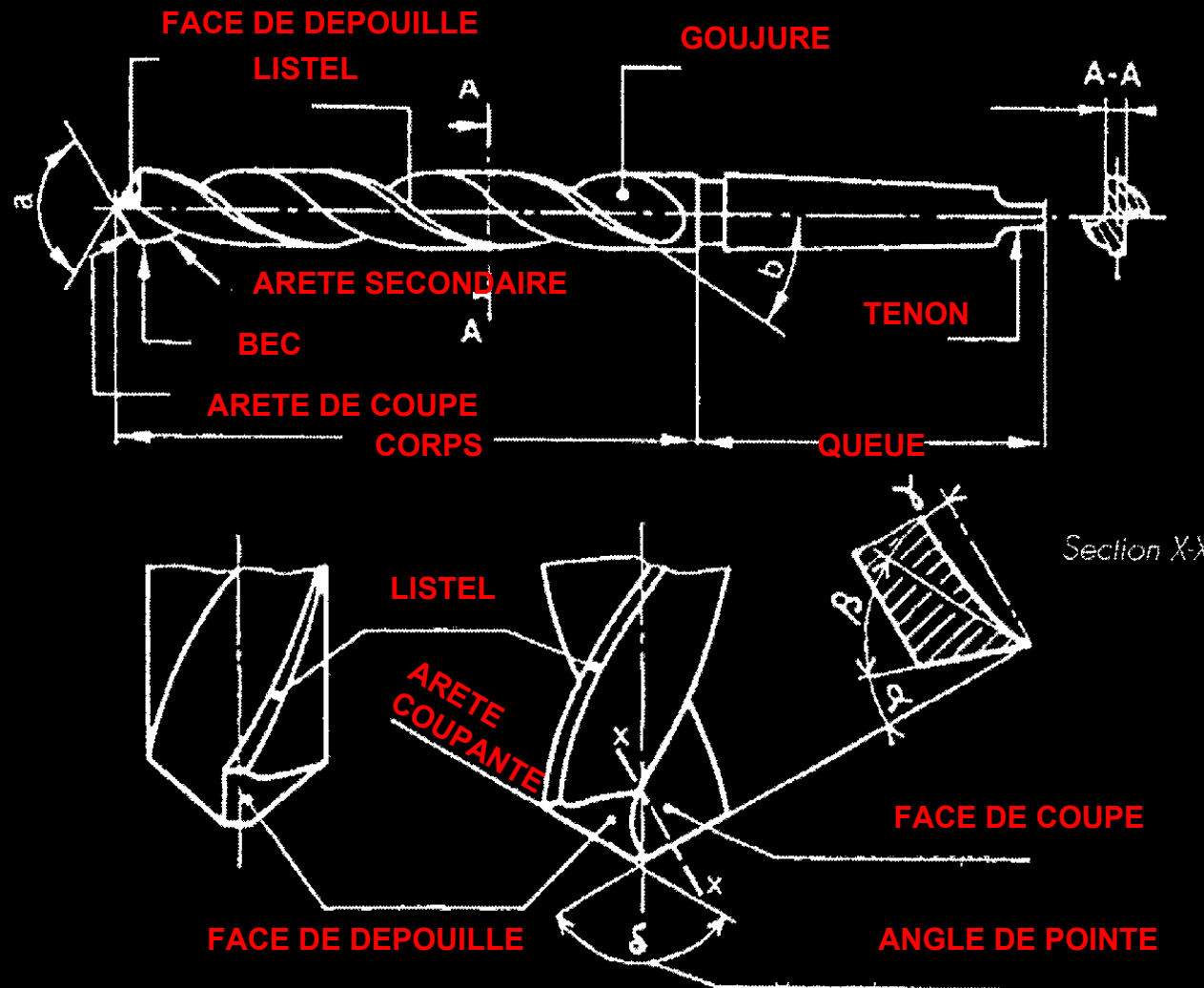


TYPE D'USINAGE EN FRAISAGE

USINAGE EN CONCORDANCE

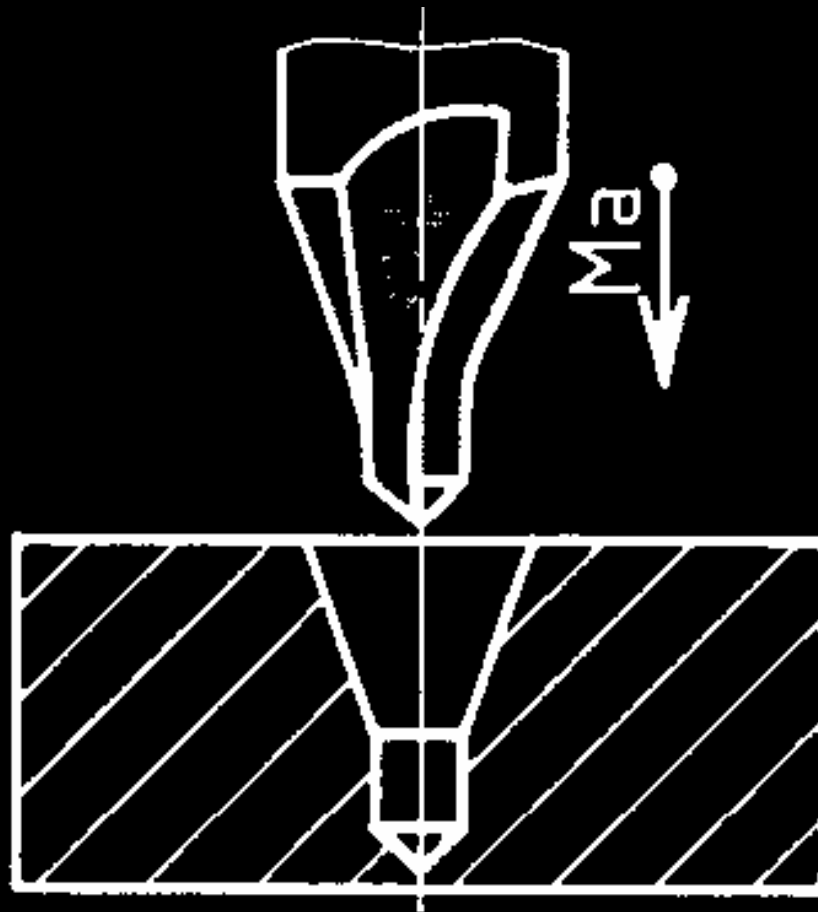


OUTIL DE PERCAGE



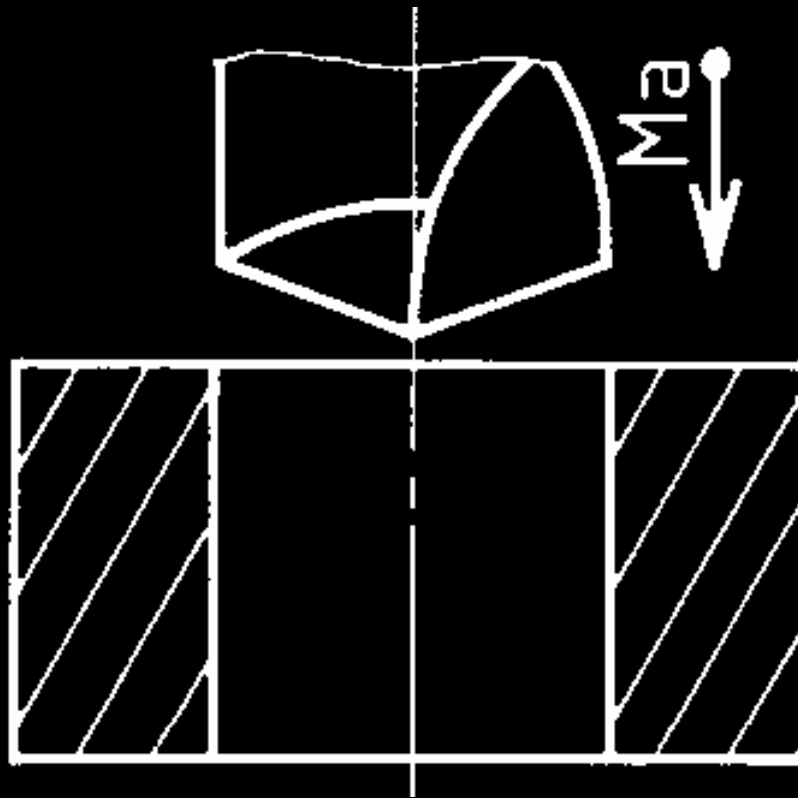
OPERATIONS D'USINAGE EN PERCAGE

Foret à centrer



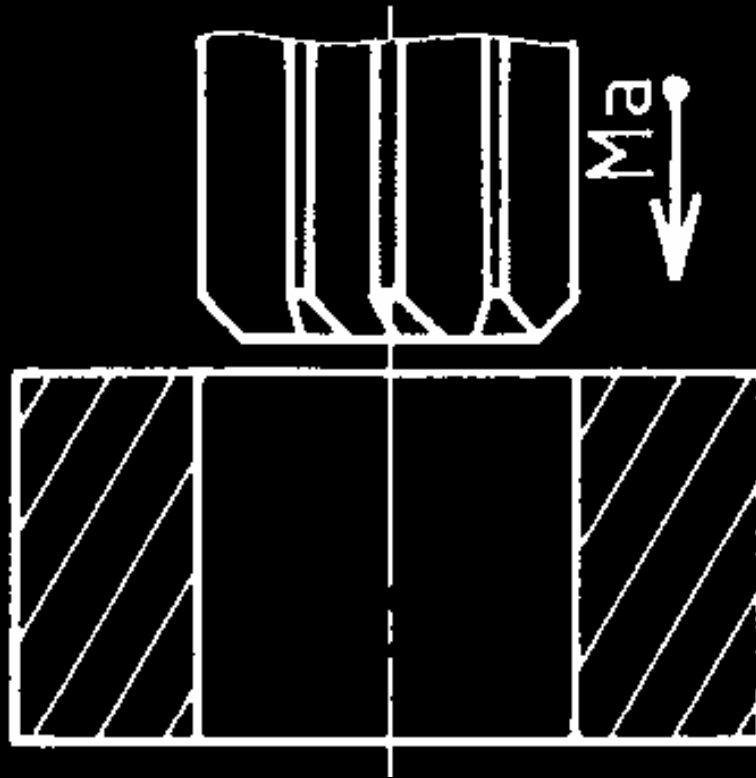
OPERATIONS D'USINAGE EN PERCAGE

Foret

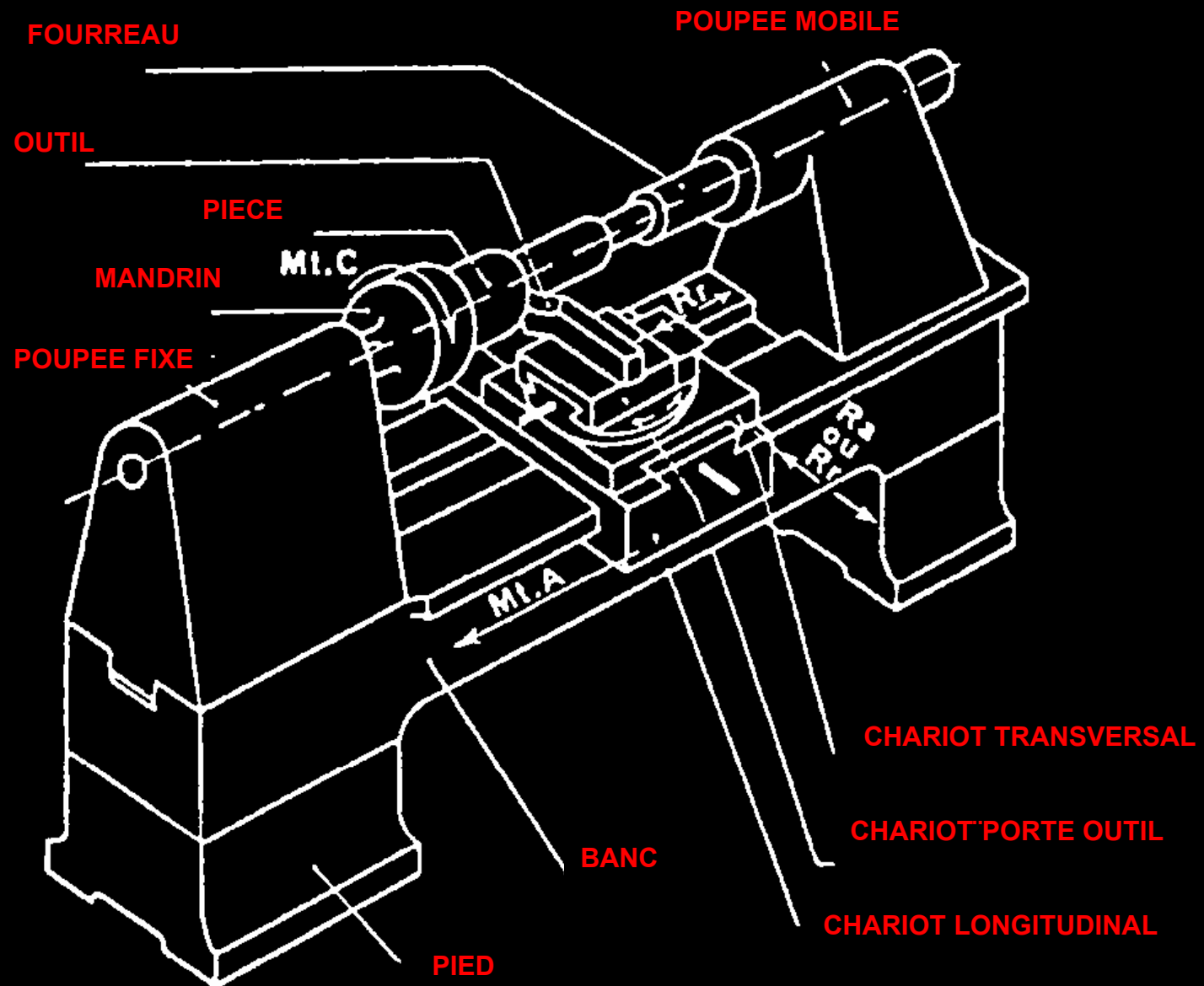


OPERATIONS D'USINAGE EN PERCAGE

Alésoir



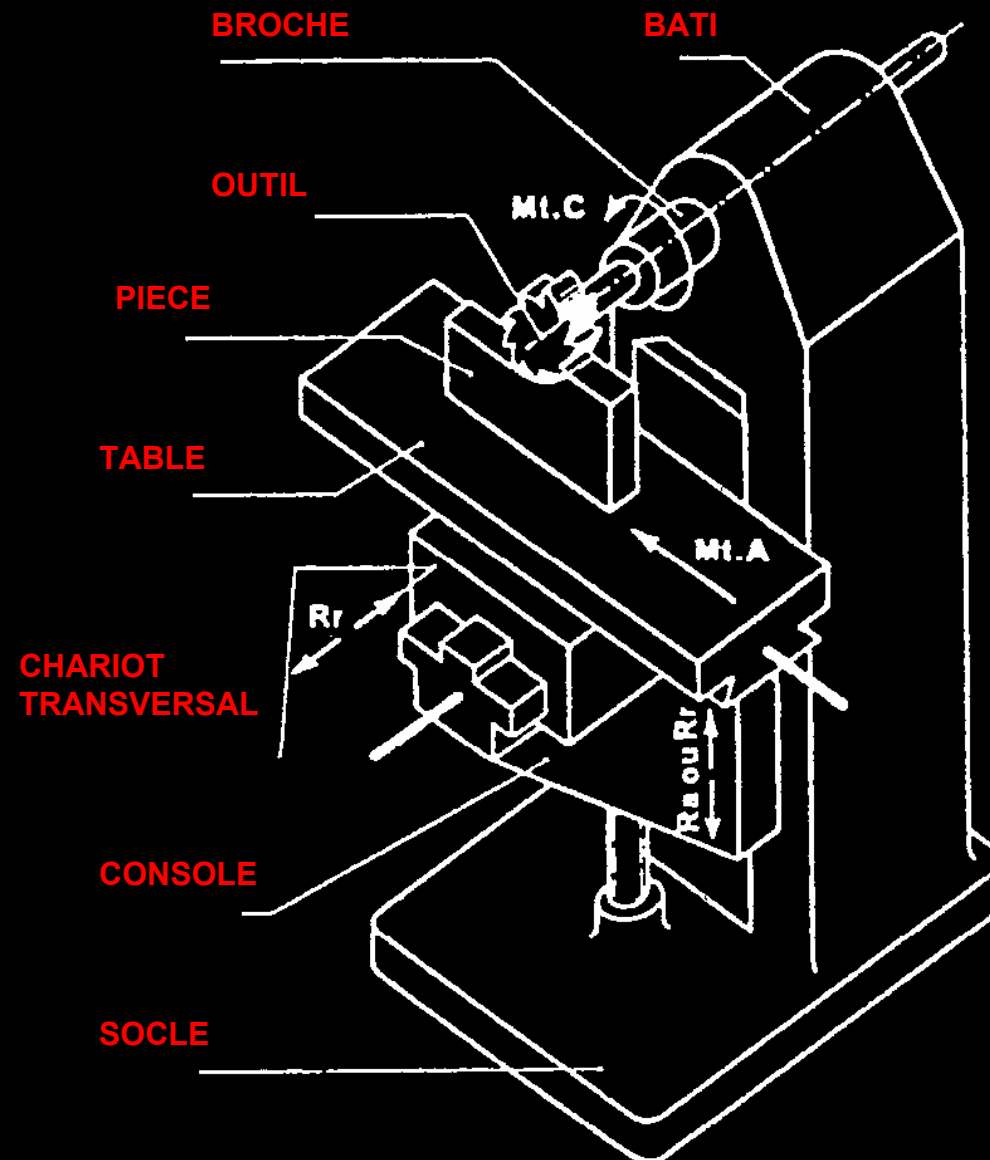
TOUR PARALLELE



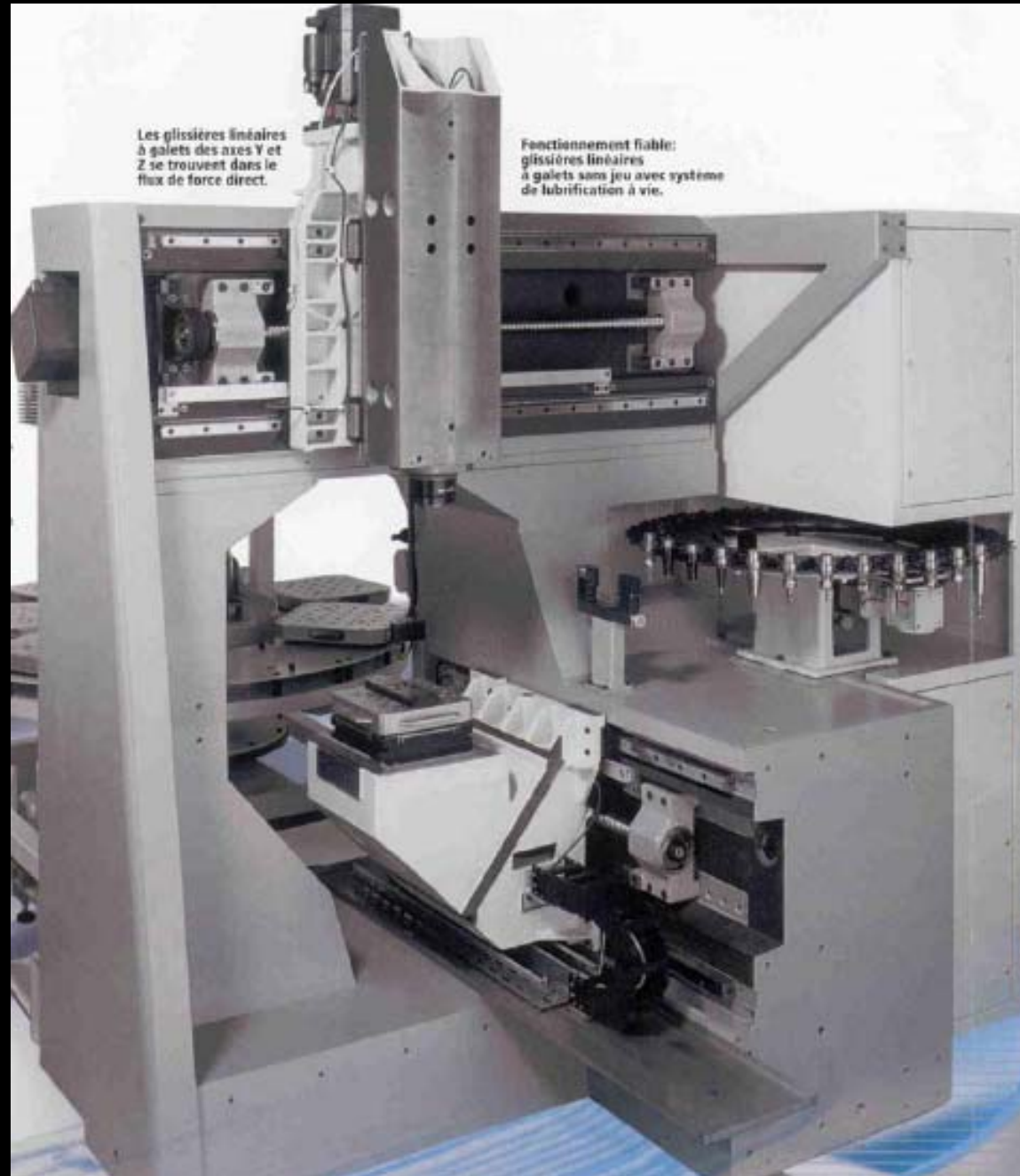
TOUR A COMMANDE NUMERIQUE



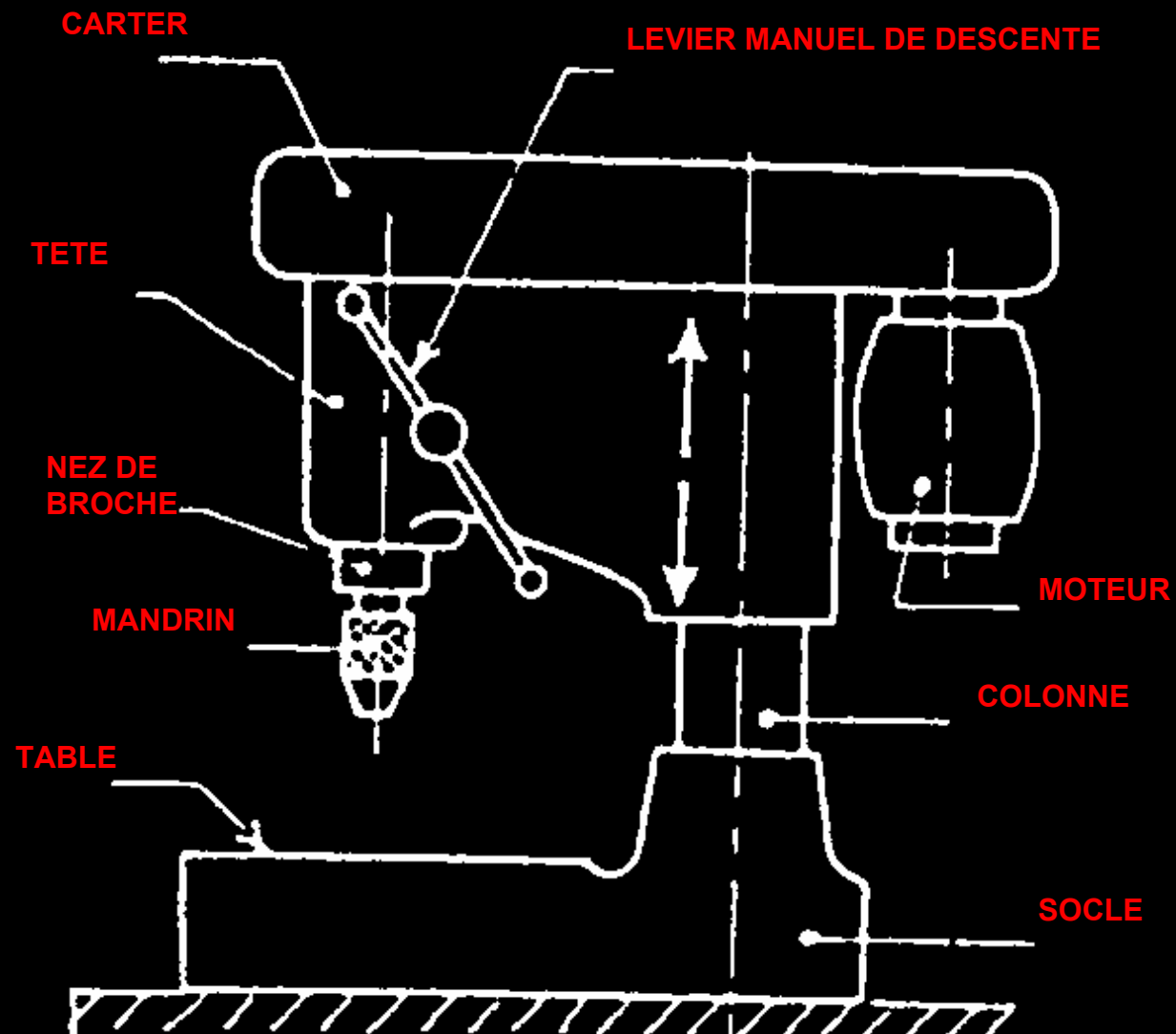
FRAISEUSE HORIZONTALE



CENTRE DE FRAISAGE



PERCEUSE COLONNE



CALCUL DES CONDITIONS DE COUPE

$$N = \frac{1000.V_c}{\pi.D}$$

V_c en m/min

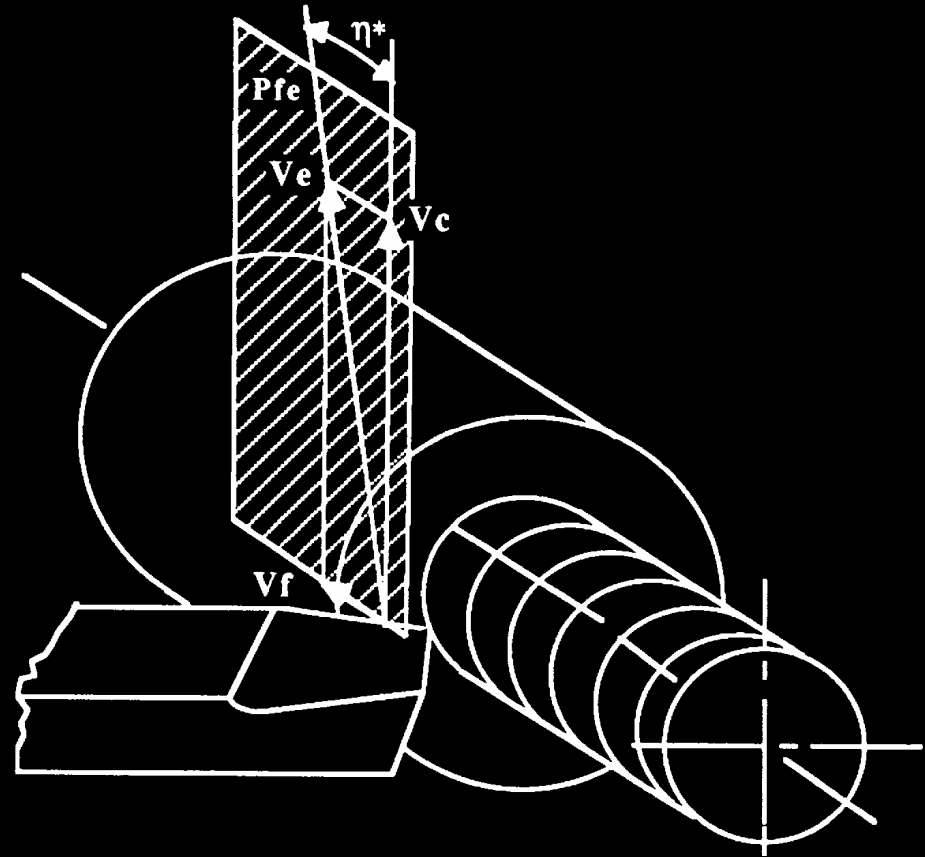
D en mm

Cas du Tournage

$$V_f = f.N$$

Cas du Fraisage

$$V_f = f_z.N.Z$$

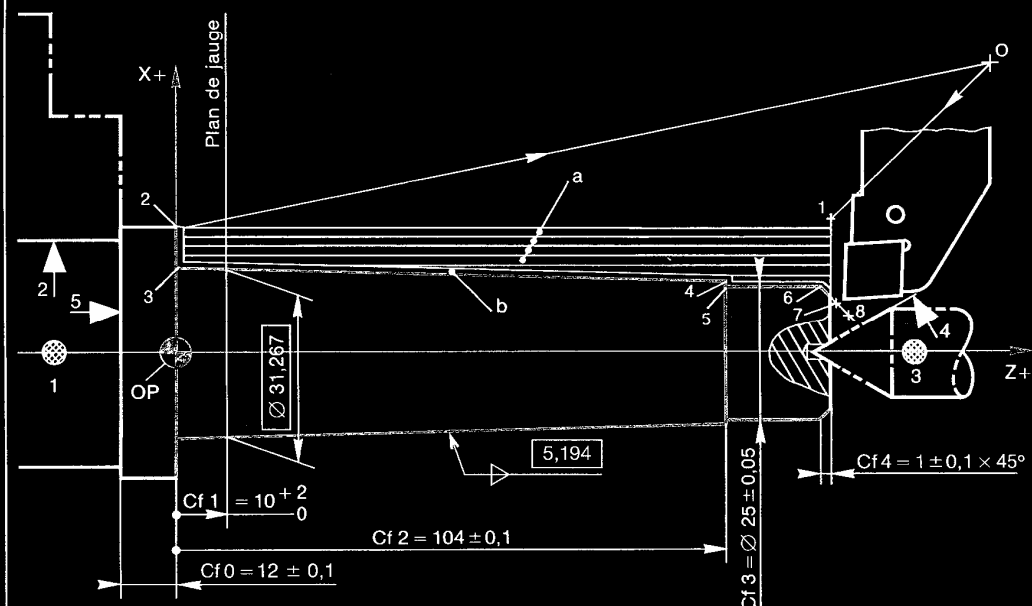


Vc en m/min	Outil en ARS	Outils à plaquettes carbures
Acier	15 à 30	100 à 200
Alliage d'aluminium	50 à 80	>250

f aura une valeur comprise entre 0.05 et 0.5 mm/tr

fz aura une valeur comprise entre 0.03 et 0.3 mm/tr

PHASE TOURNAGE CN 40			Machine : TOUR C.N. HES 300*					Établissement :	
Ens. : Barre d'alésage								Page N°	
Désignation : Axe			Porte-pièce : Mandrin 3 mors doux + pointe tournante					Date :	
Matière : 16CrNi 6 (16 NC 6) - Laminé								Dessiné :	
Nombre : 25/mois									
Opérations d'usinage			Éléments de coupe					Outillages	
N°	Rep.	Désignation	V _c	n	f	V _f	a _p	Fabrication	Contrôle
1		Ébauche a	m/min	tr/min	mm/tr	mm/min	mm	PCLN { Sandwicks PCLN { Coromant	Montage de contrôle
2		1/2 finition b	100	—	0,3	—	2		
		Cf0 = 12 ± 0,1	120	—	0,15	—	0,5		
		Cf1 = 10 + $\frac{2}{0}$							
		Cf2 = 10,4 ± 0,1							
		Cf3 = Ø25 ± 0,05							
		Cf4 = 1 ± 0,1							

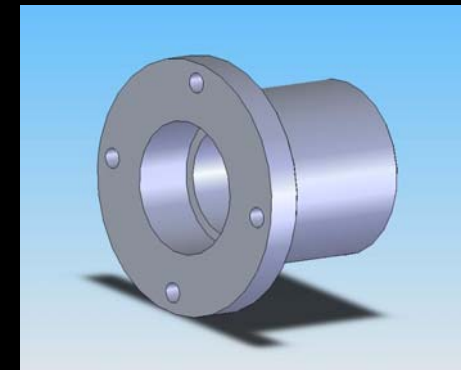
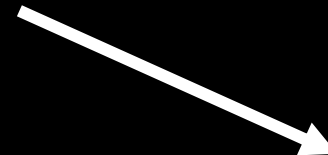
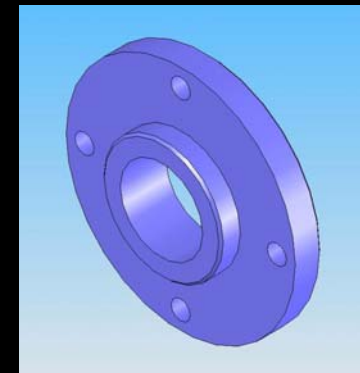
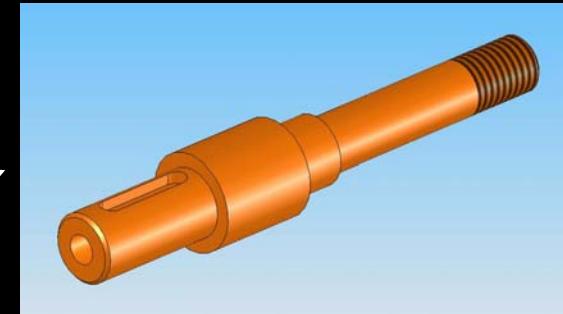
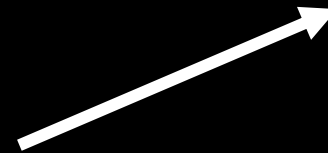
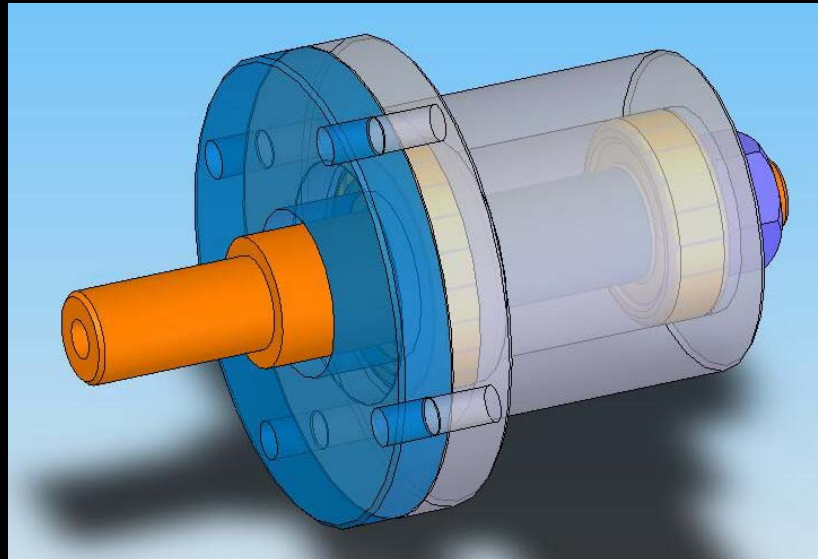


a : cycle d'ébauche
b : cycle de finition

R_a 3,2

Projets 2006-2007

Montage de roulement



Projets 2006-2007

Moulage en moule permanent

