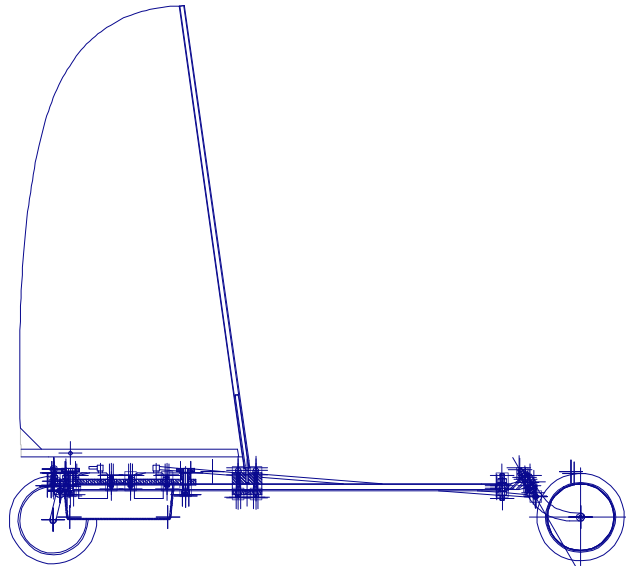
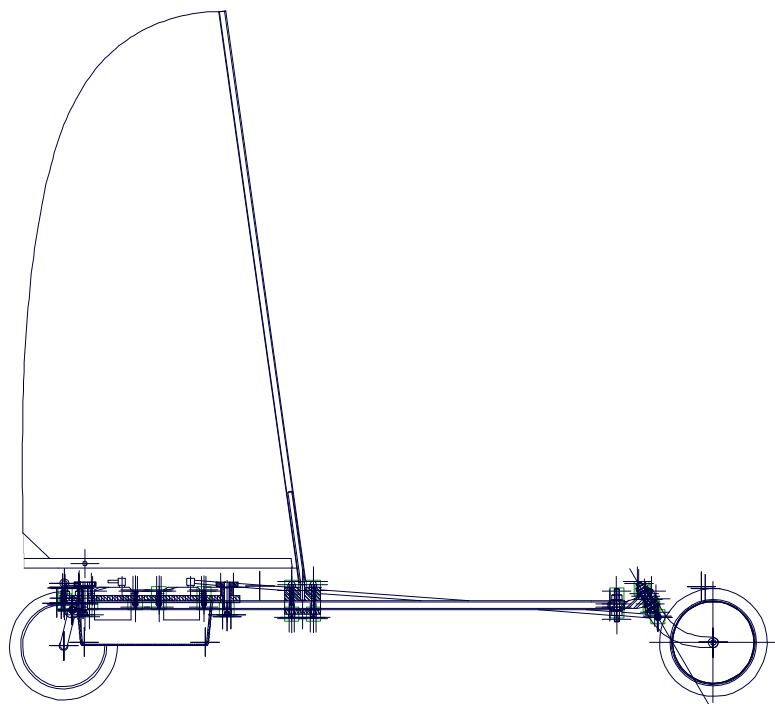


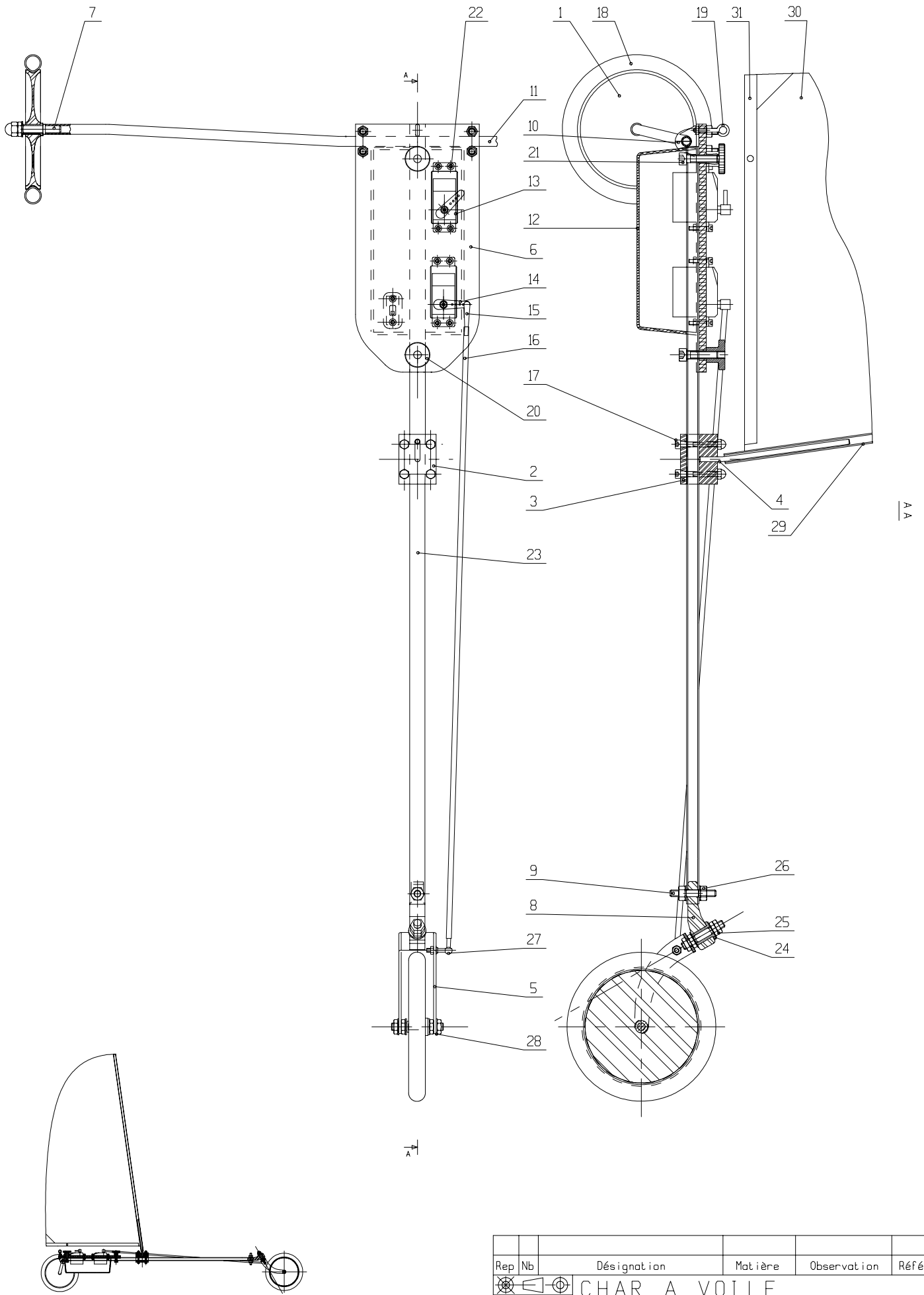
CHAR A VOÏLE RADIO-COMMANDE




Lycée BLAISE PASCAL
5 rue des Emmurés
76100 ROUEN
Tel : 02 32 81 58 16
Fax : 02 32 81 58 17
E-Mail: p.saintmartin@free.fr

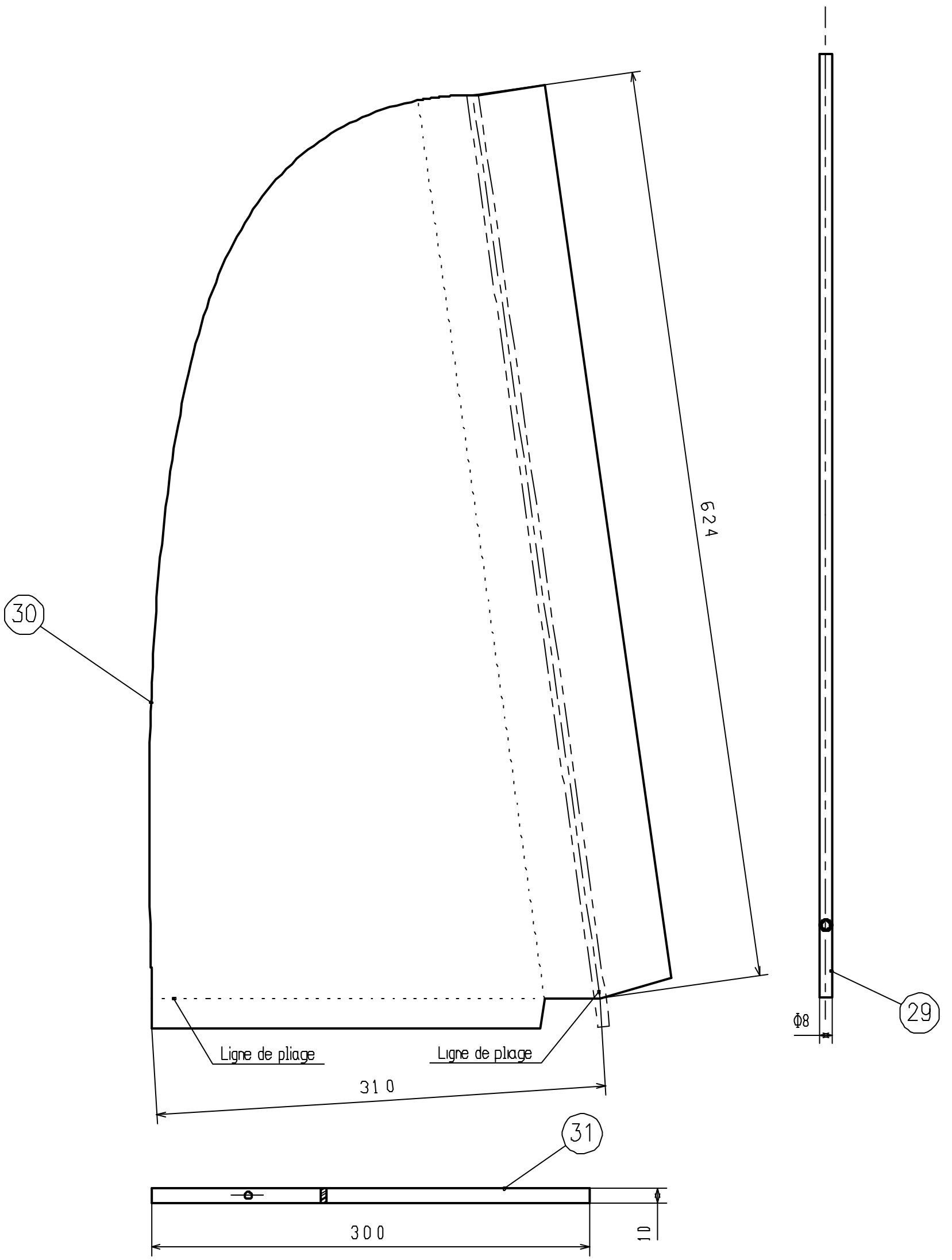
Dessin d'ensemble





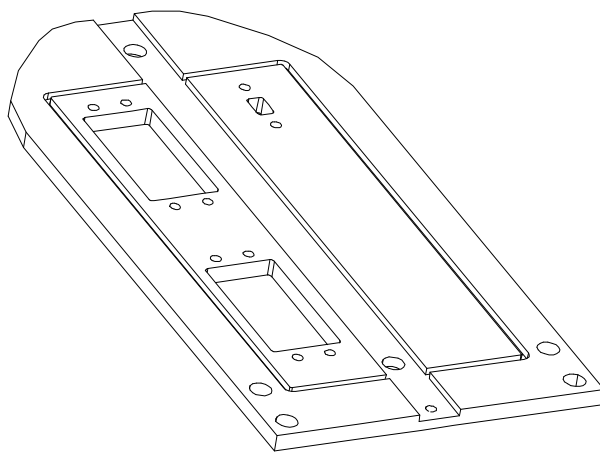
Rep	Nb	Désignation	Matériau	Observation	Référence
		CHAR A VOILE			
Format :					
Ech. 1 : 2					
Dessiné par : St MARTIN					
L.T.N. Blaise Pascal ROUEN					
Le 23/04/1999 N°1					

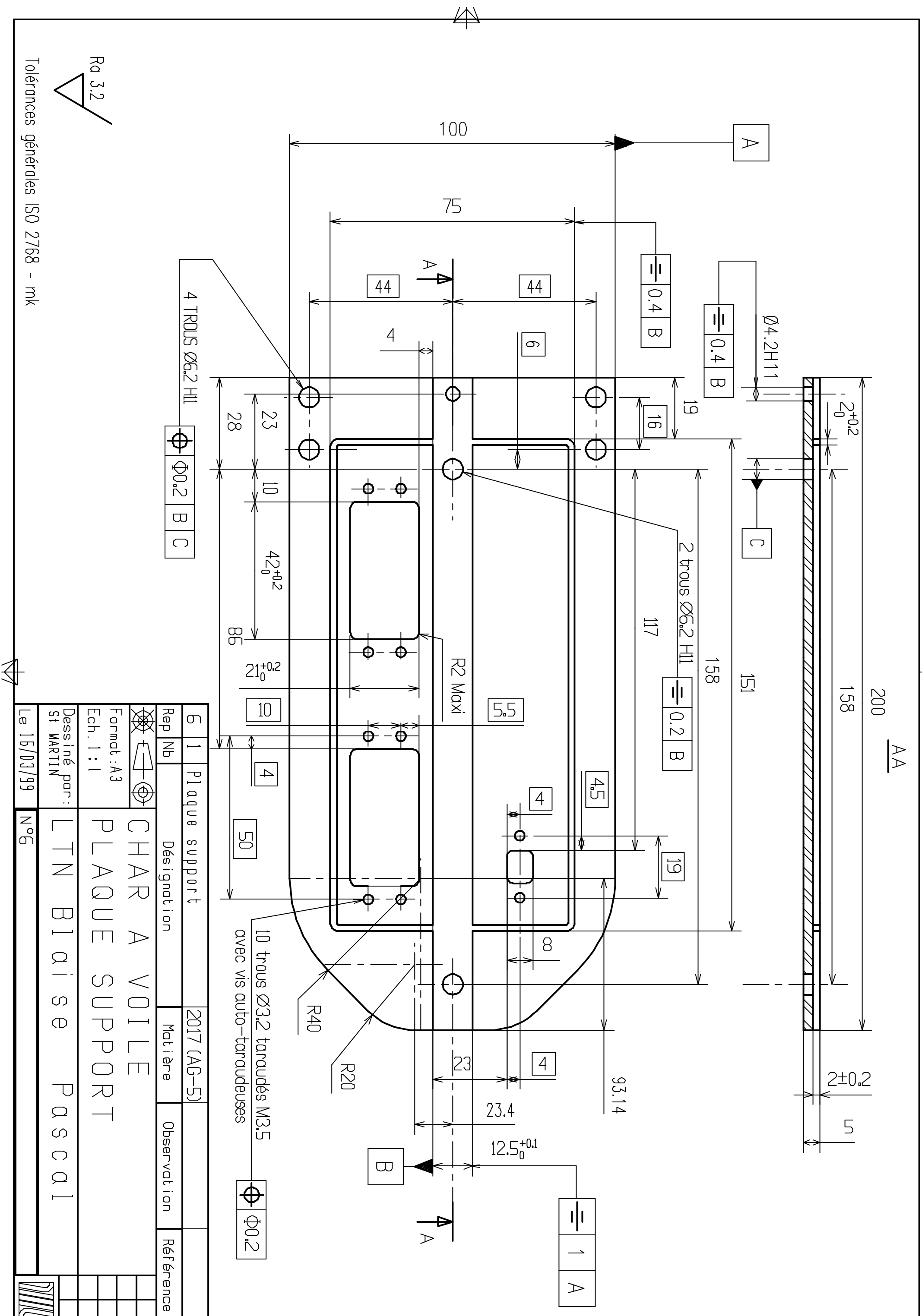
31	1	Baume	2017 (AU4G)	Plat 10 X2
30	1	voile	Calque	polyester
29	1	Mat	2017 (AU4G)	tube Ø6
28	6	Rondelle Ø6	C60	
27	1	Rotule M3	Plastique	Fourniture modélisme
26	4	Ecrou H M 6,8	classe 6.8	NF E 25-401
25	10	Ecrou Hm M 6,8	classe 6.8	NF E 25-401
24	4	Bague autolubrifiante	Bronze BP25	Metafram
23	1	Poutre centrale	2017 (AU4G)	Tube rectang.
22	10	Vis CLS ST 3.5 - 6.5 F		NF E 25-663
21	2	Vis C HC , M6 - 30	classe 6.8	NF E 25-125
20	2	Ecrou à oreilles M6	classe 6.8	NF E 27-454
19	1	Piton	Acier zingué	
18	3	Pneu	Durite essence	Collé à la cyano-acrylique
17	4	Vis C HC, M4 - 35	classe 6.8	NF E 25-125
16	1	Commande flexible	plastique	Fourniture modélisme
15	2	chape	Acier zingué	Fourniture modélisme
14	2	Palonnier	plastique	Fourniture modélisme
13	2	Servo		S17 - S19
12	1	Boitier	Plastique	Bac à couvercles "CURVER"
11	1	Bras de suspension	2017 (AU4G)	tube Ø6
10	2	Serre câbles à étrier	Acier galvanisé	
9	2	Goujon M6 -25, bm12	classe 8.8	NF E27-135
8	1	Support de fourche	2017 (AU4G)	
7	2	Axe de roue arrière	S300	
6	1	plaque support	2017 (AU4G)	
5	1	Fourche	S235 (E24)	Tôle ep : 2
4	1	Pied de mat	C60	corde à piano
3	1	Plaque pied de mat	2017 (AU4G)	
2	1	Support pied de mat	2017 (AU4G)	
1	3	Jante	2017 (AU4G)	
REP	NB	DESIGNATION	MATIERE	OBSERVATION
		<h1>CHAR A VOILE</h1>		
Format				
Ech 1:1				
Dessiné par:				
St MARTIN		L.T.N. Blaise Pascal ROUEN		
23/04/1999		Nomenclature prototype n°2		



29	1	Mat		profilé d =8	
31	1	Baune		profilé 10 x 2	
30	1	voile	claque	polyester	
Rep	Nb	Désignation	Matériau	Observation	Référence
Format		CHAR A VOILE			
Ech. 0, 3:1		GREEMENT			
Dessiné par St Martin		LTN Blaise Pascal ROUEN			
Le 16/03/99		N°			

Plaque support





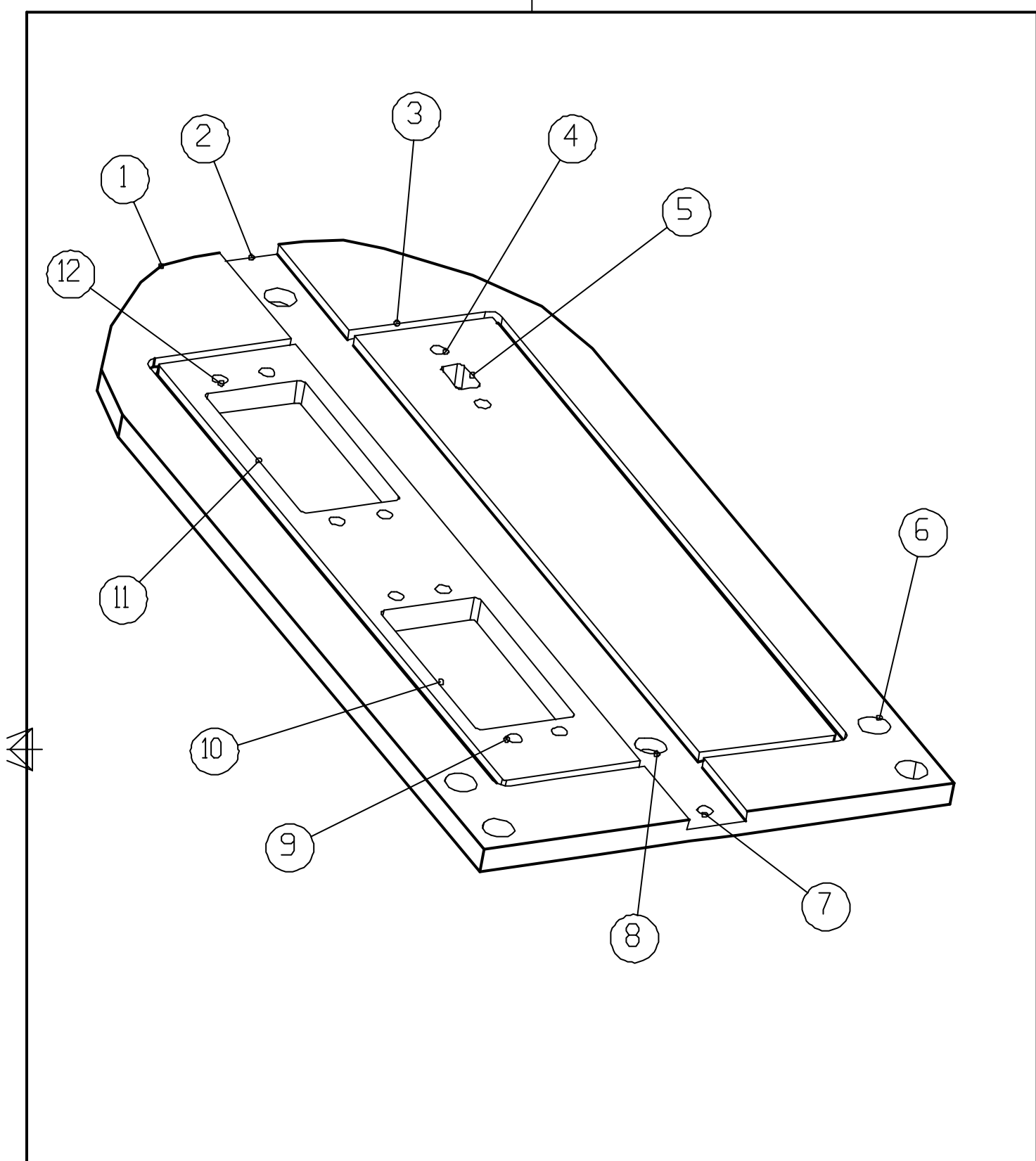
6	1	Plaque support	2017 (AG-5)	
Rep Nb	Designation		Matière	Observation
	CHAR A VOILE			
	PLAQUE SUPPORT			
	LTN BIAISE			
	PASCAL			
	N°6			

Ra 3.2

Tolérances générales ISO 2768 - mk

Le 15/03/99	N°6
Dessiné par: St MARTIN	
Format: A3	
Ech. 1:1	





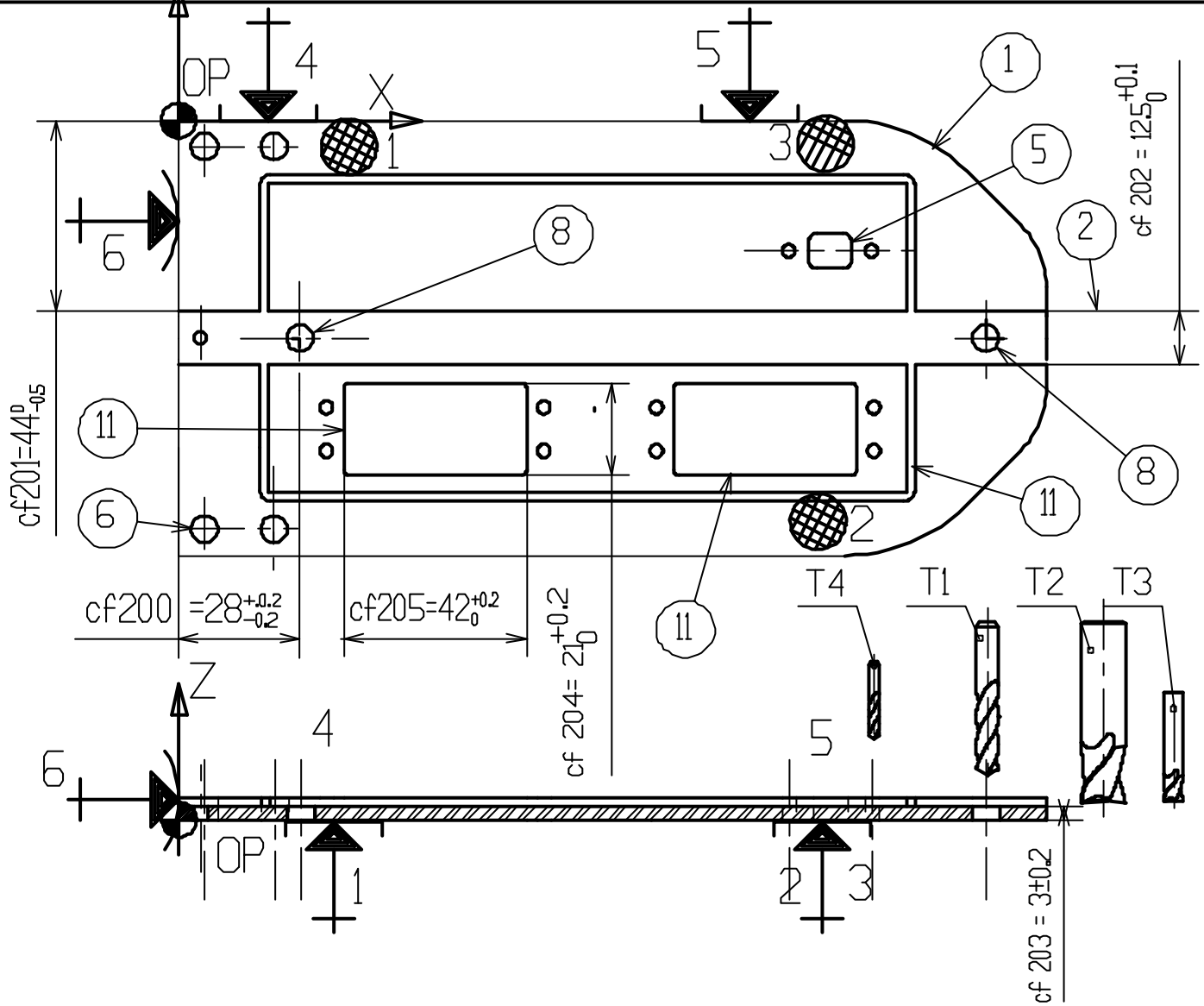
5	1	Repérage des surfaces	2017		
Rep	Nb	Désignation	Matière	Observation	Référence
		CHAR A VOILE PLAQUE SUPPORT			
Format : A4 Ech. 1 : 1		Dessiné par : St Martin			
Le 28/09/99		LTN Blaise Pascal			
		N°5			



AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20	Ensemble: Char à vaile	Date: 23/03/99	DMT
	Pièce: Plaque support	BUREAU DES METHODES	
NOM St Martin	Matière AG5		1
	Programme %520		

Désignation: Fraisage

Machine-Outil: Centre d'usinage vertical



DESIGNATION DES OPERATIONS	OUTILS	T	D	V m/mn	N tr/mn	f mm/tr	Vf mm/min	n
a) percer 6 trous (6; 8) finition : cf200 percer 3 trous (5;10;11) ébauche	foret alu $\Phi 6.2$	1	1	40	2200	0.05	220	1
b) contournage ext. (1) finition rainurer (2) finition : cf 201; cf202; cf203 contourner (10;11) ébauche	fraise 2 tailles $\Phi 12$ ARS coupe au centre z = 3 dents	2	2	80	2200	0.1	330	2
c) contournage (5;10;11) finition cotes : cf 204; cf 205	fraise 2 tailles $\Phi 4$ coupe alu z = 2 dents	3	3	63	5000	0.03	300	2
d) percer 11 trous 4,7,8 $\Phi 3$	foret alu $\Phi 3$	4	4	40	4400	0.03	260	1

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%520
(CHAR A VOILE )
(plaque support ph10)
(T1 = foret D6.2)
(T2 = fraise D12)
(T3 = fraise D4 )
(T4 = foret D3 )

N10 G17 G71 G90 G94
N15 G59 Z5
N20 T1 D1 M6
N30 S2200 F150 M41 M3 M8 (Percege d=6.2)
N40 G00 X6 Y-6.25 Z5
N50 Z3
N60 G83 X6 Y-6.25 Z-8 F150 ER3 P3 Q3
N70 X22
N80 X28 Y-50.25
N90 X22 Y-94.25
N100 X6
N110 X186 Y-50.25
N120 X150.222 Y-30.25
N130 X73.523 Y-67.125
N140 X149.817
N150 G80
N160 G00 Z5
N170 (Temps de l'usinage : 0.02 min)
N180 (Temps total : 0.00 min)
N190 M9 M5
N200 T2 D2 M6
N210 S2200 F330 M41 M3 M8 (Contournage fraisage ext)
N220 G00 X157.032 Y14.072 Z10
N230 Z5
N240 L1 = -3
N250 L2 = 5
N260 X157.032 Y14.072
N270 G01 ZL1 F100
N280 G41 G01 X146.431 Y7 F300
N290 G03 X153.431 Y0 I153.431 J7
N300 G02 X181.998 Y-12 I153.431 J-40
N310 G01 X194.283 Y-24.534
N320 G02 X200 Y-38.534 I180 J-38.534
N330 G01 Y-61.966
N340 G02 X194.142 Y-76.108 I180 J-61.966
N350 G01 X181.998 Y-88.5
N360 G02 X153.431 Y-100.5 I153.431 J-60.5
N370 G03 X146.431 Y-107.5 I153.431 J-107.5
N380 G40 G01 X158.899 Y-112.579
N390 G00 ZL2
N400 L1 = L1 - 3
N410 G79 L1 >= -6 N260
N420 G00 Z10
N430 (Temps de l'usinage : 0.69 min)
N440 (Temps total : 1.38 min)
N470 S2200 F330 M41 M3 M8 (rainure centrale)
N480 G00 X215.223 Y-49.409 Z10
N490 Z5
N500 X215.223 Y-49.409 Z5
N510 G01 Z-2 F100
N520 G41 X205.577 Y-44 F330
N530 X200
N540 X0
N550 X-8
N560 Y-56.5
N570 X0
N580 X200
N590 X205.577
N600 G40 X215.223 Y-49.409
N610 G00 Z5
N620 G00 Z10
N630 (Temps de l'usinage : 1.63 min)
N640 (Temps total : 3.01 min)
N670 S3000 F200 M41 M3 M8 (Poches servol)
N680 G00 X73.523 Y-67.125 Z10
N690 Z5
N700 L1 = -3
N710 L2 = 5
N720 X73.523 Y-67.125
N730 G01 ZL1 F66
N740 G01 X44.523 F200
N750 Y-75.125

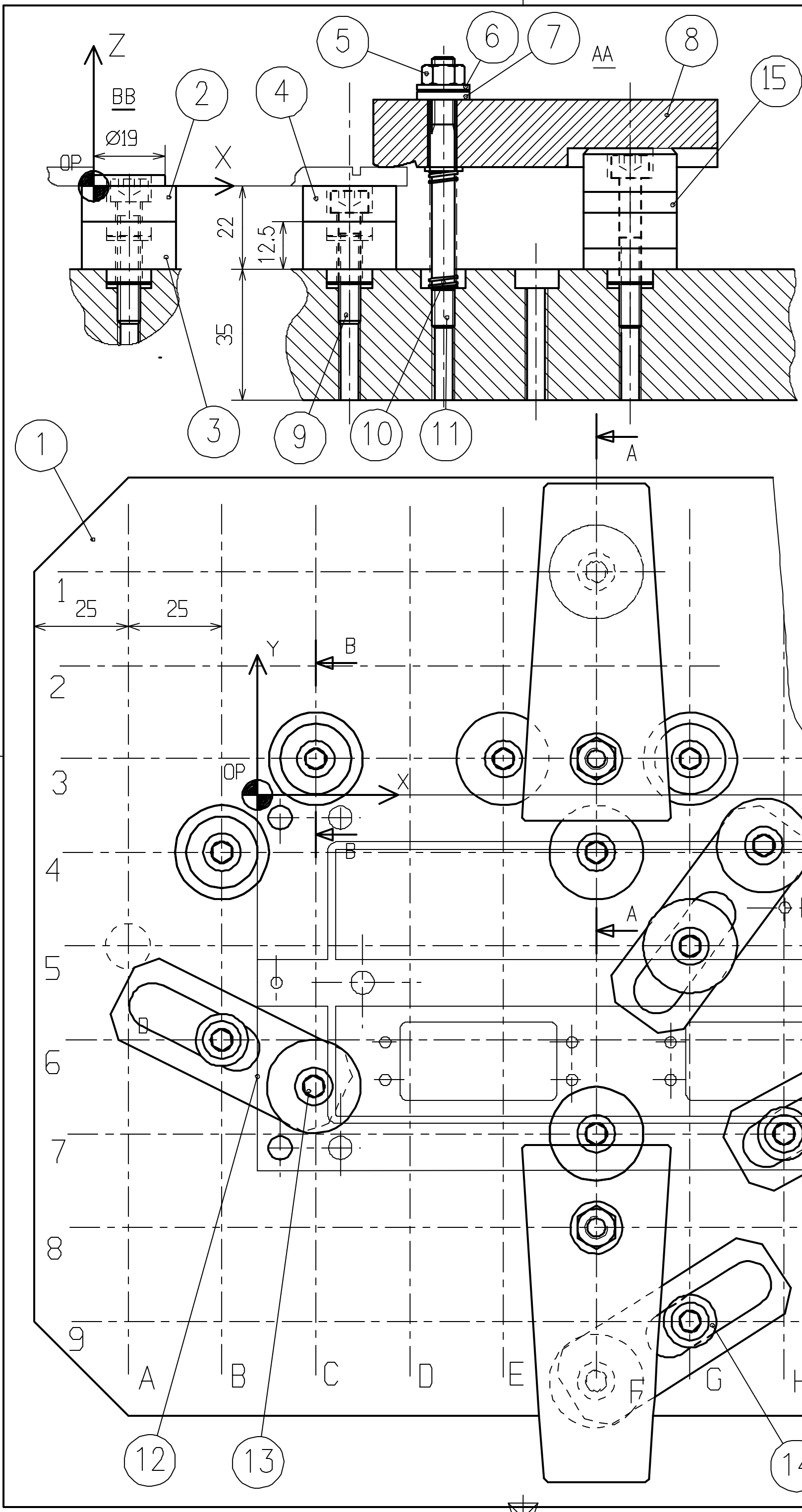
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N760      X73.523
N770      Y-67.125
N780 G00 ZL2
N790 L1 = L1 - 3
N800 G79 L1 >= -6 N720
N810 G00 Z10
N820 (Temps de l'usinage :      0.39 min)
N830 (Temps total      :      3.78 min)
N860 S3000 F200 M41 M3 M8 (Poches servo2)
N870 G00 X149.817 Y-67.125 Z10
N880      Z5
N890 L1 = -3
N900 L2 = 5
N910      X149.817 Y-67.125
N920 G01 ZL1 F66
N930 G01 X120.817 F200
N940      Y-75.125
N950      X149.817
N960      Y-67.125
N970 G00 ZL2
N980 L1 = L1 - 3
N990 G79 L1 >= -6 N910
N1000 G00 Z10
N1010 (Temps de l'usinage :      0.39 min)
N1020 (Temps total      :      4.55 min)
N1030 M9 M5
N1040 T3 D3 M6
N1050 S4500 F300 M41 M3 M8 (rainure boitier)
N1060 G00 X165.604 Y-50 Z10
N1070      Z5
N1080 L1 = -1
N1090 L2 = 5
N1100      X165.604 Y-50
N1110 G01 ZL1 F133
N1120 G41 G01 X169.722 Y-45.75 F330
N1130      Y-43.75
N1140      Y-15
N1150 G03 X167.222 Y-12.5 I167.222 J-15
N1160 G01 X21.222
N1170 G03 X18.722 Y-15 I21.222 J-15
N1180 G01 Y-85
N1190 G03 X21.222 Y-87.5 I21.222 J-85
N1200 G01 X167.222
N1210 G03 X169.722 Y-85 I167.222 J-85
N1220 G01 Y-56.5
N1230      Y-54.5
N1240 G40      X165.604 Y-50.25
N1250 G00 ZL2
N1260 L1 = L1-1
N1270 G79 L1 >= -2 N1100
N1280 G00 Z10
N1290 (Temps de l'usinage :      1.14 min)
N1300 (Temps total      :      6.84 min)
N1310 M9 M5
N1320 T3 D3 M6
N1330 S4000 F260 M41 M3 M8 (Contournage servo 1)
N1340 G00 X73.523 Y-67.125 Z10
N1350      Z5
N1360 L1 = -3
N1370 L2 = 5
N1380      X73.523 Y-67.125
N1390 G01 ZL1 F66
N1400 G41 G01 X78.023 Y-60.625 F260
N1410      X40.023
N1420 G03 X38.023 Y-62.625 I40.023 J-62.625
N1430 G01 Y-79.625
N1440 G03 X40.023 Y-81.625 I40.023 J-79.625
N1450 G01 X78.023
N1460 G03 X80.023 Y-79.625 I78.023 J-79.625
N1470 G01 Y-62.625
N1480 G03 X78.023 Y-60.625 I78.023 J-62.625
N1490 G40 G01 X73.523 Y-67.125
N1500 G00 ZL2
N1510 L1 = L1 - 3
N1520 G79 L1 >= -6 N1380
N1530 G00 Z10
N1540 (Temps de l'usinage :      0.71 min)
N1550 (Temps total      :      8.26 min)
N1560 M9 M5
N1570 S4000 F260 M41 M3 M8 (Contournage servo 2)

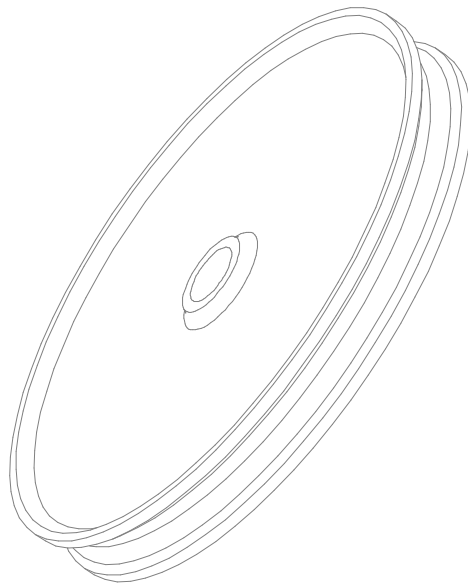
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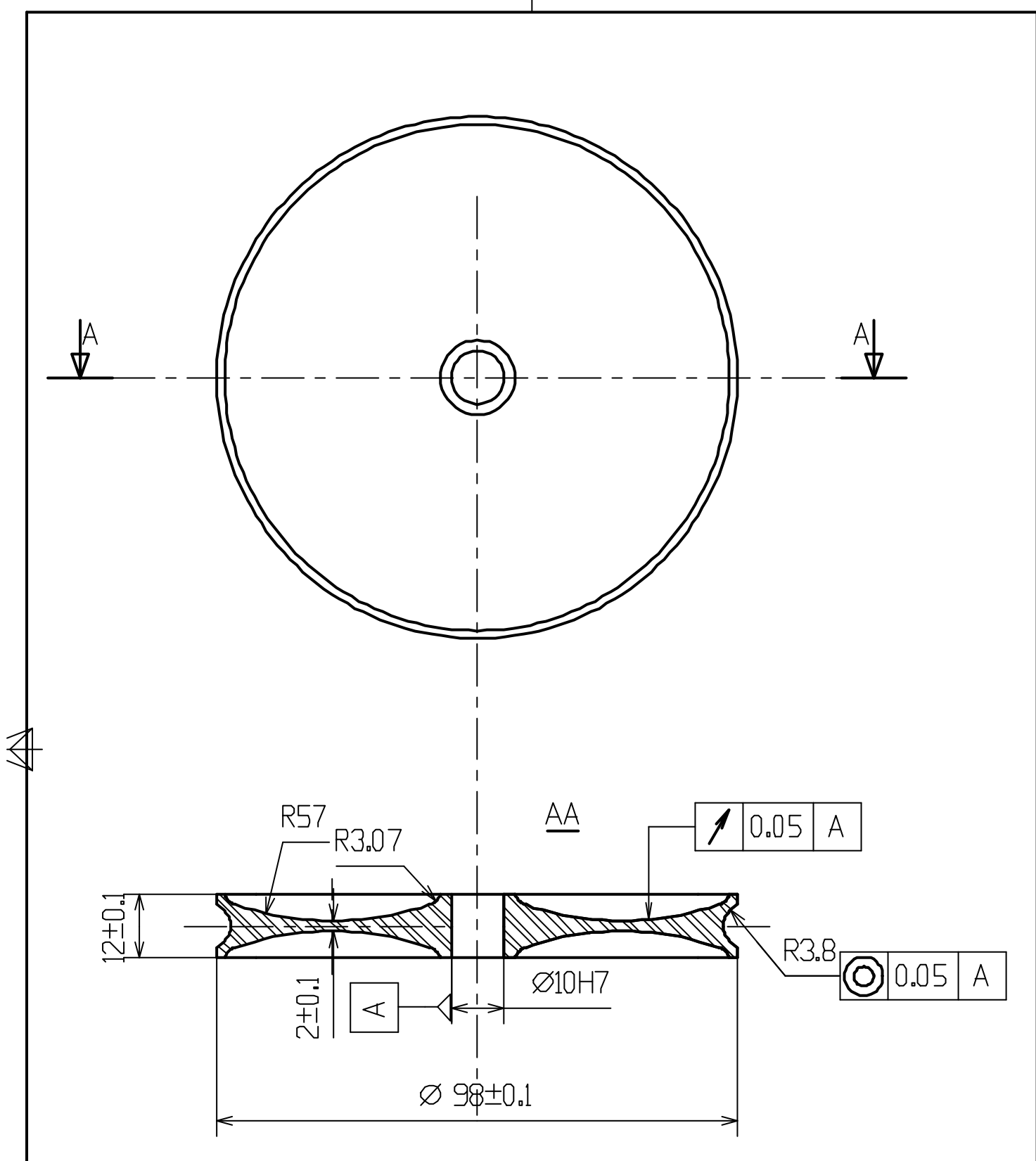
N1580 G00 X149.817 Y-67.125 Z10
N1590 Z5
N1600 L1 = -3
N1610 L2 = 5
N1620 X149.817 Y-67.125
N1630 G01 ZL1 F66
N1640 G41 G01 X154.317 Y-60.625 F260
N1650 X116.317
N1660 G03 X114.317 Y-62.625 I116.317 J-62.625
N1670 G01 Y-66.125
N1680 Y-76.125
N1690 Y-79.625
N1700 G03 X116.317 Y-81.625 I116.317 J-79.625
N1710 G01 X154.317
N1720 G03 X156.317 Y-79.625 I154.317 J-79.625
N1730 G01 Y-76.125
N1740 Y-66.125
N1750 Y-62.625
N1760 G03 X154.317 Y-60.625 I154.317 J-62.625
N1770 G40 G01 X149.817 Y-67.125
N1780 G00 ZL2
N1790 L1 = L1 - 3
N1800 G79 L1 >= -6 N1620
N1810 G00 Z10
N1820 (Temps de l'usinage : 0.69 min)
N1830 (Temps total : 9.65 min)
N1840 M9 M5
N1850 S4000 F260 M41 M3 M8 (Contournage interupteur)
N1860 G00 X150.222 Y-30.25 Z10
N1870 Z5
N1880 L1 = -3
N1890 L2 = 5
N1900 X150.222 Y-30.25
N1910 G01 ZL1 F66
N1920 G41 G01 X147.222 Y-26.25 F260
N1930 G03 X145.222 Y-28.25 I147.222 J-28.25
N1940 G01 Y-32.25
N1950 G03 X147.222 Y-34.25 I147.222 J-32.25
N1960 G01 X153.222
N1970 G03 X155.222 Y-32.25 I153.222 J-32.25
N1980 G01 Y-28.25
N1990 G03 X153.222 Y-26.25 I153.222 J-28.25
N2000 G01 X147.222
N2010 G40 X150.222 Y-30.25
N2020 G00 ZL2
N2030 L1 = L1 - 3
N2040 G79 L1 >= -6 N1900
N2050 G00 Z10
N2060 (Temps de l'usinage : 0.21 min)
N2070 (Temps total : 10.07 min)
N2080 M9 M5
N2090 T4 D4 M6
N2100 S4400 F260 M41 M3 M8 (Perceage d= 3)
N2110 G00 X5 Y-50.25 Z5
N2120 Z3
N2130 G83 X5 Y-50.25 Z-8 F260 ER3 P3 Q3
N2140 X34.023 Y-66.125
N2150 Y-76.125
N2160 X84.023
N2170 Y-66.125
N2180 X110.317
N2190 Y-76.125
N2200 X160.317
N2210 Y-66.125
N2220 X159.722 Y-30.25
N2230 X140.722
N2240 G80
N2250 G00 Z5
N2260 (Temps de l'usinage : 0.02 min)
N2270 (Temps total : 10.07 min)
N2280 M9 M5
N2290 G00 G52 X0 Y0 Z0
N2300 M2



Rep Nb	Désignation	Matériau	Observation	Référence
0				
	Montage modulaire			
	Plaque support			
	Lycée Blaise Pascal ROUEN			
	Format: A3			
	Ech. 1:1			
	Dessiné par: St Martin			
	Le 19/10/1999			
	N°5			

Jante





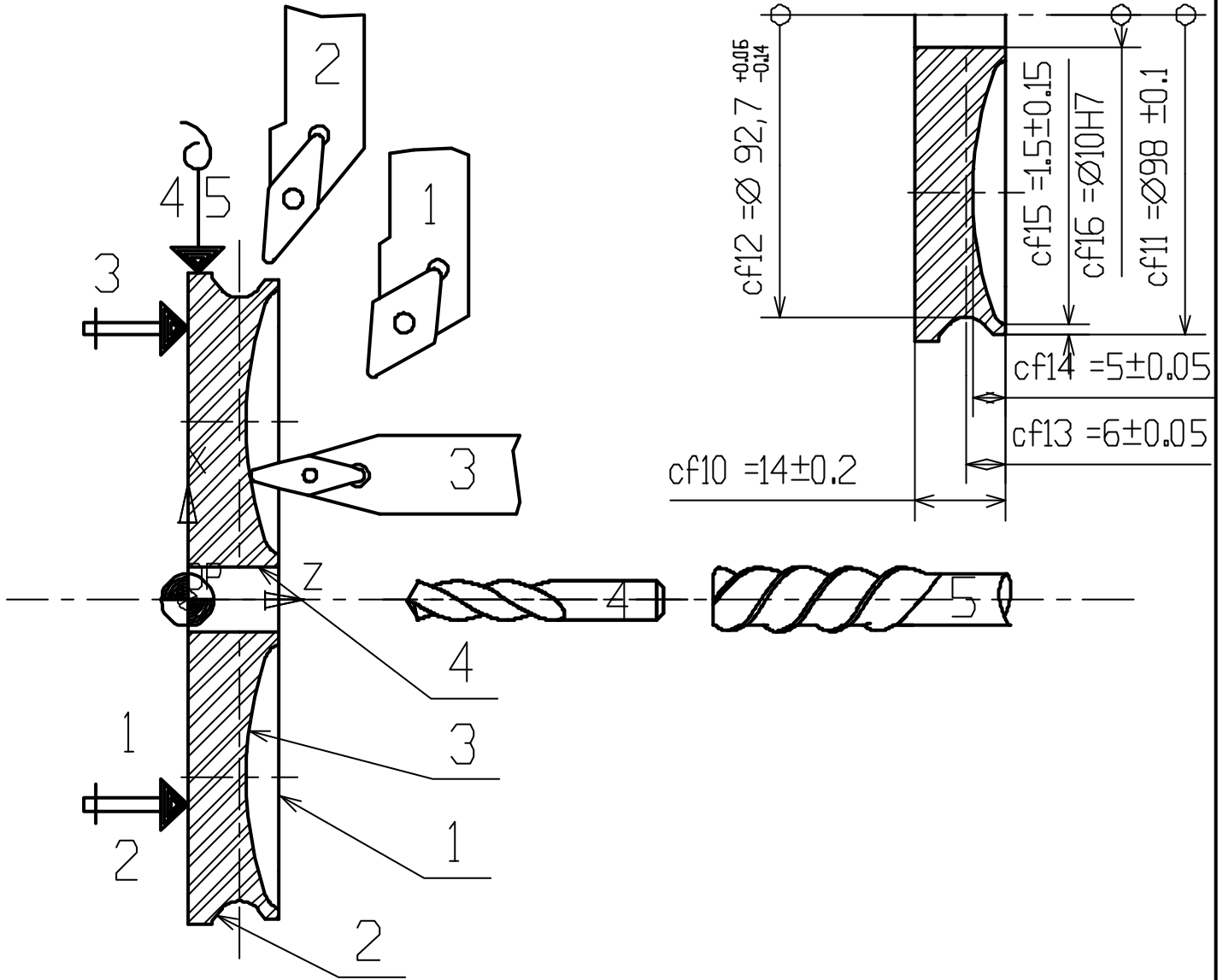
1		jante	AU4G		
Rep	Nb	Désignation	Matière	Observation	Référence
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Format: A4					
Ech. 1:1					
Dessiné par :					
Le 14/11/97		N°			



AVANT-PROJET D'ETUDE DE FABRICATION PHASE N°10 A	Ensemble: Char à voile	Date 22/02/00	DMT
	Pièce JANTE	BUREAU DES METHODES	
	Matière: 2017		2
NOM: St MARTIN	Programme:%110		

Désignation: TOURNAGE

Machine-Outil: T200

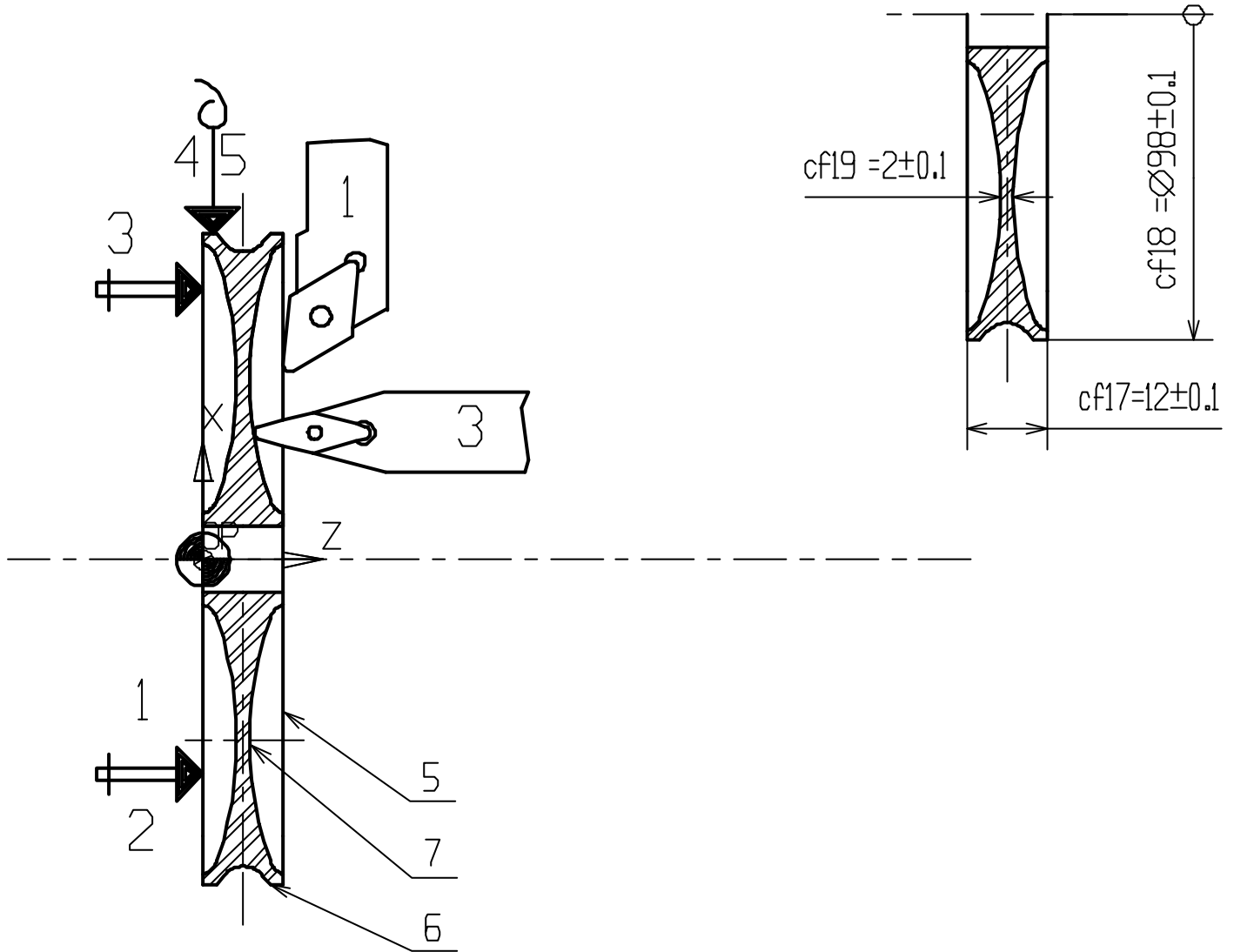


DESIGNATION DES OPERATIONS	OUTILS		V	N	f	a	n
			m/mn	tr/mn	mm/tr	mm	
a) dresser 1 : cf10; cf11	PCLN	T1 D1	150		0.15		
b) gorge exterieur 2 : cf12; cf13	PDJN	T2 D2	150		0.15		
c) gorge frontale 3 : cf14; cf15	PTEN	T3 D3	150		0.15		
d) percer 4	Foret Ø9.7 ARS coupe alu	T4 D4	60	1900	0.2		1
d) aléser 4 : cf15	Alesoir machine à coupe à descendante Ø10	T5 D5	30	950	0.2	0.15	1
e) arrêt programmé : retourner la pièce							

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N°10 B	Ensemble: Char à voile	Date 22/02/00	BUREAU DES METHODES	
	Pièce JANTE			
	NOM: St MARTIN	Matière: 2017	Programme:%110	2

Désignation: TOURNAGE

Machine-Outil: T200



DESIGNATION DES OPERATIONS	OUTILS		V	N	f	a	n
			m/mn	tr/mn	mm/tr	mm	
e) dresser 5 et 6: cf10; cf11	PCLN	T1 D1	150		0.15		
f) gorge frontale 3 : cf19	PTEN	T3 D3	150		0.15		

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%110
(char a voile)
(jante ph10A et 10B)
(24/2/2000)
N10 G0 G52 X Z
N30 T1 D1 M6
N40 G92 S3500

(cylindrer 1)
N50 X98 G95 S1500 F0.15 M41 M3 M8
N60 G00 X98.603 Z16.842
N65 G96 S150
N70 G42 X98 Z16.537
N80 G01 Z9.952
N90 X99.832
N100 G40 G00 X100.374 Z10.418
N160 G00 X102.039 Z15.295
N170 X100.547 Z15
N180 G01 X98.547
N190 X-0.8
N210 G00 Z17.652
N270 G00 X98.603 Z16.842
N280 X100.547 Z14
N290 G01 X98.547
N300 X-0.8
N320 G00 X2.41 Z16.616
N350 M5

(Gorge ext n2)
N360 G00 G52 XZ
N370 T2 D2 M6
N390 X100 G95 S1500 F0.15 M41 M3 M8
N400 G00 X102.553 Z12.045
N405 G96 S150
N420 G01 Z12.852
N430 X98.4 Z12.171
N440 Z3.931
N450 X100 Z3.716
N460 G00 Z12.171
N470 G01 X98.4
N480 X98 Z12.001
N490 X96.8 Z11.504
N500 Z4.496
N510 X98.052 Z3.977
N520 X98.4 Z3.931
N530 G00 Z11.504
N540 G01 X96.8
N550 X95.405 Z10.925
N560 G02 X95.2 Z10.837 I100.256 K8
N570 G01 Z5.163
N580 G02 X95.405 Z5.075 I100.256 K8
N590 G01 X96.8 Z4.496
N600 G00 Z10.837
N610 G01 X95.2
N620 G02 X93.6 Z9.835 I100.256 K8
N630 G01 Z6.165
N640 G02 X95.2 Z5.163 I100.256 K8
N650 G00 Z9.835
N660 G01 X93.6
N670 G02 X92.656 Z8 I100.256 K8
N680 G02 X93.6 Z6.165 I100.256 K8
N690 G02 X95.2 Z5.163 I100.256 K8
N700 G02 X95.405 Z5.075 I100.256 K8
N710 G01 X96.8 Z4.496
N720 X98.052 Z3.977
N730 X98.4 Z3.931
N740 X100 Z3.716
N750 G00 X102.397 Z5.33
N760 (Temps de l'usinage : 0.78 min)
N770 (Temps total : 0.89 min)
N780 M5

(Gorge frontale ebauche)
N790 G0 G40 G52 XZ M5
N800 T5 D5 M6
N820 X0 G95 S1500 F0.15 M41 M3 M8
N830 G00 X93.313 Z16.277
N835 G96 S150
N850 G01 X94.84
N860 X94.523 Z14.075

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N870 G03 X94.097 Z13.575 I89.146 K14.927
N880 G01 X14.903
N890 G03 X14.477 Z14.075 I19.854 K14.927
N900 G01 X14.16 Z14.575
N910 G00 X94.097
N920 G01 Z13.575
N930 G03 X92.26 Z12.575 I89.146 K14.927
N940 G01 X16.74
N950 G03 X14.903 Z13.575 I19.854 K14.927
N960 G00 X92.26
N970 G01 Z12.575
N980 G03 X90.845 Z12.238 I89.146 K14.927
N990 G03 X86.661 Z11.575 I54.5 K66.01
N1000 G01 X22.339
N1010 G03 X18.155 Z12.238 I54.5 K66.01
N1020 G03 X16.74 Z12.575 I19.854 K14.927
N1030 G00 X86.661
N1040 G01 Z11.575
N1050 G03 X78.89 Z10.575 I54.5 K66.01
N1060 G01 X30.11
N1070 G03 X22.339 Z11.575 I54.5 K66.01
N1080 G00 X78.89
N1090 G01 Z10.575
N1100 G03 X66.64 Z9.575 I54.5 K66.01
N1110 G01 X42.36
N1120 G03 X30.11 Z10.575 I54.5 K66.01
N1130 G00 X66.64
N1140 G01 Z9.575
N1150 G03 X42.36 Z9.575 I54.5 K66.01
N1160 G03 X30.11 Z10.575 I54.5 K66.01
N1170 G03 X22.339 Z11.575 I54.5 K66.01
N1180 G03 X18.155 Z12.238 I54.5 K66.01
N1190 G03 X16.74 Z12.575 I19.854 K14.927
N1200 G03 X14.903 Z13.575 I19.854 K14.927
N1210 G03 X14.477 Z14.075 I19.854 K14.927
N1220 G01 X14.16 Z14.575
N1230 G00 X16.714 Z15.655

(finition gorge frontale)

N1300 X95.633 Z15
N1310 G01 X95 Z14
N1320 G03 X91 Z12 I89.146 K14.927
N1330 G03 X18 Z12 I54.5 K66.01
N1340 G03 X14 Z14 I19.854 K14.927
N1350 G01 X13.367 Z15
N1360 G40 G00 X14.974 Z16.526
N1370 (Temps de l'usinage : 0.22 min)
N1380 (Temps total : 2.02 min)
N1390 M5
N1400 G0 G52 XZ
N1410 T7 D7 M6
N1420 G97 G95 S1900 F0.2 M41 M3 M8 (Percage tournage)
N1430 G00 X-0 Z17.849
N1450 G83 X0 Z-6 P4 Q4 F0.2
N1460 G80 X-0 Z18.26
N1470 (Temps de l'usinage : 0.00 min)
N1480 (Temps total : 2.02 min)
N1490 G0 G52 XZ M5

(cylindrer 6)

N1580 G0 G52 XZ M0 M5 M9
N1590 T1 D1 M6
N1610 X98 G95 S1500 F0.15 M41 M3 M8
N1620 G00 X98.79 Z14.904
N1625 G96 S150
N1630 G42 X98 Z14.537
N1640 G01 Z7.952
N1650 X99.832
N1660 G40 G00 X100.7 Z8.527

(dresser 5 finition)

N1720 G00 X101.004 Z13.48
N1730 G41 X98.547 Z12.3
N1740 G01 X-0.8
N1750 G40 G00 X1.64 Z14.148
N1760 (Temps de l'usinage : 0.01 min)
N1770 (Temps total : 2.11 min)
N1780 M5

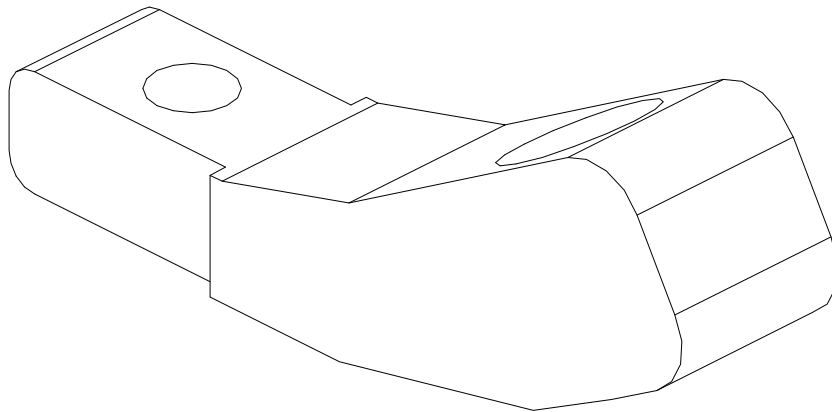
(Gorge frontale 7 ebauche)

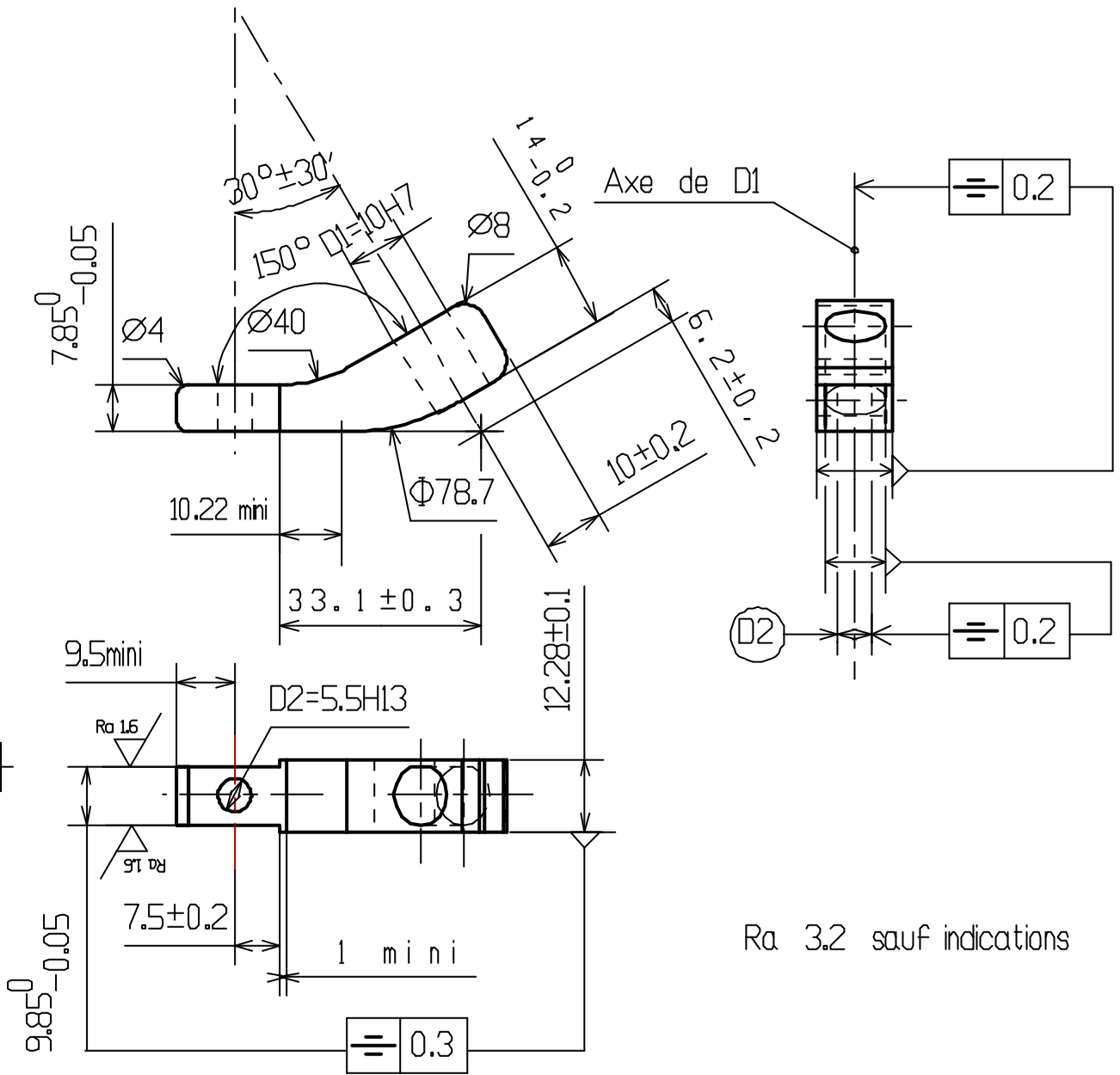
N1790 G0 G52 XZ
N1800 T5 D5 M6
N1820 X0 G95 S150 F0.15 M41 M3 M7
N1830 G00 X94.326 Z14.148
N1835 G96 S150
N1850 G01 X94.554
N1860 X94.237 Z12.121
N1870 G03 X93.804 Z11.621 I89.146 K12.927
N1880 G01 X15.196
N1890 G03 X14.763 Z12.121 I19.854 K12.927
N1900 G01 X14.446 Z12.621
N1910 G00 X93.804
N1920 G01 Z11.621
N1930 G03 X91.838 Z10.621 I89.146 K12.927
N1940 G01 X17.162
N1950 G03 X15.196 Z11.621 I19.854 K12.927
N1960 G00 X91.838
N1970 G01 Z10.621
N1980 G03 X90.751 Z10.38 I89.146 K12.927
N1990 G03 X85.901 Z9.621 I54.5 K64.01
N2000 G01 X23.099
N2010 G03 X18.249 Z10.38 I54.5 K64.01
N2020 G03 X17.162 Z10.621 I19.854 K12.927
N2030 G00 X85.901
N2040 G01 Z9.621
N2050 G03 X77.886 Z8.621 I54.5 K64.01
N2060 G01 X31.114
N2070 G03 X23.099 Z9.621 I54.5 K64.01
N2080 G00 X77.886
N2090 G01 Z8.621
N2100 G03 X64.489 Z7.621 I54.5 K64.01
N2110 G01 X44.511
N2120 G03 X31.114 Z8.621 I54.5 K64.01
N2130 G00 X64.489
N2140 G01 Z7.621
N2150 G03 X44.511 Z7.621 I54.5 K64.01
N2160 G03 X31.114 Z8.621 I54.5 K64.01
N2170 G03 X23.099 Z9.621 I54.5 K64.01
N2180 G03 X18.249 Z10.38 I54.5 K64.01
N2190 G03 X17.162 Z10.621 I19.854 K12.927
N2200 G03 X15.196 Z11.621 I19.854 K12.927
N2210 G03 X14.763 Z12.121 I19.854 K12.927
N2220 G01 X14.446 Z12.621
N2230 G00 X14.995 Z13.881

(gorge frontale 7 finition)

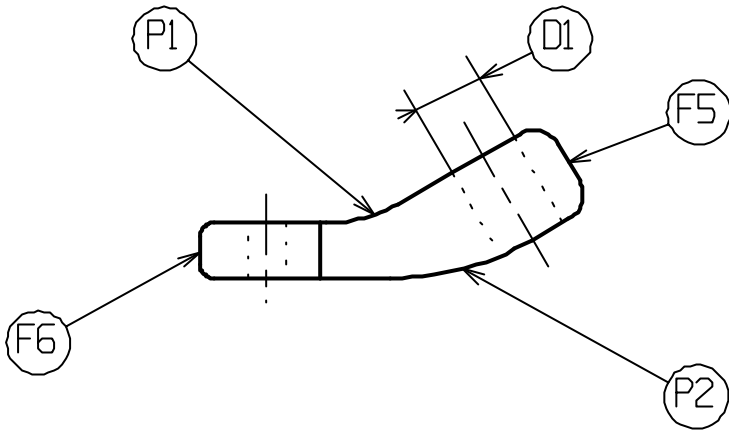
N2290 G00 X94.326 Z14.148
N2300 G41 X95.633 Z13
N2310 G01 X95 Z12
N2320 G03 X91 Z10 I89.146 K12.927
N2330 G03 X18 Z10 I54.5 K64.01
N2340 G03 X14 Z12 I19.854 K12.927
N2350 G01 X13.367 Z13
N2360 G40 G00 X14.995 Z13.881
N2370 (Temps de l'usinage : 0.22 min)
N2380 (Temps total : 3.24 min)
N2390 M5
N2400 G00 G52 X0 Z0
N2410 M2

Support de fourche

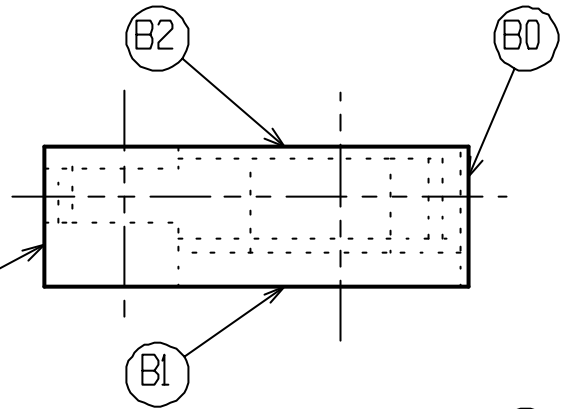
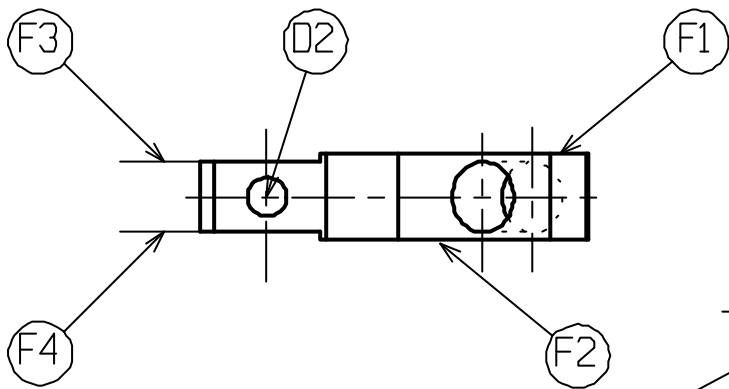
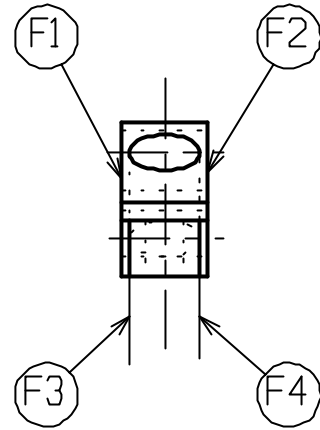




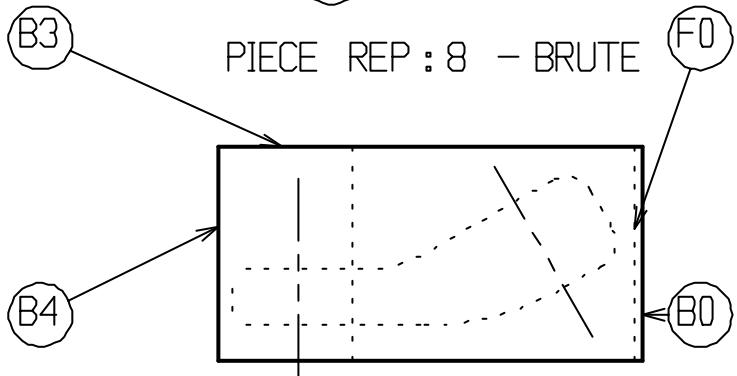
8	1	support de fourche	AU4G(2017)	brut étiré	
Rep	Nb	Désignation	Matière	Observation	Référence
		CHAR A VOILE			
Format : A4		Support de fourche			
Ech. 1 : 1					
Dessiné par : St Martin		LTN Blaise Pascal ROUEN			
Le 11/09/99		N°			



PIECE REP : 8 ETAT FINAL



PIECE REP : 8 - BRUTE



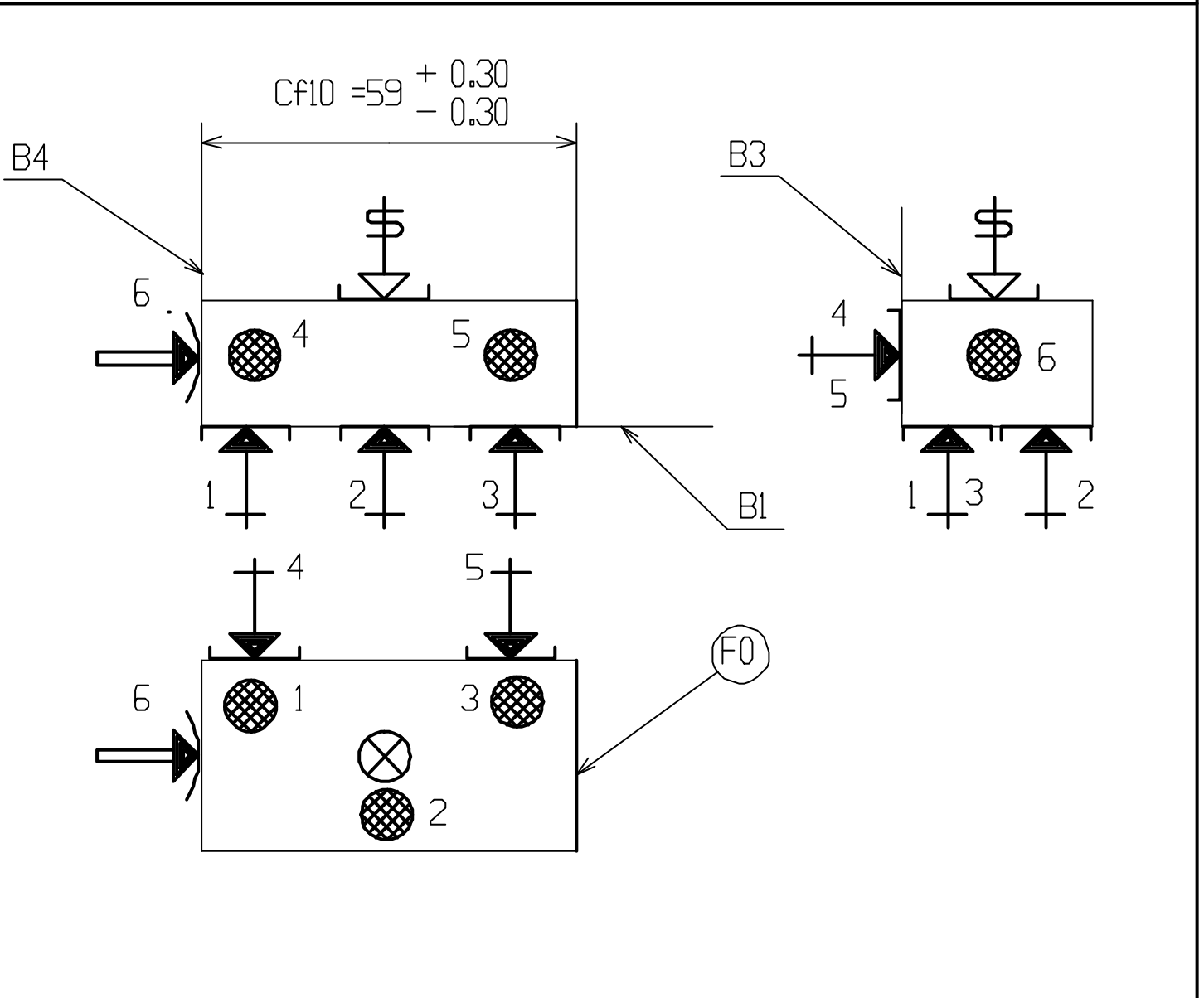
8	1	Support de fourche	AU4G-2017	30x20-lg60	étiré
Rep	Nb	Désignation	Matière	Observation	Référence
		SUPPORT DE FOURCHE			
Format : A4 Ech. 1 : 1		REPERES DES SURFACES			
Dessiné par : F.M		L. T. N BLAISE PASCAL			
Le 11/09/99		N°			



AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 100	Ensemble: Char à voile	Date 11/09/99	DMT
	Pièce SUPPORT DE FOURCHE - Rep 8	BUREAU DES METHODES	
	Matériau: 2017 - AL4G		6
NOM: F.M	Programme:		

Désignation: FRAISAGE

Machine-Outil: FRAISEUSE HORIZONTALE

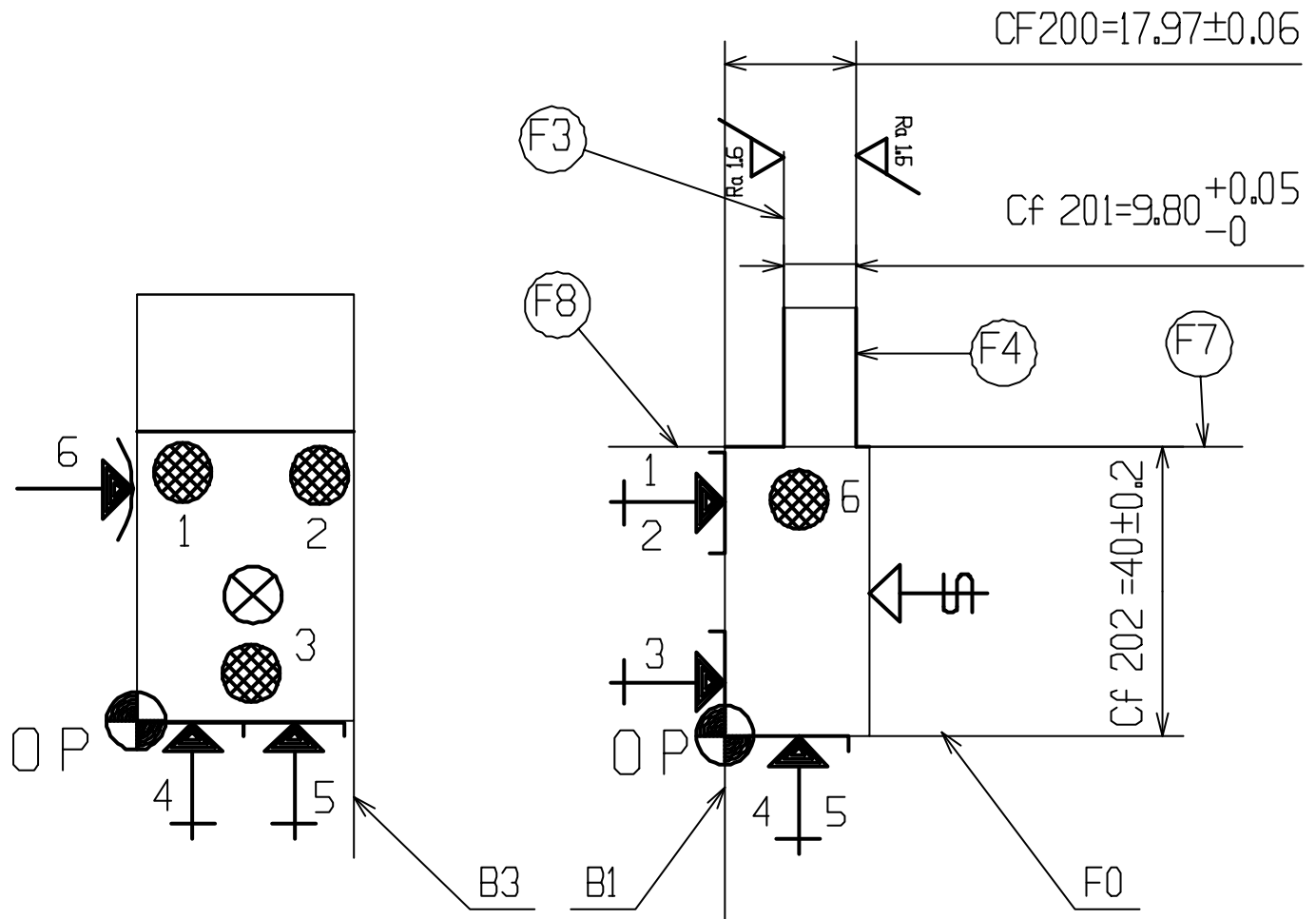


DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
101 - Dresser F0 en finition à Cf10	Fraise 2 tailles ARS - Diam 30 3 dents	120	1250	0.10	1	1
				Vf = 375 mm/min		

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 200	Ensemble: CHAR A VOILE	Date 11/09/99	DMT
	Pièce SUPPORT DE FOURCHE-Rep 8	BUREAU DES METHODES	
	Matière: AU4G (2017)		Programme:
NOM: FM			

Désignation: FRAISAGE

Machine-Outil: Centre Usinage Vertical

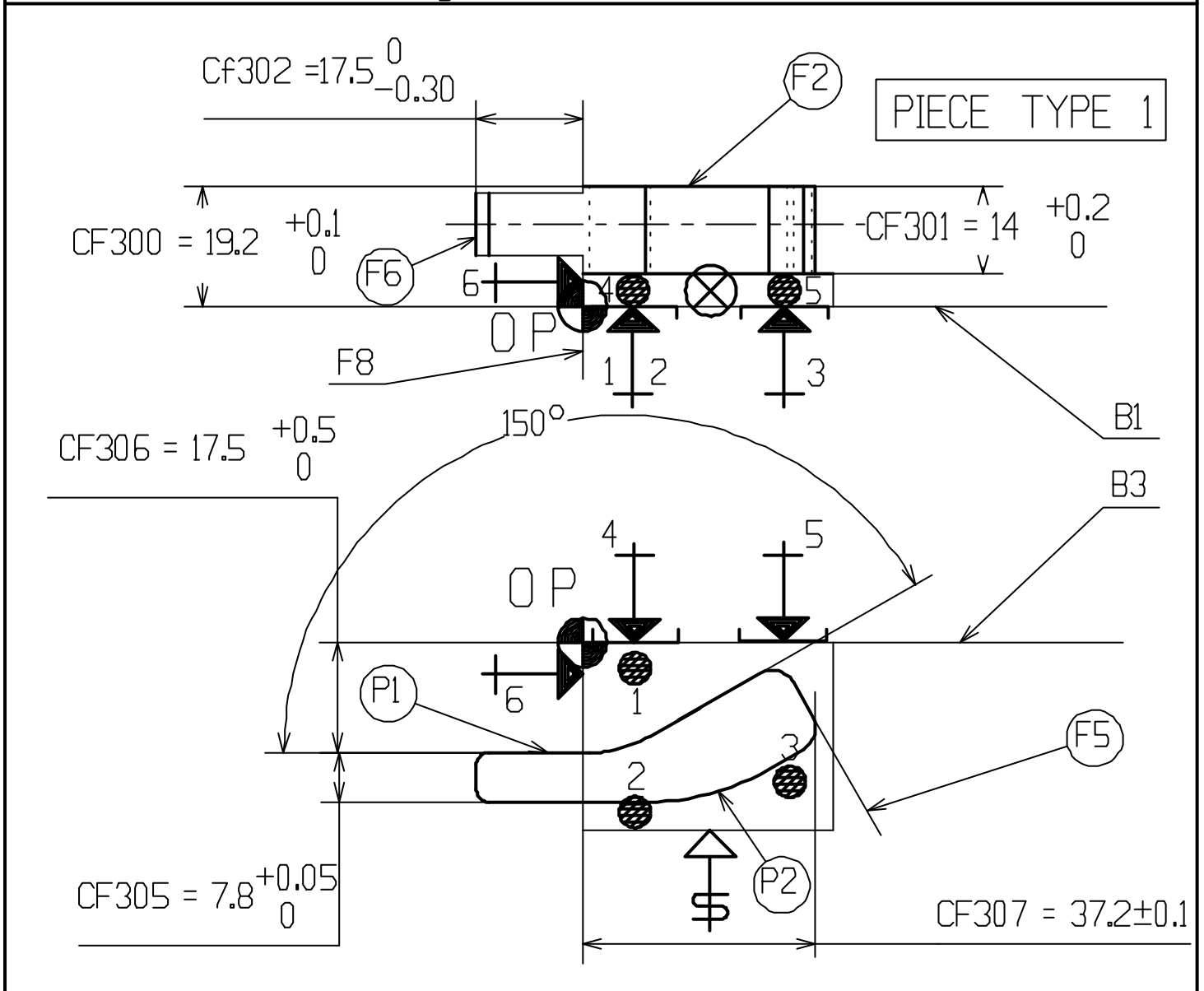


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
201 - Usiner le tenon F3 - F4 - F7 - F8 en Ebauche et Finition aux cotes Cf 200 - Cf 201 - Cf 202	Fraise 2 tailles ARS - Diam 14 2 dents	Eb 100	2500	0.08	5	4
			Vf = 400	mm/min		
	Fraise 2 tailles ARS - Diam 14 2 dents	Fin 120	2700	0.07	0.5	1
			Vf = 400	mm/min		

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 300-A	Ensemble: CHAR A VOILE	Date 11/09/99	DMT
	Pièce SUPPORT DE FOURCHE - Rep 8	BUREAU DES METHODES	
	Matière: AU4G (2017)		Programme:
NOM: FM			

Désignation: FRAISAGE

Machine-Outil: Centre Usinage Vertical

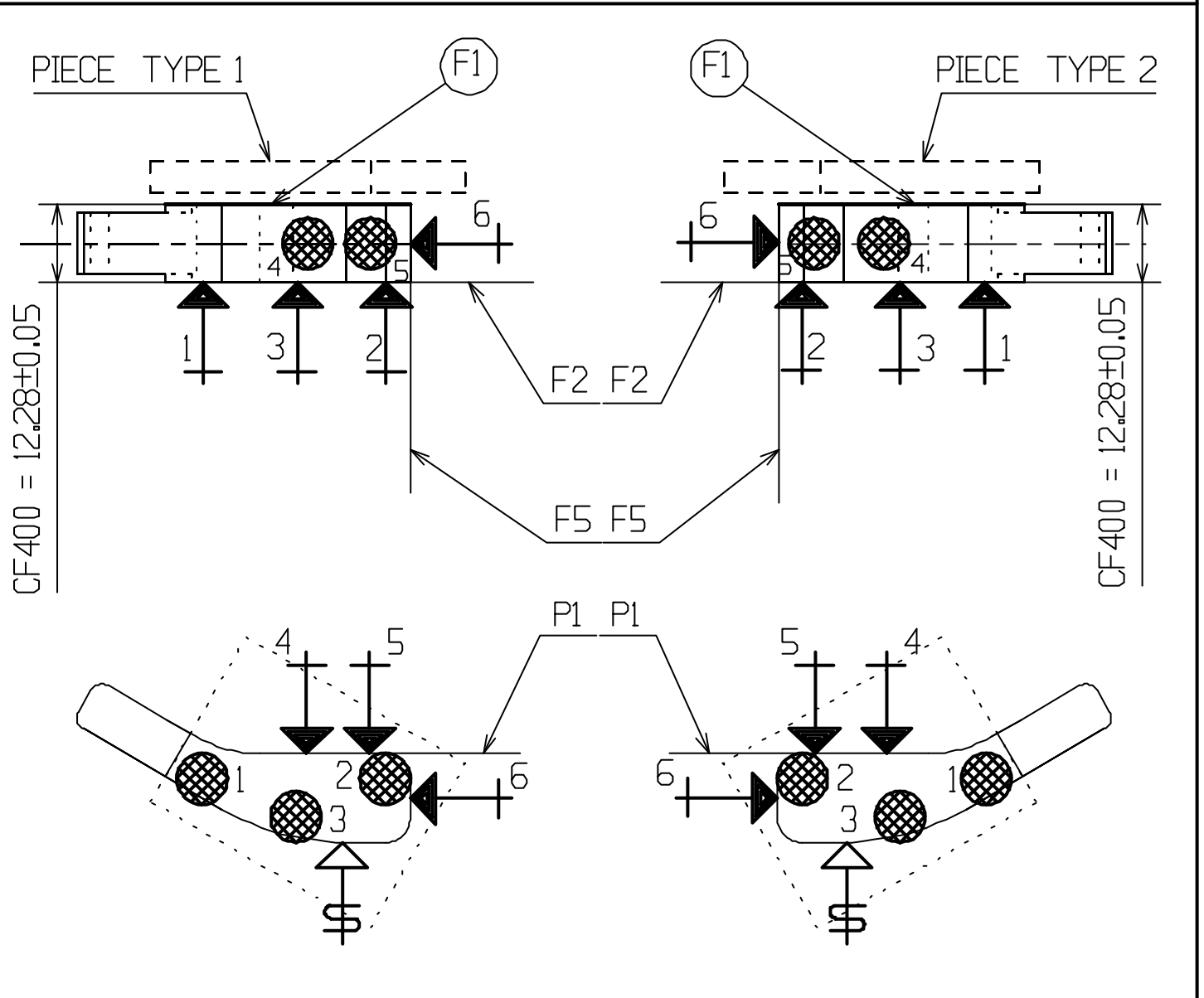


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
301 - Surfacier F2 en finition à la cote Cf 300	Fraise 2 tailles - ARS Diam 50 - 4 dents	100	650	0.10	1	1
302 - Contournage du profil en Ebauche	Fraise 2 tailles - ARS Diam 14 - 3dents	80	1700	0.12	5	3
303 - Contournage du profil P1-F5-P2-F6 en finition à Cf 301-302-305-306-307	Fraise 2 tailles - ARS Diam 14 - 3dents	120	2700	0.08	0.5	1

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 400	Ensemble: CHAR A VOILE	Date 11/08/99	DMT
	Pièce SUPPORT DE FOURCHE	BUREAU DES METHODES	
	Matière: AU4G (2017)		Programme:
NOM: FM			

Désignation: FRAISAGE

Machine-Outil: CU vertical ou Fraiseuse Verticale

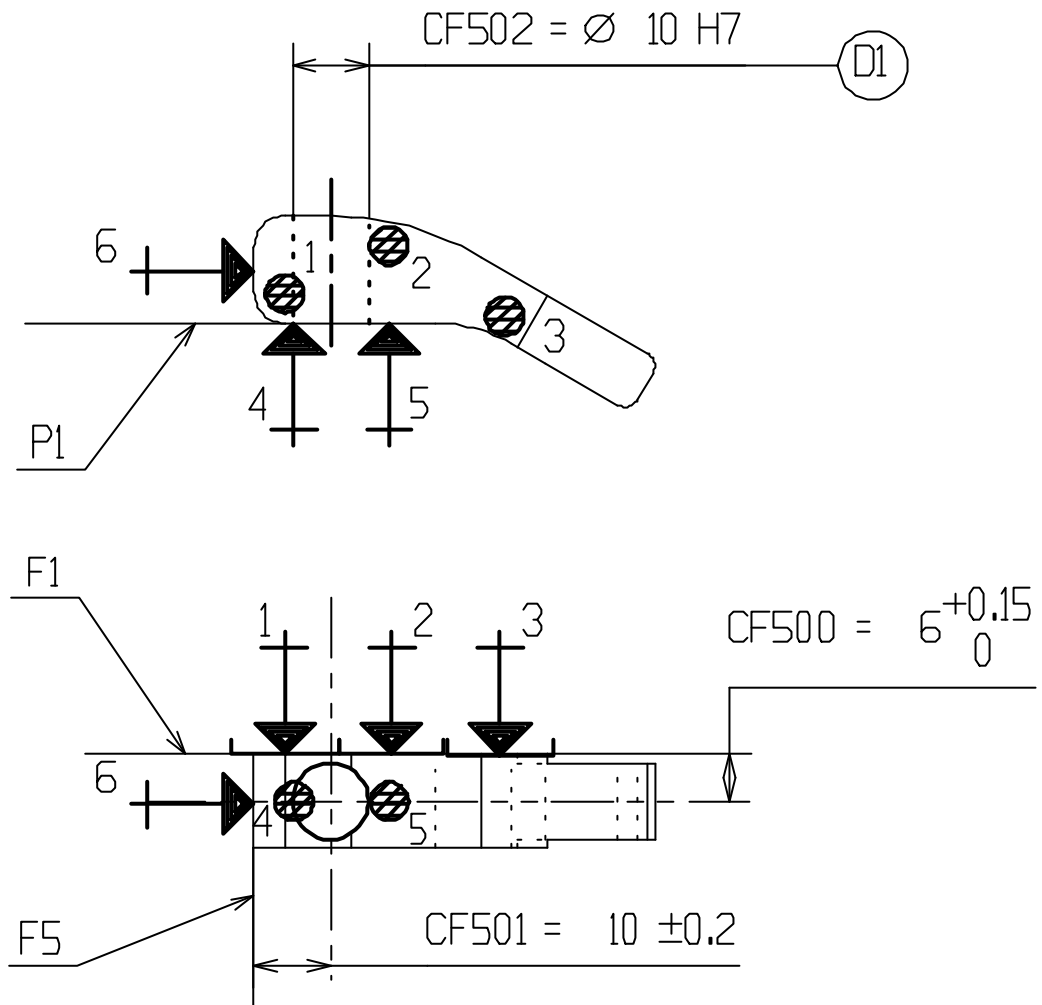


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
401 - Surfacier F4 en finition sur les 2 types de pièces à la cote Cf 400	Fraise 2 tailles - ARS Diam 50 - 4 dents	Eb				
		80	1700	0.12	5	3
		Vf =	600	mm/min		
	Fraise 2 tailles - ARS Diam 50 - 4 dents	Fin				
120		2700	0.08	0.5	1	
	Vf =	650	mm/min			

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 500	Ensemble: CHAR A VOILE	Date 13/08/99	DMT
	Pièce SUPPORT DE FOURCHE	BUREAU DES METHODES	
	Matière: AU4G (2017)		Programme:
NOM: FM			

Désignation: PERCAGE - ALESAGE

Machine-Outil: PERCEUSE A COLONNE

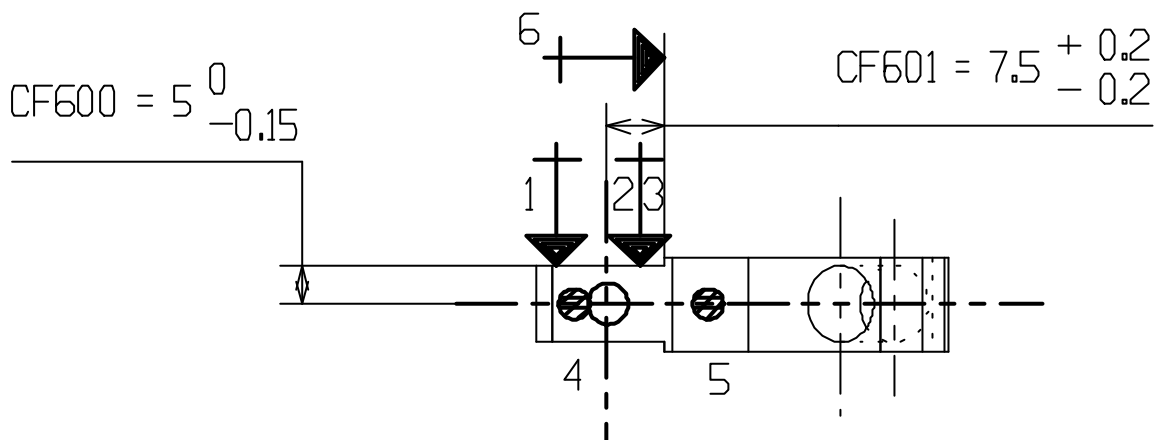
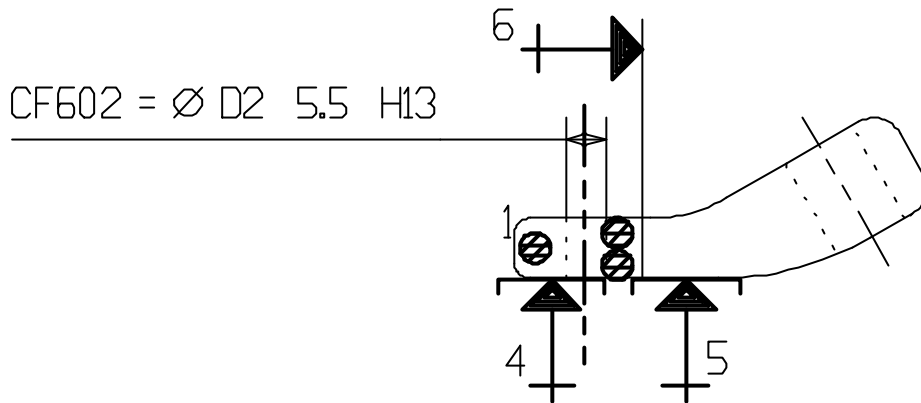


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
501 - Percer D1 en ébauche aux cotes Cf500 - 501 - et Cf502 eb	Foret coupe alu - ARS Diam 9.7 - 2 lèvres	60	1900	Man	-	1
502 - aléser d1 en finition aux cotes Cf500 - 501 - et Cf502 fin	Alésoir coupe alu - ARS Diam 10 k6 - 3 lèvres	25	800	0.3	0.15	1

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 600	Ensemble: CHAR A VOILE	Date 14/08/99	DMT
	Pièce SUPPORT DE FOURCHE	BUREAU DES METHODES	
	Matière: AU4G (2017)		Programme:
NOM: FM			

Désignation: PERCAGE

Machine-Outil: PERCEUSE SENSITIVE



DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
600 - Percer D2 en finition aux cotes Cf600 - 601 - et Cf602	Foret coupe alu - ARS Diam 5.5 - 2 lèvres	60	3000	Man	-	1

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%8200
(support de fourche Rep 8 Ph200)
(fraisage du tenon)
(outil fraise 2 tailles d=14)

N05 G59 Z59
N10 G0 G52 Z G90 G94
N20 T1 D1 M6
N30 S2500 F400 M41 M3 M8 (Contournage fraisage ebauche)
N40 G00 X48.57 Y2.342 Z10
N50 Z5
N60 L1 = -4.75
N70 L2 = 5
N80 X48.57 Y2.342
N90 G01 ZL1 F133
N100 G41 G01 X35.2 Y-8.145 F400
N110 Y-17.97
N120 G02 X35 Y-18.17 I35 J-17.97
N130 G01 X30
N140 X0
N150 X-5
N160 G02 X-5.2 Y-17.97 I-5 J-17.97
N170 G01 Y-8.145
N180 G02 X-5 Y-7.945 I-5 J-8.145
N190 G01 X0
N200 X30
N210 X35
N220 G40 X48.57 Y2.342
N230 G00 ZL2
N240 L1 = L1 - 4.75
N250 G79 L1 >= -19 N80
N260 G00 Z10
N270 (Temps de l'usinage : 0.35 min)
N280 (Temps total : 1.41 min)
N290 M9 M5
N310 S2500 F400 M41 M3 M8 (Contournage fraisage finition)
N320 G00 X48.57 Y2.342 Z10
N330 Z5
N340 X48.57 Y2.342 Z5
N350 G01 Z-19 F133
N360 G41 X35 Y-8.145 F400
N370 Y-17.97
N380 X30
N390 X0
N400 X-5
N410 Y-8.145
N420 X0
N430 X30
N440 X35
N450 G40 X48.57 Y2.342
N460 G00 Z5
N470 G00 Z10
N480 (Temps de l'usinage : 0.53 min)
N490 (Temps total : 1.95 min)
N500 M9 M5
N510 G00 G52 X0 Y0 Z0
N520 M2

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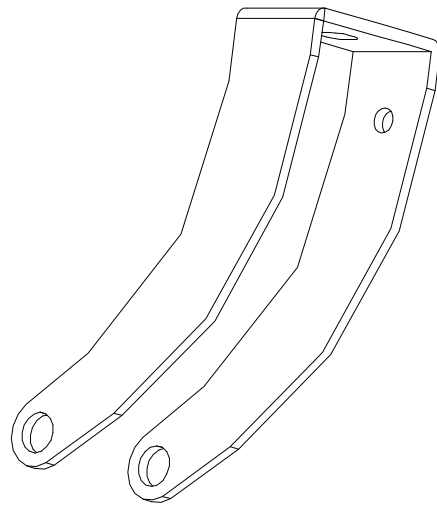
%8301
(char a voile)
(support de fourche Rep 8 Ph300-a)
(outil 1 fraise 2 tailles d=12)

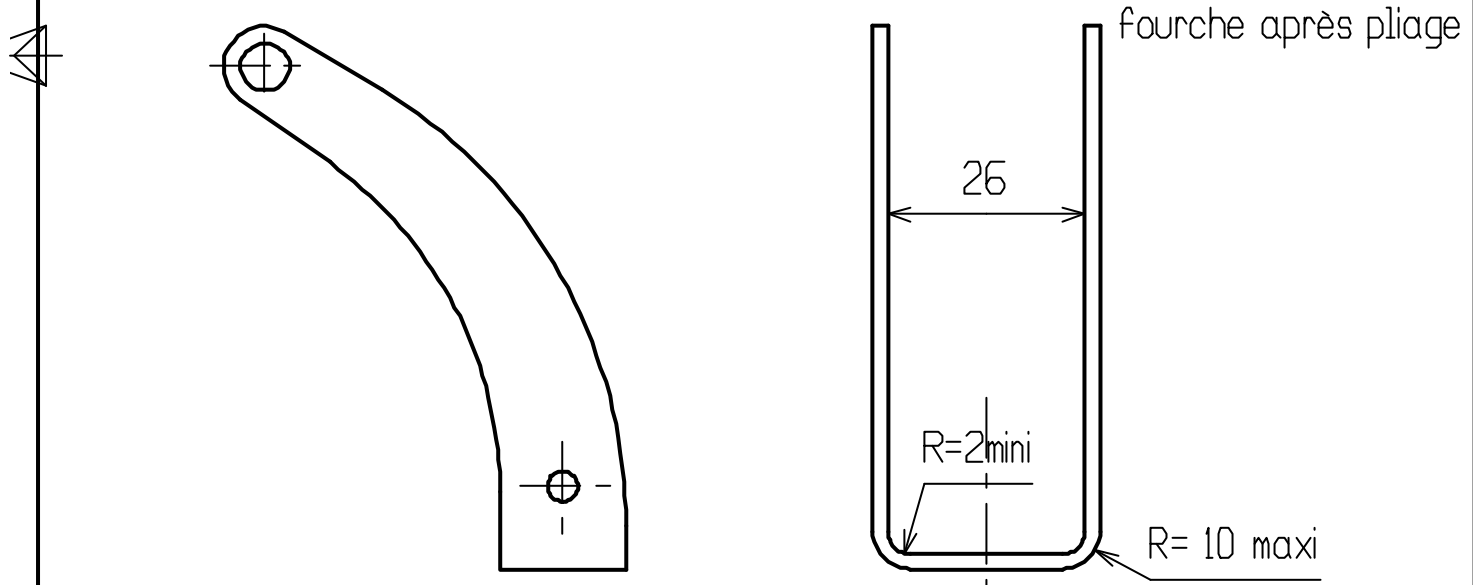
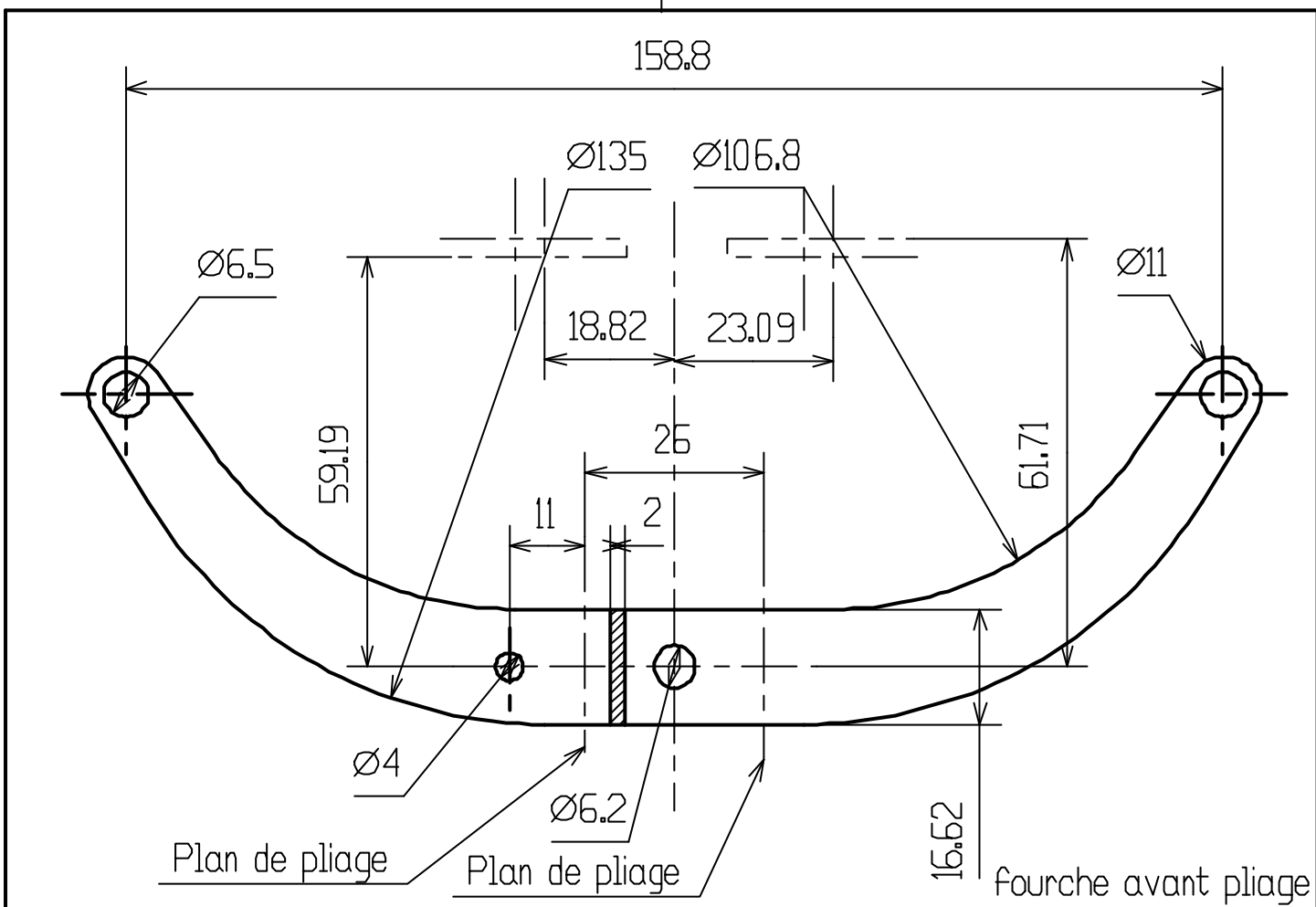
N10 G0 G52 Z G94
N20 T1 D1 M6
N25 G59 Z20
N30 S2500 F400 M41 M3 M8 (Contournage ebauche)
N40 G00 X-30.651 Y-32.308 Z10
N50 Z5
N60 L1 = -5
N70 L2 = 5
N80 X-30.651 Y-32.308
N90 G01 ZL1 F133
N100 G41 G01 X-30.009 Y-30.423 F400
N110 G03 X-23.009 Y-23.423 I-30.009 J-23.423
N120 G01 Y-19.598
N130 G02 X-15.009 Y-11.598 I-15.009 J-19.598
N140 G01 X0.379
N150 G03 X7.072 Y-9.894 I0.379 J2.402
N160 G01 X8.687 Y-9.015
N170 X25.558 Y0.169
N180 G02 X38.999 Y-3.614 I30.339 J-8.614
N190 G01 X41.95 Y-8.725
N200 G02 X38.071 Y-22.508 I33.29 J-13.725
N210 G01 X31.834 Y-25.904
N220 G02 X10.151 Y-31.423 I10.151 J13.927
N230 G01 X-15.009
N240 G02 X-23.009 Y-23.423 I-15.009 J-23.423
N250 G03 X-30.009 Y-16.423 I-30.009 J-23.423
N260 G40 G01 X-31.976 Y-19.324
N270 G00 ZL2
N280 L1 = L1 - 5
N290 G79 L1 >= -15 N80
N300 G00 Z10
N310 (Temps de l'usinage : 0.50 min)
N320 (Temps total : 1.49 min)
N330 M9 M5
N340 S2500 F400 M41 M3 M8 (Contournage 1/2 finit)
N350 G00 X-27.415 Y-23.774 Z10
N360 Z5
N370 L1 = -5
N380 L2 = 5
N390 X-27.415 Y-23.774
N400 G01 ZL1 F133
N410 G41 G01 X-24.209 Y-30.423 F400
N420 G03 X-17.209 Y-23.423 I-24.209 J-23.423
N430 G01 Y-19.598
N440 G02 X-15.009 Y-17.398 I-15.009 J-19.598
N450 G01 X0.379
N460 G03 X9.845 Y-14.988 I0.379 J2.402
N470 G01 X11.46 Y-14.109
N480 X28.331 Y-4.925
N490 G02 X33.976 Y-6.514 I30.339 J-8.614
N500 G01 X36.927 Y-11.625
N510 G02 X35.298 Y-17.414 I33.29 J-13.725
N520 G01 X29.061 Y-20.81
N530 G02 X10.151 Y-25.623 I10.151 J13.927
N540 G01 X-15.009
N550 G02 X-17.209 Y-23.423 I-15.009 J-23.423
N560 G03 X-24.209 Y-16.423 I-24.209 J-23.423
N570 G40 G01 X-27.53 Y-19.37
N580 G00 ZL2
N590 L1 = L1 - 5
N600 G79 L1 >= -15 N390
N610 G00 Z10
N620 (Temps de l'usinage : 0.41 min)
N630 (Temps total : 2.71 min)
N640 M9 M5
N650 S2500 F400 M41 M3 M8 (Contournage finition)
N660 G00 X-24.209 Y-23.423 Z10
N670 Z5
N680 X-24.209 Y-23.423 Z5
N690 G01 Z-15 F133
N700 G41 X-24.009 Y-30.423 F400
N710 G03 X-17.009 Y-23.423 I-24.009 J-23.423
N720 G01 Y-19.598
N730 G02 X-15.009 Y-17.598 I-15.009 J-19.598
N740 G01 X0.379

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N750 G03 X9.941 Y-15.164 I0.379 J2.402
N760 G01 X11.556 Y-14.285
N770 X28.426 Y-5.101
N780 G02 X33.803 Y-6.614 I30.339 J-8.614
N790 G01 X36.754 Y-11.725
N800 G02 X35.202 Y-17.239 I33.29 J-13.725
N810 G01 X28.965 Y-20.634
N820 G02 X10.151 Y-25.423 I10.151 J13.927
N830 G01 X-15.009
N840 G02 X-17.009 Y-23.423 I-15.009 J-23.423
N850 G03 X-24.009 Y-16.423 I-24.009 J-23.423
N860 G40 G01 X-24.209 Y-23.423
N870 G00 Z5
N880 G00 Z10
N890 (Temps de l'usinage : 0.56 min)
N900 (Temps total : 3.27 min)
N910 M9 M5
N920 S2500 F400 M41 M3 M8 (surfacage)
N930 G00 X51.44 Y-0.621 Z10
N940 Z5
N950 X51.44 Y-0.621 Z5
N960 G01 Z-0.8 F133
N970 G41 X37.603 Y1.26 F400
N980 X8.956 Y-13.717
N990 G02 X-0.374 Y-15.993 I-0.31 J4.007
N1000 G01 X-6.715 Y-15.973
N1010 X-6.777 Y-28.738
N1020 X10.82
N1030 G03 X27.344 Y-24.722 I10.82 J7.262
N1040 G01 X47.929 Y-14.087
N1050 G40 X51.344 Y-0.621
N1060 G00 Z5
N1070 G00 Z10
N1080 (Temps de l'usinage : 0.41 min)
N1090 (Temps total : 3.68 min)
N1100 M9 M5
N1110 G00 G52 X0 Y0 Z0
N1120 M2

Fourche





Tolérances générales ISO 2768 mk

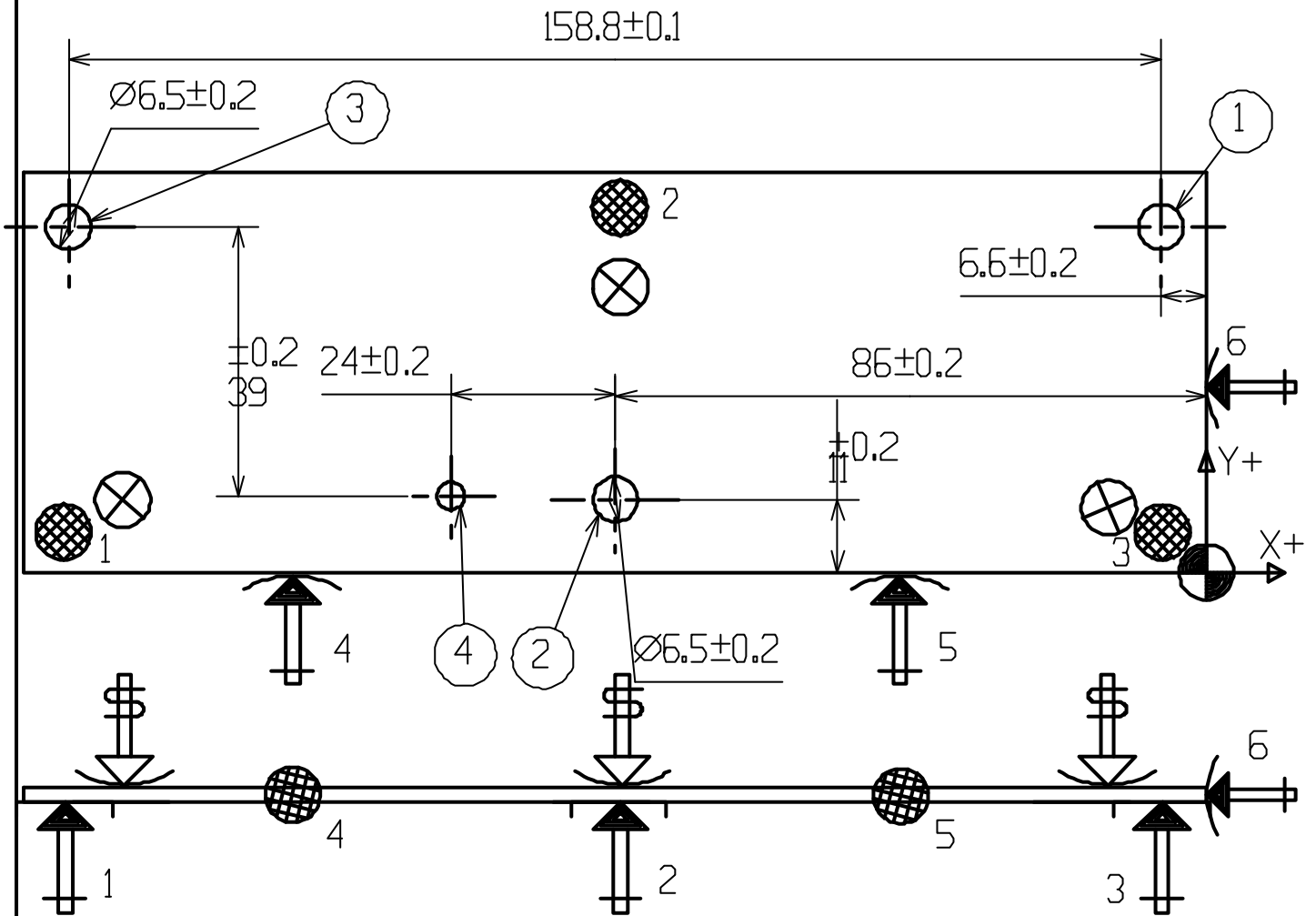
5	1	tôle ep 2	E26		
Rep	Nb	Désignation	Matériau	Observation	Référence
			CHAR A VOILE		
Format: A4 Ech. 1 : 1			FOURCHE		
Dessiné par: St Martin			LTN BLAISE PASCAL		
Le 08/01/99			N°5		



AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20A	Ensemble: Char à voile	18/01/2000	DDMT
	Pièce: fourche	BUREAU DES METHODES	1
	Matière: tôle E26 ep 2		1
NOM: St Martin	Programme: %520		

Désignation: PERCAGE

Machine-Outil: C200

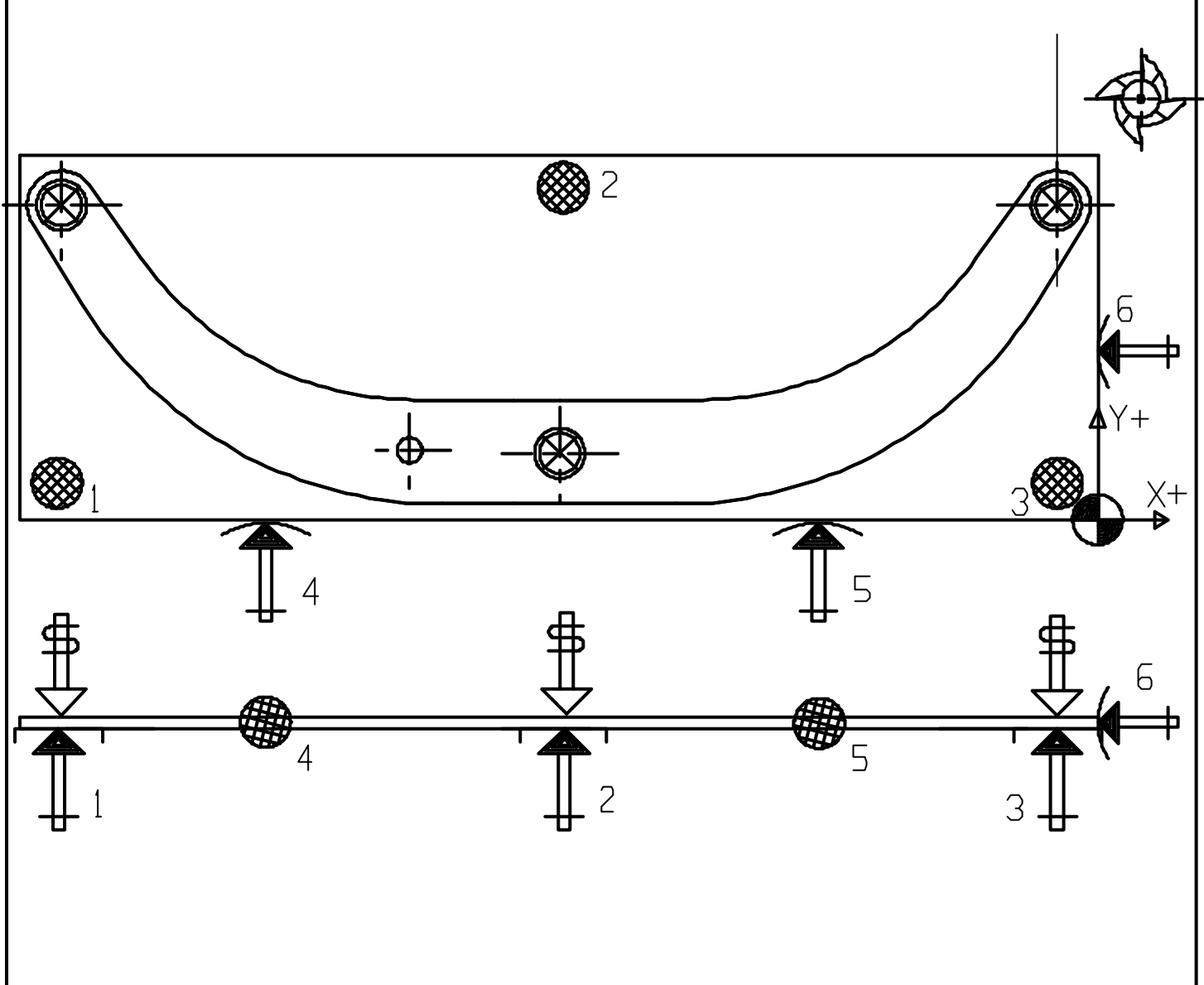


DESIGNATION DES OPERATIONS	OUTILS	T.D.	Vc m/mn	n tr/mn	fz mm/dt	Vf mm/min	n
a) Pointer 1, 2, 3, 4	Foret à pointer $\Phi 10$	1.1	12	900	0.1	100	1
b) percer 3 trous $\Phi 6.5$	Foret $\Phi 6.5$	2.2	12	600	0.05	60	1
c) percer 1 trou $\Phi 4$	foret $\Phi 4$	3.3	12	954	0.05	100	1

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20B	Ensemble: Char à voile	Date: 23/03/1999	BUREAU DES METHODES	1 / 1
	Pièce: FOURCHE			
	Matière: E26	Programme: %10		
NOM: ST Martin				

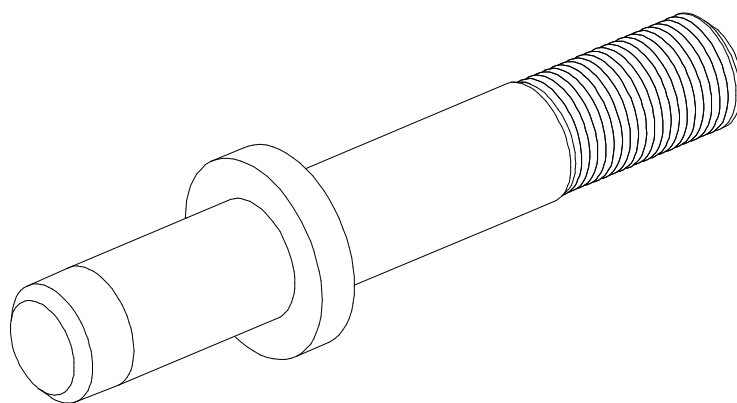
Désignation: FRAISAGE

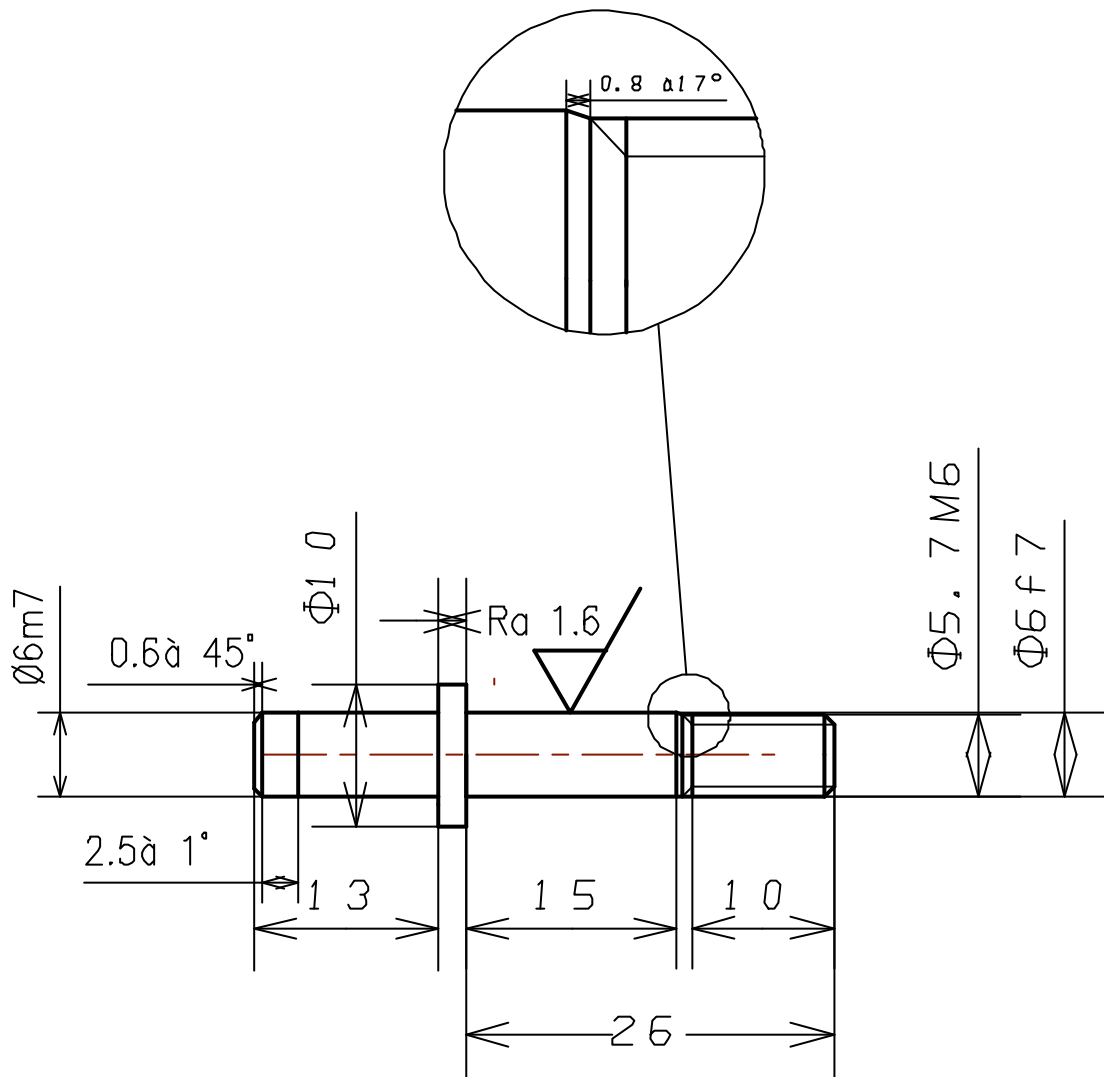
Machine-Outil: Centre d'usinage vertical



DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
a) contourner le profil ext	fraise 2 tailles Ø10	12	400	0.05	2	1

Axe de roue arrière





Tolérances générales ISO 2768 - mk

$\varnothing 6 m7 = 6^{+0.021}_{+0.006}$

$\varnothing 6 f7 = 6^{-0.01}_{-0.022}$

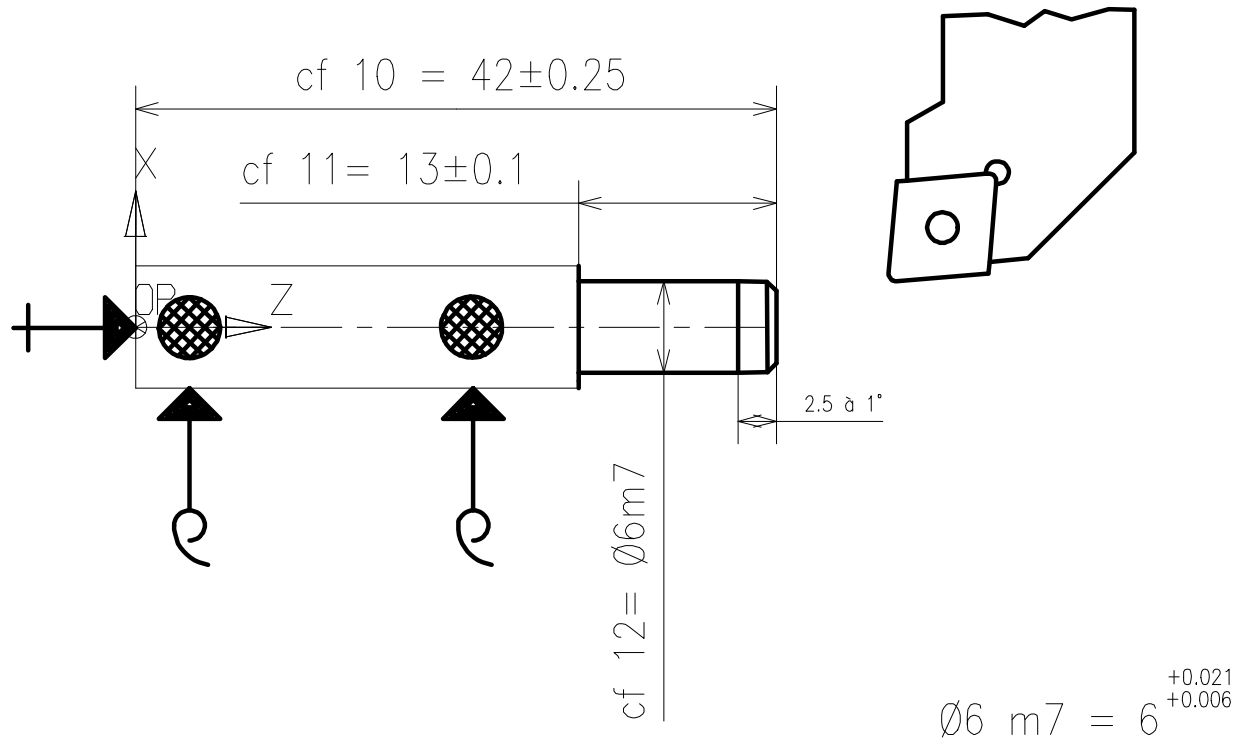
7	2	Axe	E26		
Rep	Nb	Désignation	Matériau	Observation	Référence
		CHAR A VOILE			
Format : A4		AXE			
Ech. 2:1					
Dessiné par : St Martin		LTN Blaise Pascal			
Le 13/03/2000		N°7			



AVANT-PROJET D'ETUDE DE FABRICATION PHASE N°10	Ensemble: Char à voile	Date: 23/03/2000	IDMIT
	Pièce: Axe roue arrière	BUREAU DES METHODES	
	Matière: E26		Programme: %710
NOM: St Martin			

Désignation: TOURNAGE

Machine-Outil: TCN

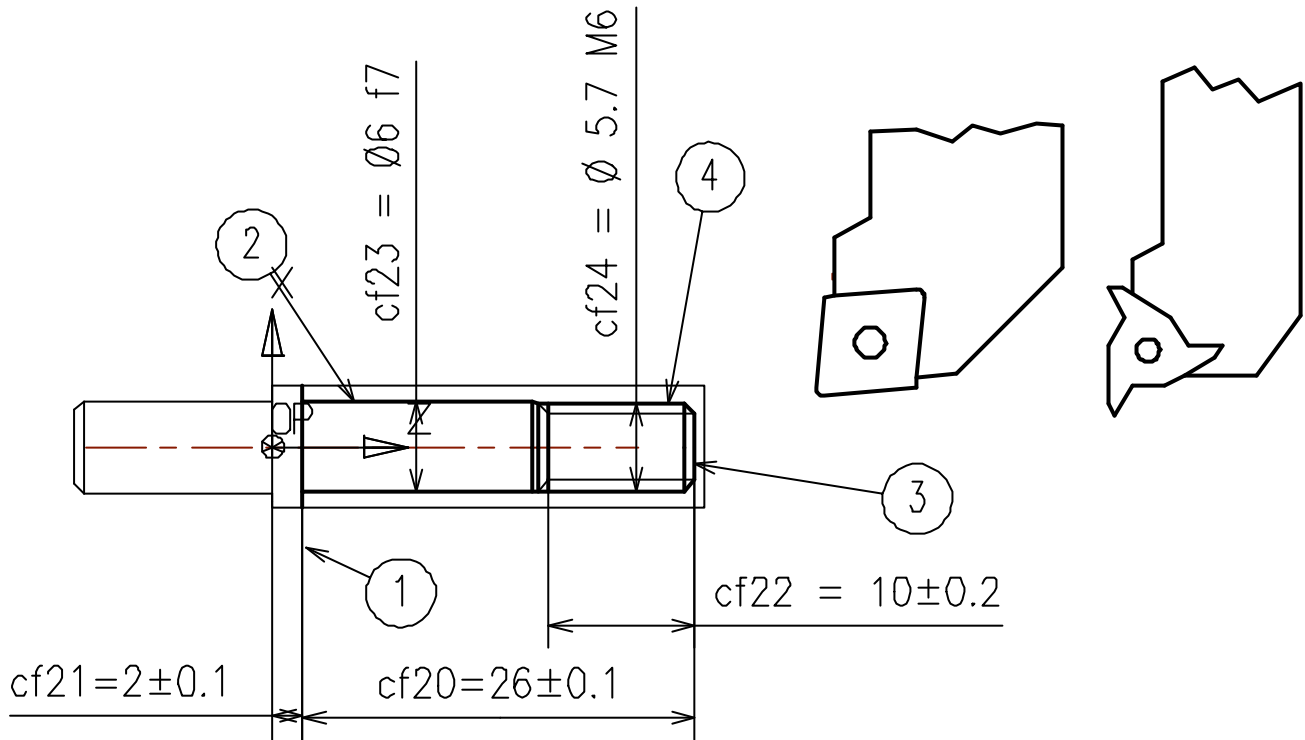


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
a) Contournage du profil : - ébauche - finition cotes : Cf10; cf11; cf12	PCLN T1 D1	60		0.1 0.05	1 0.2	

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20	Ensemble: Char à voile	Date 27/03/2000	DMT 1 1
	Pièce AXE	BUREAU DES METHODES	
	Matière: E26		
NOM: St Martin	Programme: %720		

Désignation: TOURNAGE

Machine-Outil: TCN



DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
a) contournage 1,2,3,4 ébauche, finition cotes cf20, cf21, cf23, cf 24	PCLN T1 D1	60		0.05	0.5	
b) filetage finition cotes : cf 22 , cf24	CER T3 D3	30	1500	1	0.05	10

```

%710
(CHAR A VOILE)
(axe de roue phase10)
(outil T1 ebauche PCLN)

N10 G90 G95 G80 G40 T0 D0
N20 G00 X60 Z150
N30 T1 D1 M6
N40 G92 S5000
N50 G97 S1000 X10 G95 F0.05 M41 M3 M8 (Ebauche tournage)
N60 G00 X12.917 Z2.635
N65 G96 S60
N70 X10 Z2
N80 X8.4
N90 G01 Z-13.8
N100 X10
N110 G00 Z2
N120 X8.4
N130 X6.8
N140 G01 Z-13.8
N150 X8.4
N160 G00 Z2
N170 X6.8
N180 X5.2
N190 G01 Z-0.93
N200 X6.283 Z-1.472
N210 G03 X6.4 Z-1.613 I6 K-1.613
N220 G01 Z-13.8
N230 X6.8
N240 G00 Z2
N250 X5.2
N260 X3.6
N270 G01 Z-0.8
N280 X4.774
N290 G03 X5.057 Z-0.859 I4.774 K-1
N300 G01 X5.2 Z-0.93
N310 G00 Z2
N320 X3.6
N330 X2
N340 G01 Z-0.8
N350 X3.6
N360 G00 Z2
N370 X2
N380 X0.4
N390 G01 Z-0.8
N400 X2
N410 G00 Z2
N420 X1.846 Z2.564
N430 (Temps de l'usinage : 10.21 min)
N440 (Temps total : 10.21 min)
N500 G00 X1.001 Z1.848 F0.05
N510 G42 X0 Z1.623
N520 G01 Z-1
N530 X4.7
N540 X5.92 Z-1.613
N550 X5.98 Z-14
N560 X12.26
N570 G40 G00 X12.692 Z-13.575
N580 (Temps de l'usinage : 10.04 min)
N590 (Temps total : 20.25 min)
N600 M5 M9
N610 G00 G52 X0 Z0
N620 M2

```

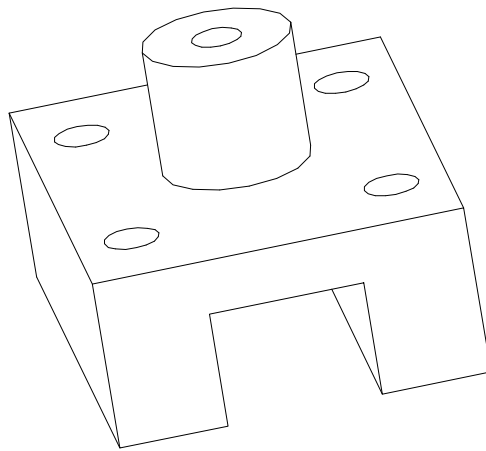
%720
(char a voile)
(axe roue arriere)
(ph20 prise en pince)
(outil T1 : PCLN)
(outil T3 : outil a fileter)

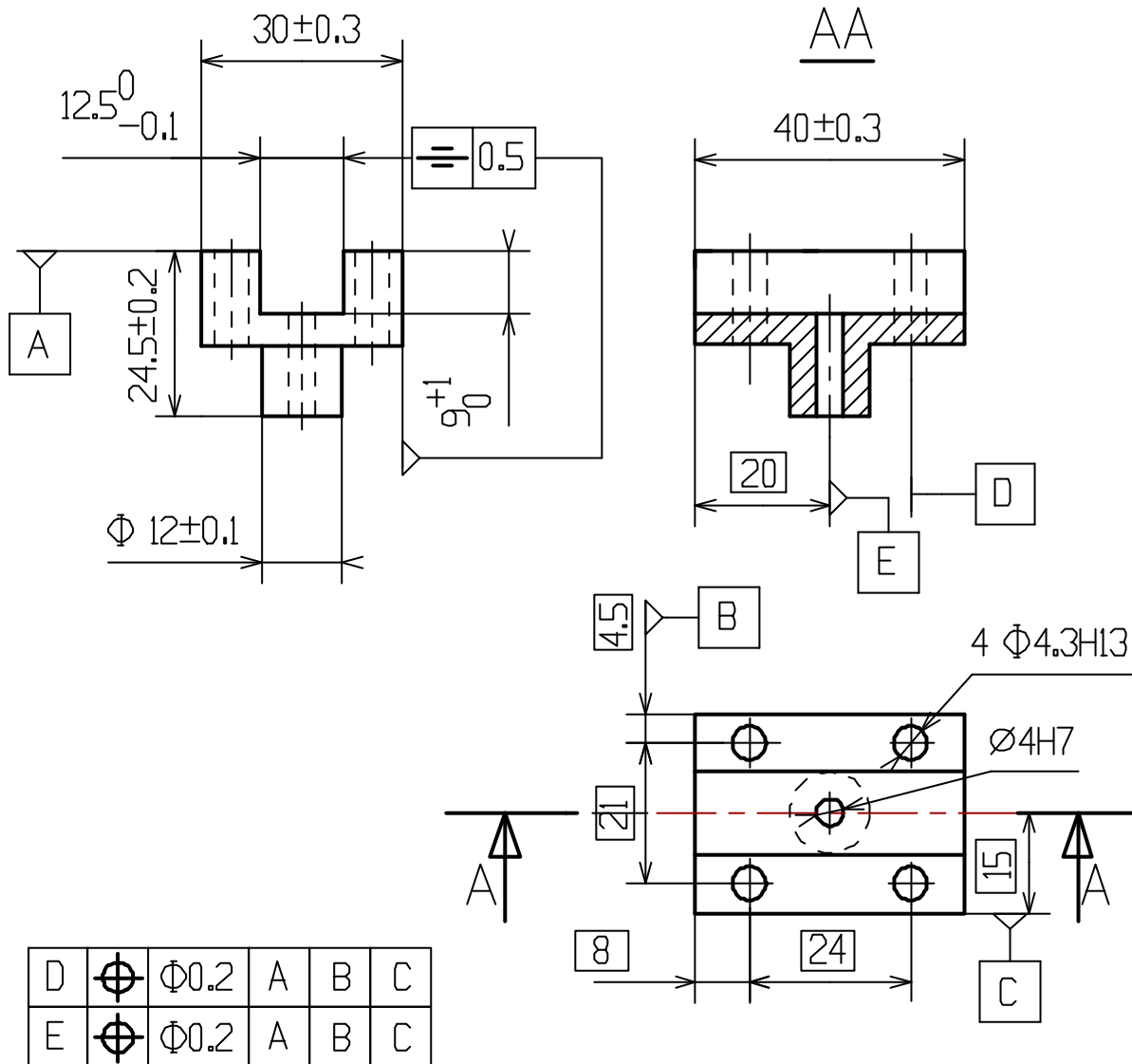
N10 G90 G95 G80 G40 T0 D0
N20 G0 G52 XZ
N30 T1 D1 M6
N40 G92 S5000
N50 G97 S1000 X10 G95 F0.05 M41 M3 M8 (Ebauche tournage)
N60 G00 X13.663 Z33.948
N65 G96 S60
N70 X10 Z33
N80 X8.4
N90 G01 Z2.6
N100 X10
N110 G00 X12 Z3.6
N120 Z33
N130 X8.4
N140 X6.8
N150 G01 Z27.281
N160 G03 X6.94 Z27 I5.74 K27
N170 G01 Z17.486
N180 X7.18 Z17.089
N190 Z2.6
N200 X8.4
N210 G00 X10.4 Z3.6
N220 Z33
N230 X6.8
N240 X5.2
N250 G01 Z28.119
N260 X6.589 Z27.424
N270 G03 X6.8 Z27.281 I5.74 K27
N280 G00 X8.8 Z28.281
N290 Z33
N300 X5.2
N310 X3.6
N320 G01 Z28.6
N330 X3.74
N340 G03 X4.589 Z28.424 I3.74 K28
N350 G01 X5.2 Z28.119
N360 G00 X7.2 Z29.119
N370 Z33
N380 X3.6
N390 X2
N400 G01 Z28.6
N410 X3.6
N420 G00 X5.6 Z29.6
N430 Z33
N440 X2.8
N450 X1.2
N460 G01 Z28.6
N470 X2
N480 G00 X4 Z29.6
N490 Z33
N500 X2.294 Z33
N580 G00 X1.07 Z32.56
N590 G42 X0 Z32.423
N600 G01 Z31.423
N610 Z28
N620 X3.74
N630 X5.74 Z27
N640 Z17.397
N650 X5.98 Z17
N660 Z2
N670 X11.889
N680 X13.889
N690 G40 G00 X13.663 Z0.729
N700 (Temps de l'usinage : 10.06 min)
N710 (Temps total : 20.33 min)
N720 M5
N730 G0 G52 XZ
N740 T3 D3 M6
N750 G97 S2200 G95 F0.1 M41 M3 M8 (Filetage tournage)
N760 G00 X8.111 Z32.238
N770 X8 Z36
N780 G33 Z18 X6 K1 EA0 EB30 R0 P0.65 Q0 S20 F1
N785 G0 X8 Z36

N787 G33 Z18 X6 K1 EA0 EB30 R0 P0.65 Q0 S5 F1
N788 G0 X8 Z36
N790 (Temps de l'usinage : 10.00 min)
N800 (Temps total : 20.33 min)
N810 M5
N820 G00 G52 X0 Z0
N830 M2

Support pied

Support pied **de mat**



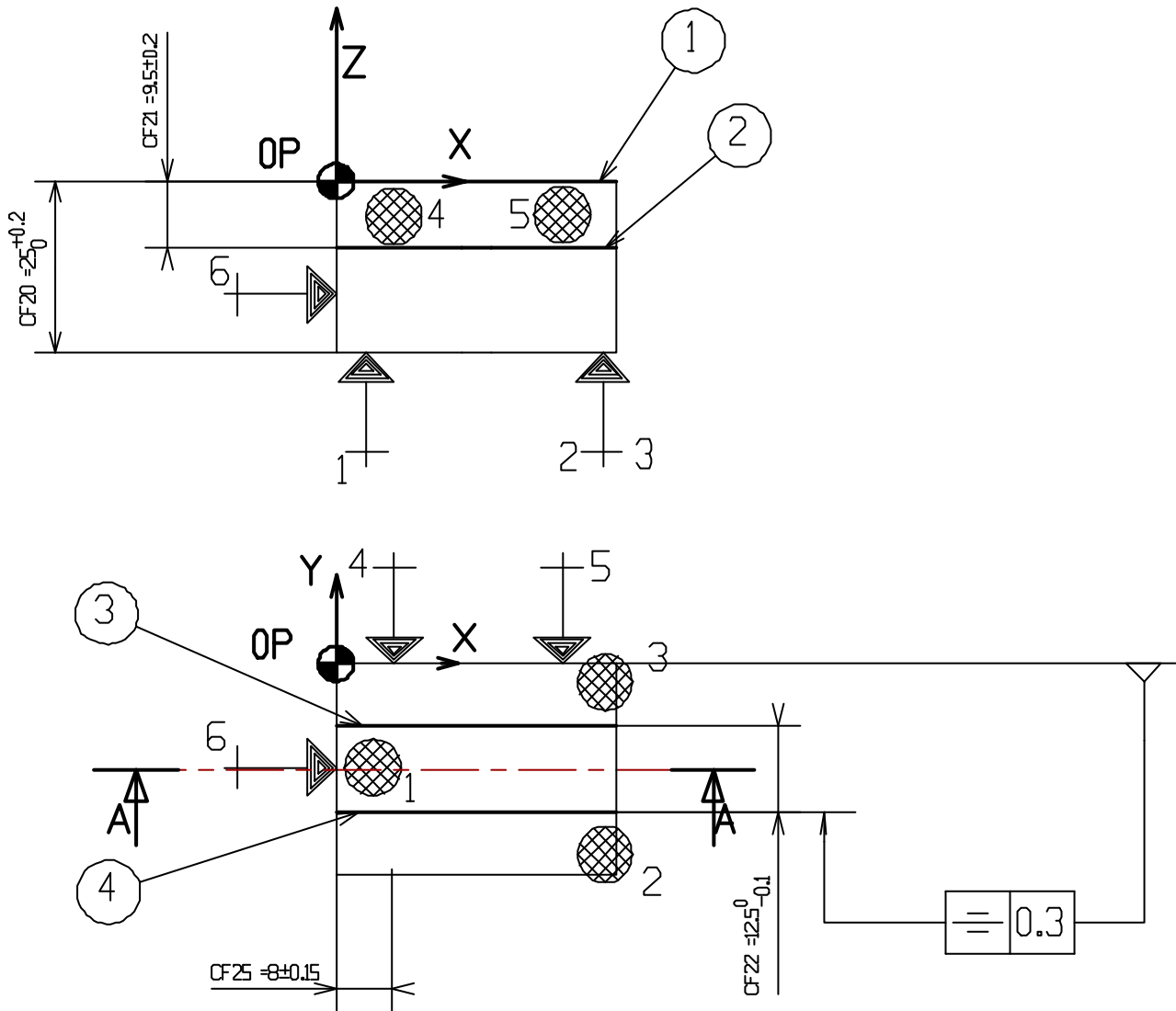


2	1	SUPPORT PIED DE MAT	AU4G (2017)		
Rep	Nb	Désignation	Mat i ère	Observation	Référence
		CHAR A VOILE			
Format : A4		SUPPORT PIED DE MAT			
Ech. 1 : 1					
Dessiné par :					
Montagne					
Le 1/04/1999		N°			

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 30	Ensemble: CHAR A VOILE	Date 1/04/1999	BUREAU DES METHODES	1 1
	Pièce SUPPORT PIED DE MAT			
		Matière: AU4G		
NOM:	Programme: %230			

Désignation: FRAISAGE

Machine-Outil: Centre d'usinage C300

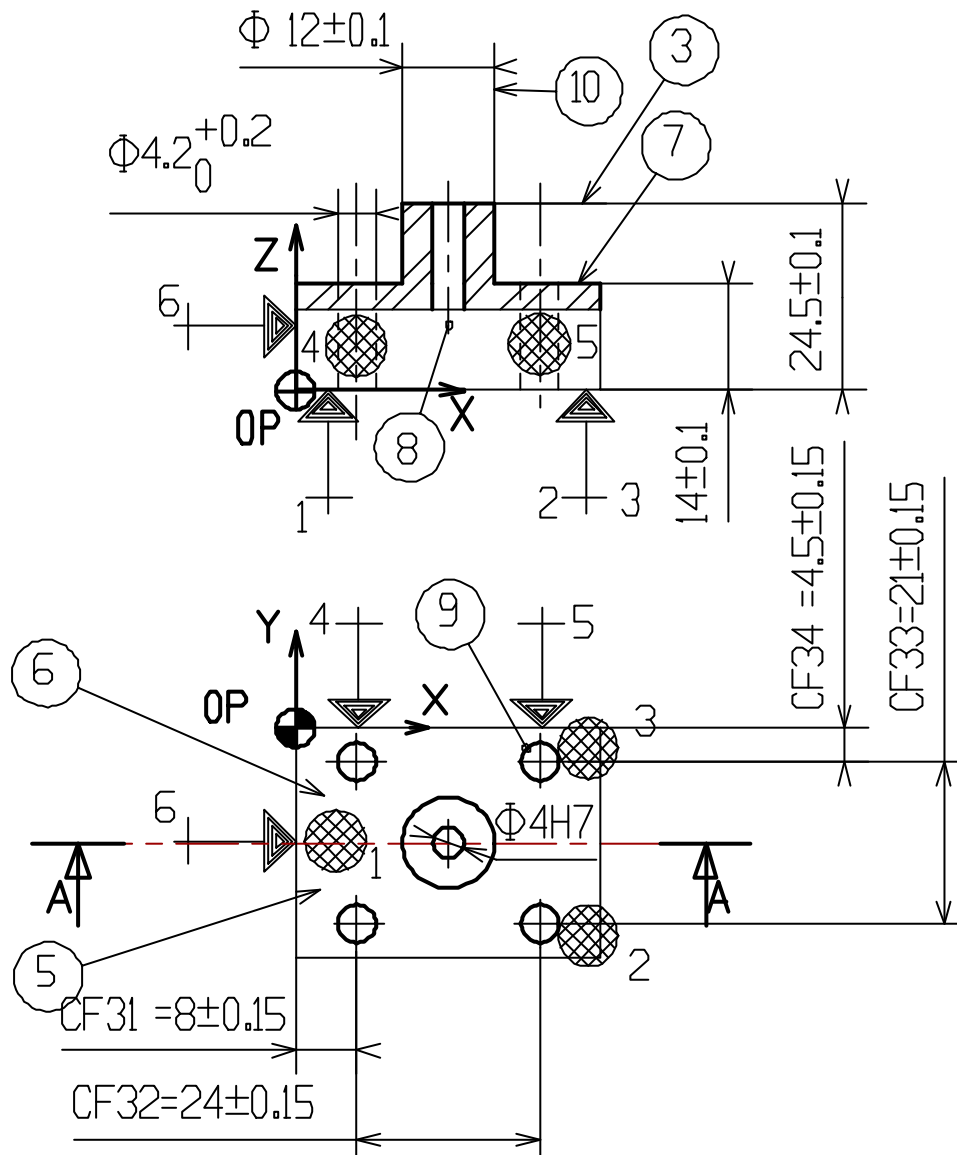


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
Surfacier en finition 1	T1 Fraise Φ 36 en ARS	100	800	200	0.5	
Rainurer en finition 2,3,4	T2 Fraise Φ 12 en ARS	80	1600	200	9	3

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 30	Ensemble: CHAR A VOILE	Date 1/04/1999	DMT 1 1
	Pièce SUPPORT PIED DE MAT	BUREAU DES METHODES	
	Matière: AU4G		
NOM:	Programme: %230		

Désignation: FRAISAGE

Machine-Outil: Centre d'usinage C300



DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
Surfacer en finition 3	T1 Fraise Φ 32 en ARS	100	800	200	1	
Contourner en ebauche 10	T8 Fraise Φ 14 en ARS	100	800	200		
Contourner en finition 10	T8 Fraise Φ 14 en ARS	80	1600	200		
Pointer 5 trous	T3 Foret à pointer Φ 8		1000	100		
Percer 4 trou Φ 4.2	T4 Foret Φ 4.2		1000	100		
Percer 8 en eb diamètre 3.8	T5 Foret Φ 3.8		1000	100		
Alésier en finition 6 CF=4H7	T6 Alésaire Φ 4 H 7	500		100	0.1	

%220
(char a voile)
(01/02/2000 support pied de mat REP2 PHASE20)

N10 G0 G40 G80 G90 G94
N20 G0 G52 X0 Y0 Z0
N30 (G59 X0 Y0 Z0)
(SURFACER 1 EN FINITION)
N40 T1 D1 M6 (fraise 2 tailles diametre 32)
N50 M41 S800 M3
N60 G0 X-25 Y-15 (pt1)
N70 G1 Z25.5 F2000 M8 (pt2)
N80 G1 X65 Y-15 F200 (pt3)
N90 G0 G52 Z0 M9 M5

(CYCLE DE RAINURAGE 5,6,7)

N110 G59 X0 Y0
N120 T2 D2 M6(fraise 2 tailles diametre 10)
N130 M41 S1000 M3
N140 G0 X-10 Y-15
N150 Z16.5 M8
N160 G1 X50 Y-15 F200
N170 G41 X50 Y-8.875 Z16
N180 X-10 Y-8.875
N190 X-10 Y-21.425
N200 X50 Y -21.425
N210 Z30 F100 M9
N220 G0 G40 G52 Z0 M5
N230 M2

%230 (01/01/2000 support pied de mat REP 2 PHASE30)

N10 G0 G40 G80 G90 G94
N20 G0 G52 X0 Y0 Z0
N25 (G59 X0 Y0 Z0)

(SURFACER 3 en finition)

N30 T1 D1 M6 (fraise 2 tailles diametre 36)
N40 M41 S800 M3
N50 G0 X-25 Y-15 (pt1)
N60 G1 Z24.5 F2000 M8 (pt2)
N70 G1 X65 Y-15 F200 (pt3)
N80 G0 G52 Z0 M9 M5

(CONTOURNER correcteur d'ebauche D18)

N90 G59 X20 Y-15
N100 T8 D18 M6 (fraise 2 tailles diametre mini 14)
N110 M41 S1000 M3
N120 G0 X-35 Y25 M8
N130 G0 Z15
N140 G1 G41 X-35 Y6 F100
N150 G1 X0 Y6
N160 G2 X0 Y-6 I0 J0
N170 G2 X0 Y6 I0 J0
N180 G1 X35 Y6
N190 G1 Z40
N200 G0 G40 G52 Z0

(CONTOURNER correcteur de finition D8)

N210 T8 D8 M6
N220 G77 N110 N200
N230 G0 G40 G52 Z0 M9 M5

(POINTER 5 trous)

N240 T3 D3 M6 (foret a pointer de 8)
N250 G59 X8 Y-4.4
N260 M41 S1000 M3
N270 G0 X0 Y0 M8
N280 G94 G81 X0 Y0 ER30 Z10.5 F100
N290 X24 Y0
N300 X24 Y-21
N310 X0 Y-21
N320 G0 G80 G52 Z0
N330 G94 G81 X12 Y-10.5 ER30 Z22 F100
N340 G0 G80 G52 Z0 M9 M5

(PERCER 4 DIAMETRE 4.3)

N350 T4 D4 M6
N360 M41 S1000 M3
N370 G0 X0 Y0 M8
N380 G94 G83 X0 Y0 P10 Q5 ER30 Z-2 F100
N390 X24 Y0
N400 X24 Y-21
N410 X0 Y-21
N420 G80 G0 G52 Z0 M9 M5

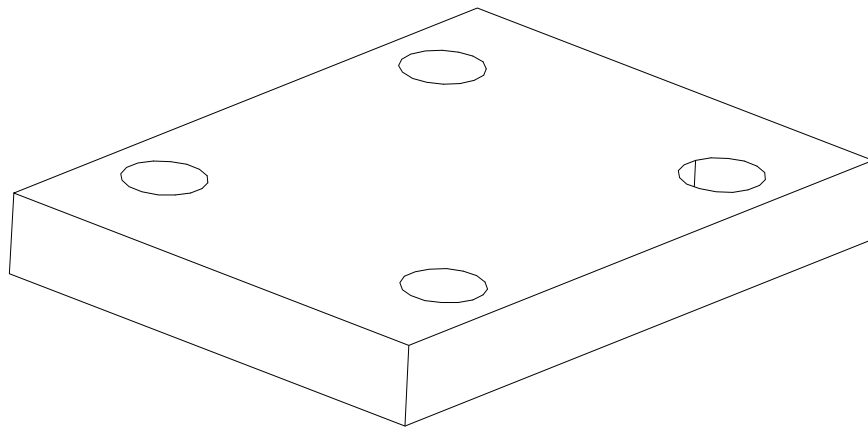
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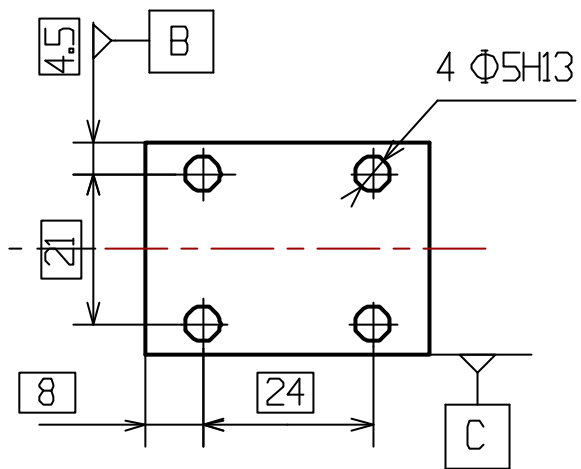
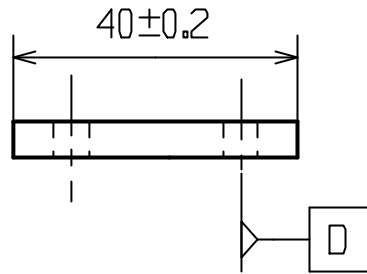
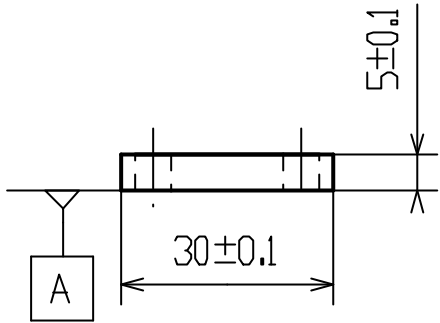
N430 T5 D5 M6
N440 M3 S1000
N450 G0 X12 Y-10.5 M8
N460 G94 G83 X12 Y-10.5 ER30 P10 Q5 Z-2 F100
N470 G0 G80 G52 Z0 M9 M5

(ALESER 8 DIAMETRE 4 H 7)

N480 T6 D6 M6
N490 M3 S600
N500 G0 X12 Y-10.5 M8
N510 G94 G85 X12 Y-10.5 Z-2 ER30 F100
N520 G0 G80 G52 Z0 M9 M5
N530 M2

Plaque pied **de mat**





D	⊕	Ø0.2	A	B	C
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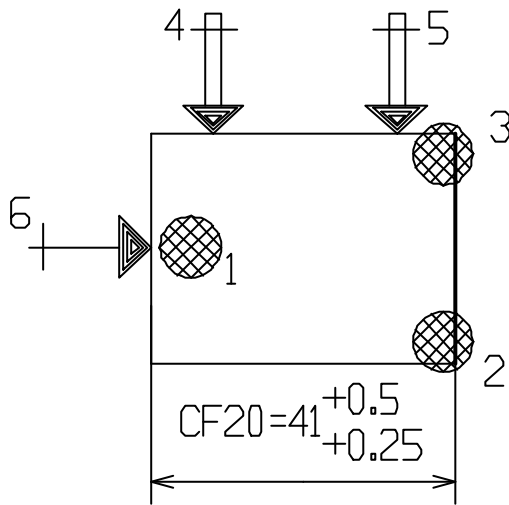
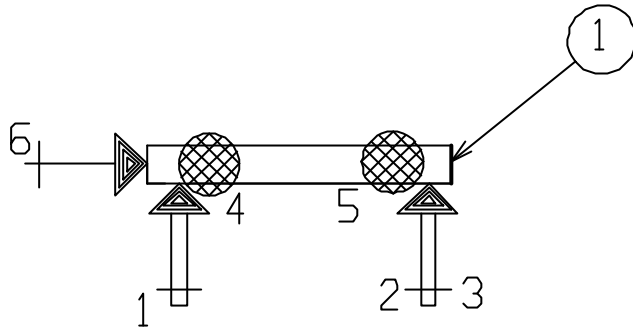
Ra 1.6

3	1	plaque pied de mat	AU4G		
Rep	Nb	Désignation	Matière	Observation	Référence
		CHAR A VOILE			
		PLAQUE PIED DE MAT			
Dessiné par :		LBP			
Le 14/11/97		N°			

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20	Ensemble: CHAR A VOILE	Date 1/04/1999	BUREAU DES METHODES	1 1
	Pièce PLAQUE PIED DE MAT			
	Matière: AU4G	Programme:		
NOM:				

Désignation: FRAISAGE

Machine-Outil: Fraiseuse verticale

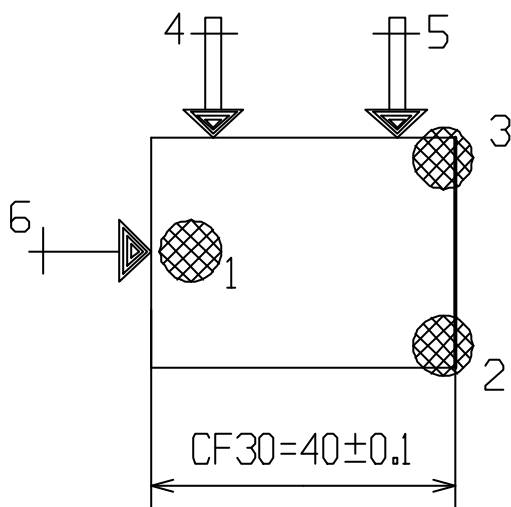
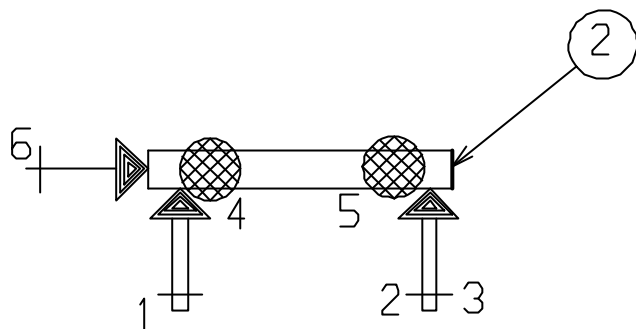


DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
Surfacer 1 en finition	Fraise 2 tailles	80		0.05		

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 30	Ensemble: CHAR A VOILE	Date 1/04/1999	BUREAU DES METHODES	1 1
	Pièce PLAQUE PIED DE MAT			
	Matière: AU4G			
NOM:	Programme:			

Désignation: FRAISAGE

Machine-Outil: Fraiseuse verticale

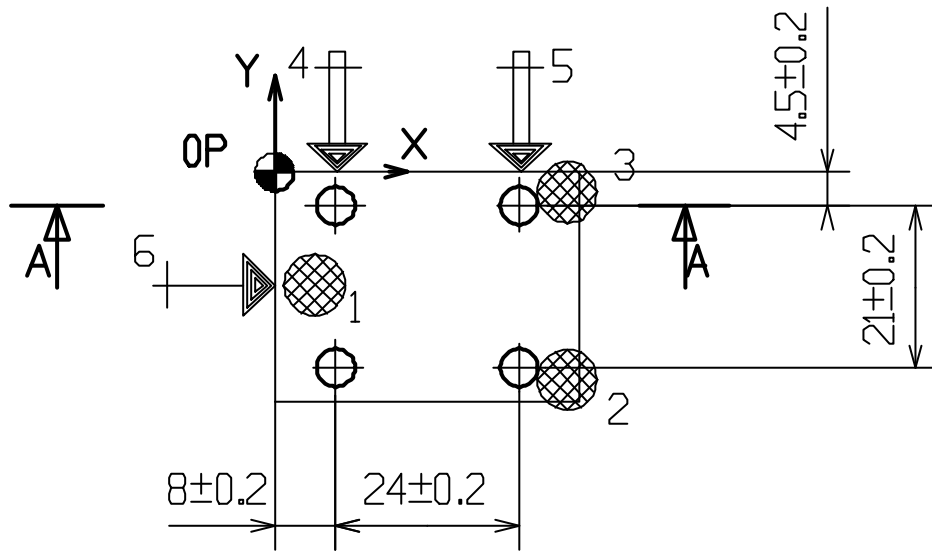
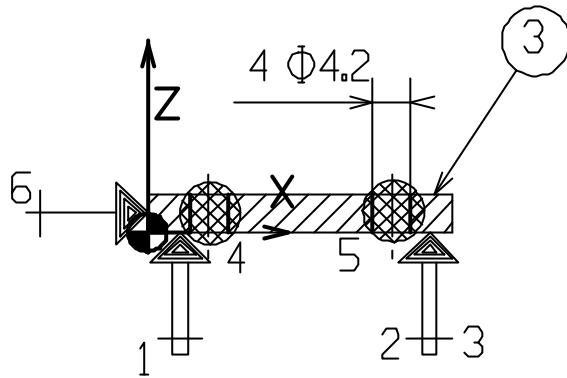


DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
Surfacer 2 en finition	Fraise 2 tailles	80		0.05		

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 40	Ensemble: CHAR A VOILE	Date 1/04/1999	DMT 1 1
	Pièce SUPPORT PIED DE MAT	BUREAU DES METHODES	
	Matière: AU4G		
NOM:	Programme: %340		

Désignation: FRAISAGE

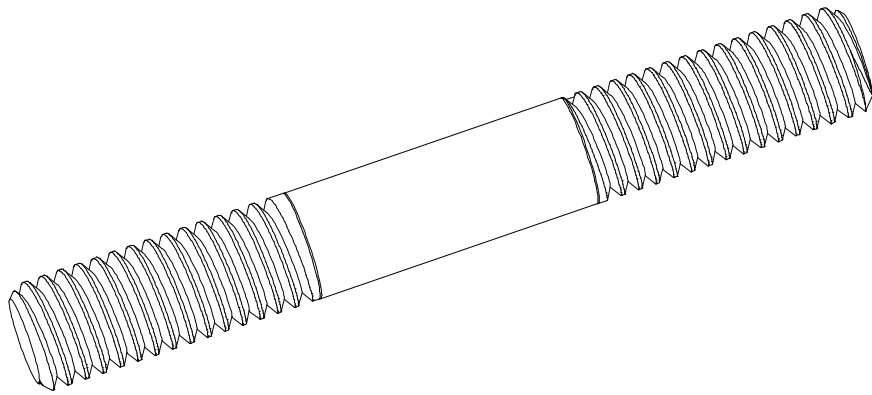
Machine-Outil: Centre d'usinage C200

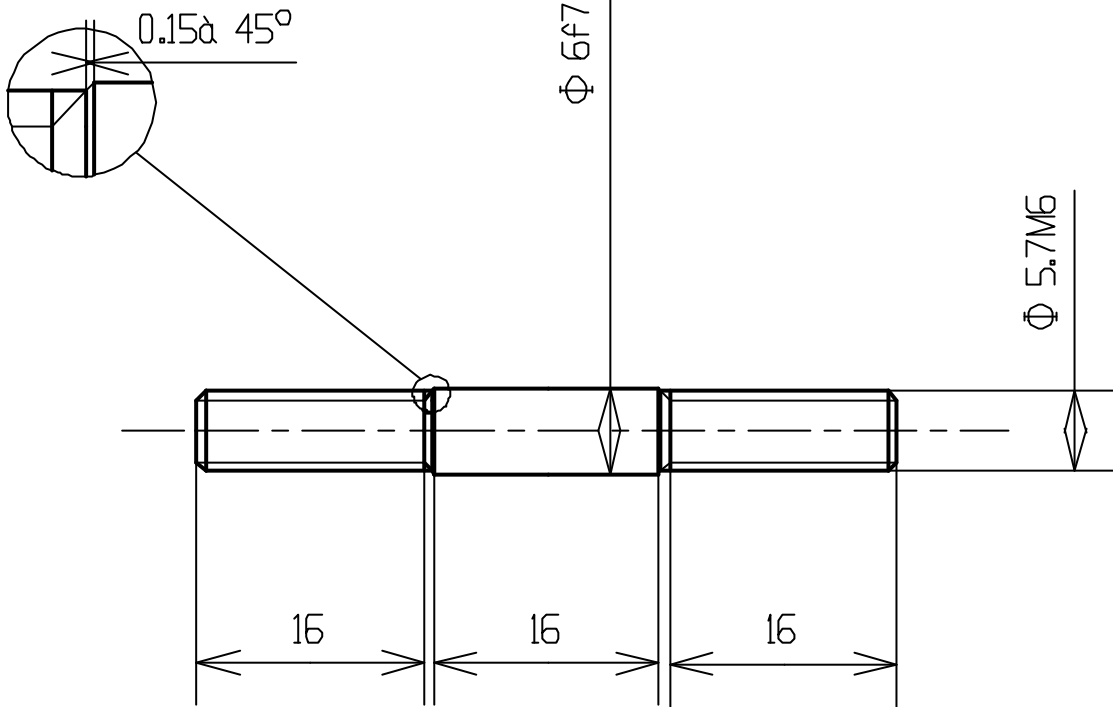


DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
Pointer 4 trous 3	T3 Foret à pointer Φ 8		1000	100		
Percer 4 diamètres 4.2	T4 Foret Φ 4.2		1000	100		

```
%340
(CHAR A VOILE)
(PLAQUE PIED DE MAT REP3)
( Outil T3 FORET A POINTER)
( Outil T4 FORET DIAM 4.2)
N10 G17 G71 G90 G94
N20 T3 D3 M6
N30 S1000 F100 M41 M3 M8 (Centrage )
N40 G00 X32 Y-4.4 Z10
N50     Z5
N60 G81 X32 Y-4.4 Z-9 F100 ER5
N70     Y-25.6
N80     X8
N90     Y-4.4
N100 G80
N110 G00 Z10
N120 (Temps de l'usinage :      0.02 min)
N130 (Temps total           :      0.00 min)
N140 M9 M5
N150 T4 D4 M6
N160 S1000 F100 M41 M3 M8 (Percage )
N170 G00 X32 Y-4.4 Z10
N180     Z5
N190 G81 X32 Y-4.4 Z-9 F100 ER5
N200     Y-25.6
N210     X8
N220     Y-4.4
N230 G80
N240 G00 Z10
N250 (Temps de l'usinage :      0.02 min)
N260 (Temps total           :      0.00 min)
N270 M9 M5
N280 G00 G52 Y0 Z0
N290 M2
```

Goujon





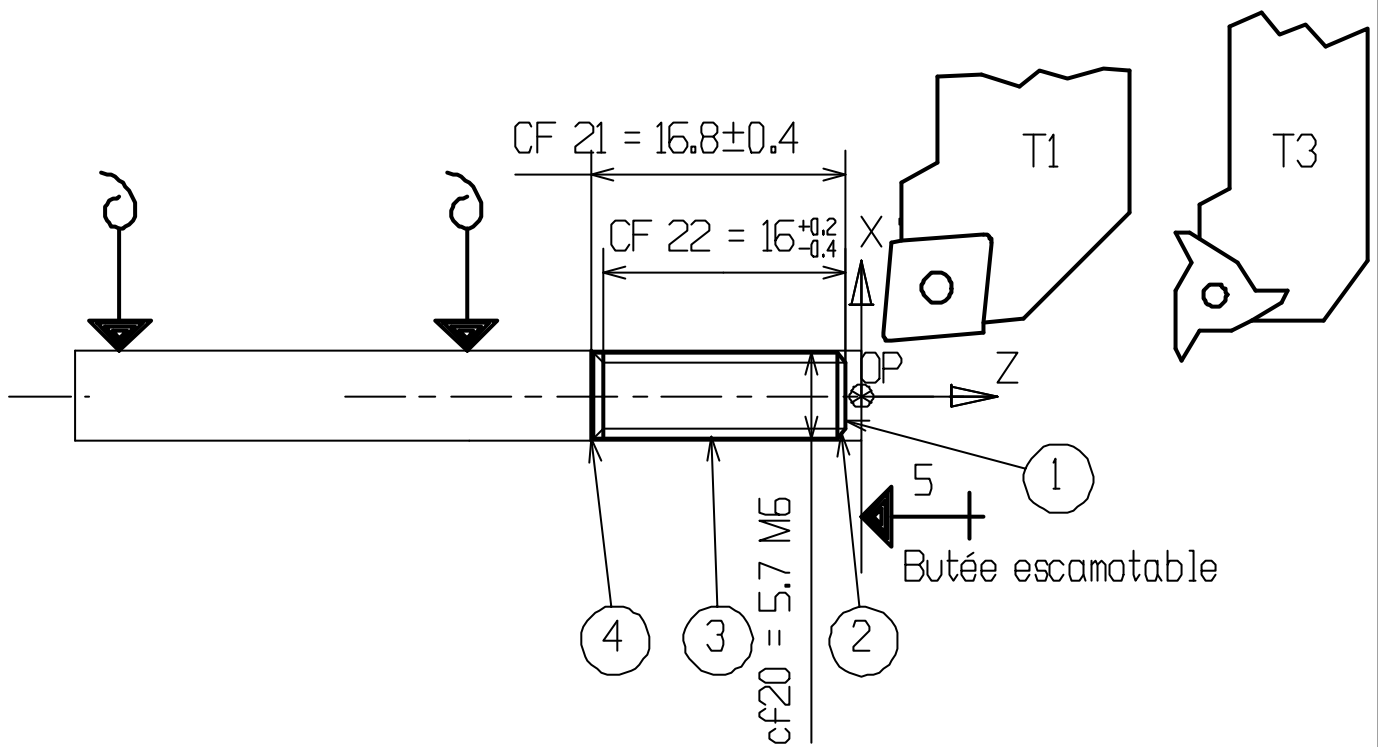
tolérances générales ISO 2768 -mk

9	2	Goujon	E26		
Rep	Nb	Désignation	Mat i ère	Observation	Référence
☒	☒	CHAR A VOILE			
Format : A4		AXE ROUE AVANT			
Ech. 2 : 1		LTN BLAISE PASCAL			
Dessiné par : St Martin					
Le 3/05/2000		N°9			

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20A	Ensemble: CHAR A VOILE	Date 15/06/2000	DMT
	Pièce GOIJON	BUREAU DES METHODES	
	Matière: E26		Programme: %920
NOM: St Martin			

Désignation: TOURNAGE

Machine-Outil: TCN

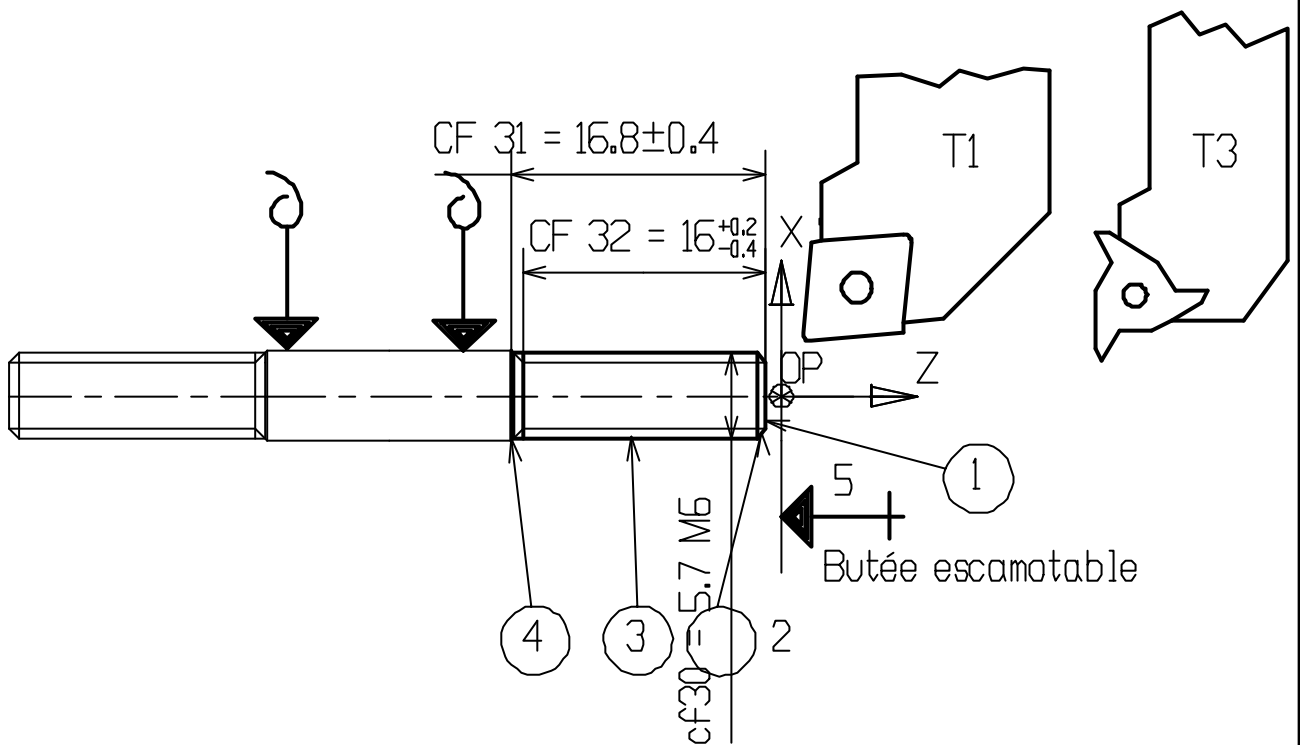


DESIGNATION DES OPERATIONS	OUTILS	V	N	f	a	n
		m/mn	tr/mn	mm/tr	mm	
a) Contournage ebauche 1,2,3,4 Ebauche, finition cotes cf20, cf21	PCLN T1 D1	60		0.05		
b) Filetage 3 finition cote: cf20 cf22	CER T3 D3	30	1500	1	0.06	10

AVANT-PROJET D'ETUDE DE FABRICATION PHASE N° 20A	Ensemble: CHAR A VOILE	Date 15/06/2000	DMT
	Pièce GOIJON	BUREAU DES METHODES	
	Matière: E26		Programme: %920
NOM: St Martin			

Désignation: TOURNAGE

Machine-Outil: TCN



DESIGNATION DES OPERATIONS	OUTILS	V m/mn	N tr/mn	f mm/tr	a mm	n
a) Contournage 1,2,3,4 Ebauche, finition cotes cf30, cf31	PCLN T1 D1	60		0.05		
b) Filetage 3 finition cote: cf30 cf32	CER T3 D3	30	1500	1	0.06	10

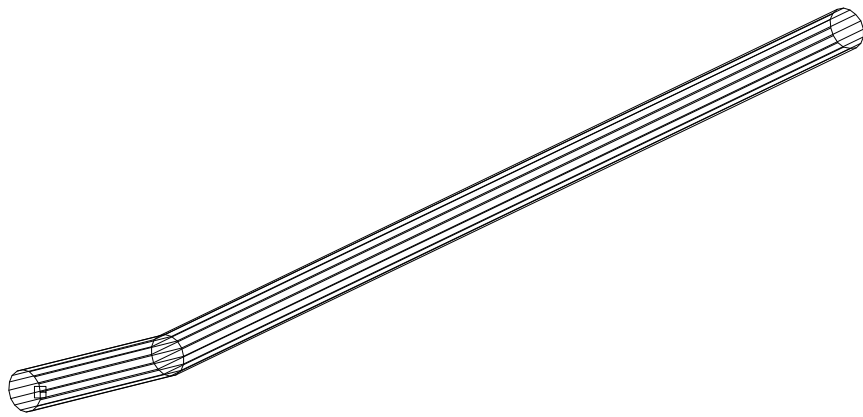
%920

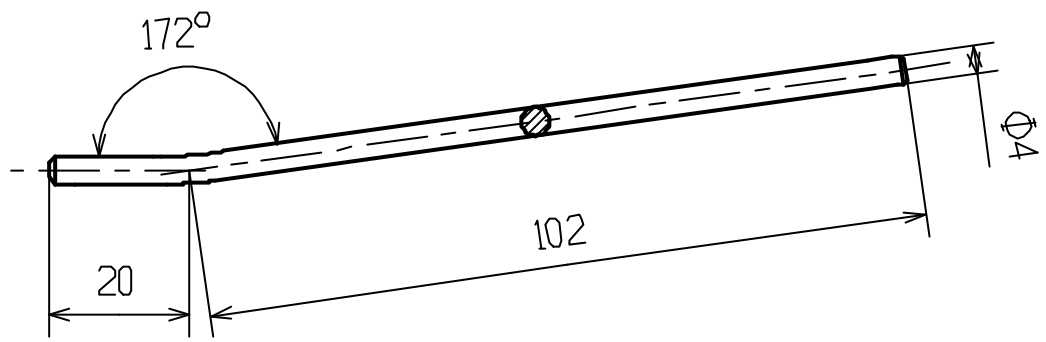
(CHAR A VOILE)
(GOUJON rep7 ph20)
(outill1 pcln)
(outill3 filetage)

N10 G90 G95 G80 G40 T0 D0
N20 G00 G52 X Z
N30 T1 D1 M6
N40 G92 S5000
N50 X6 G95 S600 F0.05 M41 M3 M8 (Ebauche tournage)
N60 G00 X6.82 Z1.576
N65 G96 S60
N70 X6 Z1
N80 X5.6
N90 G01 Z-1.313
N100 X5.7 Z-1.363
N110 Z-17.405
N120 X6 Z-17.555
N130 G00 X8 Z-16.555
N140 Z1
N150 X5.6
N160 X5.2
N170 G01 Z-1.113
N180 X5.6 Z-1.313
N190 G00 X7.6 Z-0.313
N200 Z1
N210 X5.2
N220 X4.8
N230 G01 Z-0.913
N240 X5.2 Z-1.113
N250 G00 X7.2 Z-0.113
N260 Z1
N270 X4.8
N280 X4.4
N290 G01 Z-0.75
N300 X4.473
N310 X4.8 Z-0.913
N320 G00 X6.8 Z0.087
N330 Z1
N340 X4.4
N350 X4
N360 G01 Z-0.75
N370 X4.4
N380 G00 X6.4 Z0.25
N390 Z1
N400 X4
N410 X3.6
N420 G01 Z-0.75
N430 X4
N440 G00 X6 Z0.25
N450 Z1
N460 X3.6
N470 X3.2
N480 G01 Z-0.75
N490 X3.6
N500 G00 X5.6 Z0.25
N510 Z1
N520 X3.2
N530 X2.8
N540 G01 Z-0.75
N550 X3.2
N560 G00 X5.2 Z0.25
N570 Z1
N580 X2.8
N590 X2.4
N600 G01 Z-0.75
N610 X2.8
N620 G00 X4.8 Z0.25
N630 Z1
N640 X2.4
N650 X2
N660 G01 Z-0.75
N670 X2.4
N680 G00 X4.4 Z0.25
N690 Z1
N700 X2
N710 X1.6
N720 G01 Z-0.75
N730 X2

N740 G00 X4 Z0.25
N750 Z1
N760 X1.6
N770 X1.2
N780 G01 Z-0.75
N790 X1.6
N800 G00 X3.6 Z0.25
N810 Z1
N820 X1.2
N830 X0.8
N840 G01 Z-0.75
N850 X1.2
N860 G00 X3.2 Z0.25
N870 Z1
N880 X0.8
N890 X0.4
N900 G01 Z-0.75
N910 X0.8
N920 G00 X2.8 Z0.25
N930 Z1
N940 X0.4
N950 X0
N960 G01 Z-0.75
N970 X0.4
N980 G00 X2.4 Z0.25
N990 Z1
N1000 X0.857 Z1.618
N1010 (Temps de l'usinage : 10.20 min)
N1020 (Temps total : 10.20 min)
N1030 M5
N1040 G00 G52 XZ
N1050 T3 D3 M6
N1060 G97 S1500 G95 F0.05 M41 M3 M8 (Filetage tournage EB)
N1070 G00 X6.778 Z4.959
N1080 X7.7 Z1.322
N1090 G33 Z-16 X5.7 K1 EA0 EB30 R1 P0.6 Q0 S11 F1
N1100 (Temps de l'usinage : 10.00 min)
N1110 (Temps total : 10.20 min)
N1140 G00 X7.406 Z1.67
N1150 X7.7 Z1.322
N1160 G33 Z-16 X5.7 K1 EA0 EB30 R1 P0.6 Q0 S4 F1
N1170 (Temps de l'usinage : 0.00 min)
N1180 (Temps total : 10.20 min)
N1190 M5
N1200 G00 G52 X0 Z0
N1210 M2

Pied de mat





Remarque :

Cintrage réalisé après le montage sur le support pied de mat . L'angle réel est fonction de la coupe de la voile .

4	1	Pied de Mat	XC 65 f	Corde à piano	
Rep	Nb	Désignation	Mat i ère	Observation	Référence
		CHAR A VOILE			
Format : A4		PIED DE MAT			
Ech. 1 : 1					
Dessiné par : St Martin		L. T. N. Blaise Pascal ROUEN			
Le 15/11/97		N°			

