

ETUDE DES TEMPS

| | | Symb. Chim. | Classe | | | | |
|----|-------------------|-------------|----------|----------------|-------------------------------------|-------|-------|
| 1 | MATIERE | Cu Zn40Pb3 | Laiton | 11 | Nbre tours broche marche normale | 1031 | Tours |
| 2 | FORME | DIA | 8.4 | | | | |
| 3 | DIMENSIONS | 18 | mm | 12 | Production en marche normale | 2.515 | p/mn |
| 4 | Vc | 160 | m/mn | | | | |
| 5 | NB THEORIE | 2831 | T/mn | 13 | Temps passé en marche normale | 24 | sec. |
| 6 | NB CHOISIE | 2850 | T/mn | | | | |
| 7 | V acc.A à C | 72 | °/sec | 14 | Nbre tours broche par tour A à C | 1031 | Tours |
| 8 | Nbre ° acc. | | ° | | | | |
| 9 | Temps en acc. | | sec | 15 | Vitesse arbre | 2.515 | p/mn |
| 10 | ° normaux | 360 | ° | | | | |
| | ° Product / Tours | 0.3904 | Degrés | % PRODUCTIFS | | 0.4 | |
| | Temps / pièce | 24 | Secondes | MULTIPLICATEUR | | 2.52 | |

ETUDE DES PRIX

| | | |
|-------------------|---------|--------|
| LARG. OUTIL COUPE | 2.3 | mm |
| ANGLE DE POINTE | 23 | Degrés |
| HAUTEUR POINTE | 0.98 | mm |
| | | |
| LONGUEUR PIECE | 31 | mm |
| LONGUEUR BARRE | 3000 | mm |
| POIDS/BARRE RONDE | 6.41 | Kg |
| | | |
| PERTE sur BARRE | 150 | mm |
| POIDS DE LA PIECE | 0.0749 | Kg |
| COUT MATIERE | 22.5 | F/KG |
| PRIX DE LA PIECE | 1.68516 | F |

CALCUL P.F.

MANURHIN C25
PPT

FEUILLE
I/II
I/I

REF: 6307261900ADDECMET

DOSSIER n° 0010051412

OPERATION PRINCIPALES

| N° | ORDRE DES OPERATION | OUT | VALEURS DES COURSES | VALEURS DES AVANCES | VALEURS IMPRODUCT. | | | RAYONS DE CAMES | | REPART CENT. | |
|----|---------------------|----------|---------------------|---------------------|--------------------|------|-------|-----------------|------|--------------|-----|
| | | | | | DEG. | DEG. | TOURS | BAS | HAUT | DE | A: |
| 1 | RAVITAILLEMENT | | | | | | | | | 0 | 66 |
| 2 | APPROCHE OUTIL | I | | | | | | | | | |
| 3 | CENTRAGE | I | 4 | 0.08 | | 16 | 50 | | | 66 | 82 |
| 4 | REPOS | I | | | 2 | | | | | 82 | 84 |
| 5 | SORTIE BROCHE | I | | | 20 | | | | | 84 | 104 |
| 6 | NOMBREG | I / II | | | 25 | | | | | 104 | 129 |
| 7 | APPROCHE BROCHE | II | | | 20 | | | | | 129 | 149 |
| 8 | PERCAGE DIA=5 | II | 12 | 0.08 | | 47 | 150 | | | 149 | 196 |
| 9 | REPOS | II | | | 2 | | | | | 196 | 198 |
| 10 | SORTIE BROCHE | II | | | 20 | | | | | 198 | 218 |
| 11 | NOMBREG | II / III | | | 25 | | | | | 218 | 243 |
| 12 | APPROCHE BROCHE | III | | | 20 | | | | | 243 | 263 |
| 13 | TARAUDAGE M6X1 | III | 11 | | | 25 | 77 | | | 263 | 288 |
| 14 | REPOS | III | | | 4 | | | | | 288 | 292 |
| 15 | SORTIE BROCHE | III | | | | | | | | 292 | 292 |
| 16 | APPROCHE C5 | | | | | | | | | 292 | 292 |
| 17 | COUPE DEBUT | 5 | 3.5 | 0.045 | | | 78 | | | 292 | 292 |
| 18 | COUPE FIN | 5 | 5.5 | 0.045 | | 39 | 122 | | | 292 | 331 |
| 19 | COUPE LENTE | 5 | 0.4 | 0.02 | | 7 | 20 | | | 331 | 338 |
| 20 | FIN DE COUPE | 5 | 1.2 | 0.045 | | 9 | 27 | | | 338 | 347 |
| | REPOS | | | | 1 | | | | | 347 | 348 |
| | Sortie outils | | | | 12 | | | | | 348 | 360 |

OPERATION SIMULTANES

| ORDRE DES OPERATIONS | VALEURS COURSES | VALEURS AVANCES | VALEURS IMPROD. | | RAYONS CAMES | | REPART. CENT. | |
|----------------------|-----------------|-----------------|-----------------|-------|--------------|------|---------------|-----|
| | | | DEG. | TOURS | BAS | HAUT | DE: | A: |
| — OUTIL 1— | | | | | | | | |
| TOURNAGE DIA.10 | 15 | 0.075 | 64 | 200 | | | 66 | 130 |
| REPOS | | | 2 | | | | 130 | 132 |
| — OUTIL 2— | | | | | | | | |
| FONCAGE 1X45° | 2 | 0.045 | 15 | 45 | | | 149 | 164 |
| REPOS | | | 2 | | | | 164 | 166 |
| — OUTIL 4— | | | | | | | | |
| FONCAGE DIA. 12 | 3.2 | 0.045 | 24 | 72 | | | 180 | 204 |
| REPOS | | | | | | | 204 | 206 |
| RECU LENT | 1.5 | 0.06 | 8 | 25 | | | 206 | 214 |
| — OUTIL 3— | | | | | | | | |
| FONCAGE 1X45° | 2 | 0.045 | 15 | 42 | | | 275 | 290 |
| REPOS | | | 2 | | | | 290 | 292 |

| | | | |
|--|--|----------------|-----------------|
| Academie AMIENS | Examen B.E.P | Coefficient:09 | Premiere phase |
| E.P.1 -MISE EN ŒUVRE D'UNE FABRICATION | PRODUCTIQUE MECANIQUE option :DECOLLETAGE | | Session 2001 |
| Temps alloué: 7heures | C.11 Décoder et analyser | | 9 / 12 |

| 15041 | | | | | | | | | | | | | |
|---|----------------------|----------------|----------|-----------|--|---------------------|-----------|-------------|---------------------------------|--|-------------|-------------------|--|
| ÉCARTS POUR ÉLÉMENTS USINÉS | | | | | | | | | | | | | |
| NF EN 22763 - ISO 2768 | | | | | | | | | | | | | |
| 150411 | DIMENSIONS LINÉAIRES | | | | | ANGLES CASSÉS | | | DIMENSIONS ANGULAIRES | | | | |
| | | | | | | Rayons - chanfreins | | | Dimension du côté le plus court | | | | |
| Classe de précision | 0,5 à 3 inclus | 3 à 6 | 6 à 30 | 30 à 120 | 120 à 400 | 0,5 à 3 inclus | 3 à 6 | > 6 | Jusqu'à 10 | 10 à 50 inclus | 50 à 120 | 120 à 400 | |
| I (fin) | ± 0,05 | ± 0,05 | ± 0,1 | ± 0,15 | ± 0,2 | ± 0,2 | ± 0,5 | ± 1 | ± 1° | ± 30' | ± 20' | ± 10' | |
| m (moyen) | ± 0,1 | ± 0,1 | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,2 | ± 0,5 | ± 1 | ± 1° | ± 30' | ± 20' | ± 10' | |
| c (large) | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,8 | ± 1,2 | ± 0,4 | ± 1 | ± 2 | ± 1° 30' | ± 1° | ± 30' | ± 15' | |
| v (très large) | — | ± 0,5 | ± 1 | ± 1,5 | ± 2,5 | ± 0,4 | ± 1 | ± 2 | ± 3° | ± 2° | ± 1° | ± 30' | |
| 150412 | | | | | | | | | | | | | |
| TOLÉRANCES GÉOMÉTRIQUES | | | | | | | | | | | | | |
| Tolérances | | | | | | | | | | | | Axial Radial | |
| Classe de précision | Jusqu'à 10 | 10 à 30 inclus | 30 à 100 | 100 à 300 | 300 à 1 000 | Jusqu'à 100 | 100 à 300 | 300 à 1 000 | Jusqu'à 100 | 100 à 300 | 300 à 1 000 | Toutes dimensions | |
| H (fin) | 0,02 | 0,05 | 0,1 | 0,2 | 0,3 | 0,2 | 0,3 | 0,4 | 0,5 | 0,5 | 0,5 | 0,1 | |
| K (moyen) | 0,05 | 0,1 | 0,2 | 0,4 | 0,6 | 0,4 | 0,5 | 0,3 | 0,5 | 0,5 | 0,3 | 0,2 | |
| L (large) | 0,1 | 0,2 | 0,4 | 0,8 | 1,2 | 0,5 | 1 | 1,5 | 0,5 | 1 | 1,5 | 0,5 | |
| | | | | | | | | | | | | | |
| Même valeur que la tolérance dimensionnelle ou de rectitude ou de planéité si elles sont supérieures. | | | | | Même valeur que la tolérance diamétrale mais à condition de rester inférieure à la tolérance de battement. | | | | | Les écarts de coaxialité sont limités par les tolérances de battement. | | | |
| RÈGLES GÉNÉRALES | | | | | | | | | | | | | |
| <input type="checkbox"/> Si plusieurs tolérances géométriques s'appliquent à un même élément, retenir la tolérance la plus large. <input type="checkbox"/> Choisir comme référence le plus long des deux éléments. Si les deux éléments ont la même dimension nominale, chacun d'eux peut être pris comme référence. | | | | | | | | | | | | | |

| | | | |
|--|---|-----------------------|------------------------|
| Academie AMIENS | Examen B.E.P | Coefficient:09 | Premiere phase |
| E.P.1 - MISE EN ŒUVRE D'UNE FABRICATION | PRODUCTIQUE MECANIQUE option :DECOLLETAGE | | Session 2001 |
| Temps alloué: 7heures | C.11 Décoder et analyser | | 10 / 12 |

EXTRAITS DES TOLERANCES FILETEES

| Longueur en prise | | | Qualité | Filetage extérieur | | | | | | | | | Filetage intérieur | | | | | | | | | | |
|-------------------|---------|-----|-----------|----------------------|----------------------|----------------------|---------------------|-------|--|---------------------------------|-------|-------------------------|----------------------|----------------------|------------|-------|-------|--|-------|-------|-----------------------------------|------|--|
| Groupe | Plus de | A | | Classe de tolérances | Ecart fondamental es | Diamètre extérieur d | | | Diamètre à flancs de filets d ₂ | | | Diamètre d ₁ | Classe de tolérances | Ecart fondamental EI | Diamètre D | | | Diamètre à flancs de filets D ₂ | | | Diamètre intérieur D ₁ | | |
| | | | | | | max. | Tol. T _d | min. | max. | Tol. T _{d₂} | min. | | | | max. | min. | min. | Tol. T _{D₂} | max. | min. | Tol. T _{D₁} | max. | |
| (Pas 1) | | | | | | | | | | | | | | | | | | | | | | | |
| M 6 | | | | | | | | | | | | | | | | | | | | | | | |
| Courte | | 3 | fine | 3h 4h | 0 | 6,000 | 0,112 | 5,888 | 5,350 | 0,056 | 5,294 | 4,917 | 4H | 0 | 6,000 | 5,350 | 0,095 | 5,445 | 4,917 | 0,150 | 5,087 | | |
| | | | moyenne | 5h 6h | 0 | 6,000 | 0,180 | 5,820 | 5,350 | 0,090 | 5,260 | 4,917 | 5H | 0 | 6,000 | 5,350 | 0,118 | 5,488 | 4,917 | 0,190 | 5,107 | | |
| Normale | 3 | 9 | fine | 5g 6g | -0,026 | 5,974 | 0,180 | 5,794 | 5,324 | 0,090 | 5,234 | 4,891 | 5G | +0,026 | 6,026 | 5,376 | 0,118 | 5,494 | 4,943 | 0,190 | 5,133 | | |
| | | | fine | 4h | 0 | 6,000 | 0,112 | 5,888 | 5,350 | 0,071 | 5,279 | 4,917 | 4H 5H | 0 | 6,000 | 5,350 | 0,095 | 5,445 | 4,917 | 0,190 | 5,107 | | |
| | | | moyenne | 6h | 0 | 6,000 | 0,180 | 5,820 | 5,350 | 0,112 | 5,238 | 4,917 | 6H | 0 | 6,000 | 5,350 | 0,150 | 5,500 | 4,917 | 0,238 | 5,153 | | |
| | | | moyenne | 6g | -0,026 | 5,974 | 0,180 | 5,794 | 5,324 | 0,112 | 5,212 | 4,891 | 6G | +0,026 | 6,026 | 5,376 | 0,150 | 5,528 | 4,943 | 0,236 | 5,179 | | |
| | | | moyenne | 6f | -0,040 | 5,960 | 0,180 | 5,780 | 5,310 | 0,112 | 5,198 | 4,877 | — | — | — | — | — | — | — | — | — | | |
| | | | moyenne | 6e | -0,060 | 5,940 | 0,180 | 5,760 | 5,290 | 0,112 | 5,178 | 4,857 | — | — | — | — | — | — | — | — | — | | |
| Longue | 9 | | grossière | 8g | -0,026 | 5,974 | 0,280 | 5,694 | 5,324 | 0,180 | 5,144 | 4,891 | 7H | 0 | 6,000 | 5,350 | 0,190 | 5,540 | 4,917 | 0,300 | 5,217 | | |
| | | | fine | 5h 4h | 0 | 6,000 | 0,112 | 5,888 | 3,350 | 0,090 | 5,260 | 4,917 | 7G | +0,026 | 6,026 | 5,376 | 0,190 | 5,566 | 4,943 | 0,300 | 5,243 | | |
| | | | moyenne | 7h 6h | 0 | 6,000 | 0,180 | 5,820 | 3,350 | 0,140 | 5,210 | 4,917 | 6H | 0 | 6,000 | 5,350 | 0,150 | 5,500 | 4,917 | 0,238 | 5,153 | | |
| | | | moyenne | 7g 6g | -0,026 | 5,974 | 0,180 | 5,794 | 3,324 | 0,140 | 5,210 | 4,917 | 7H | 0 | 6,000 | 5,350 | 0,190 | 5,540 | 4,917 | 0,300 | 5,217 | | |
| | | | moyenne | 7e 6e | -0,060 | 5,940 | 0,180 | 5,760 | 5,290 | 0,140 | 5,150 | 4,857 | 7G | +0,026 | 6,026 | 5,376 | 0,190 | 5,566 | 4,943 | 0,300 | 5,243 | | |
| | | | moyenne | 9g 8g | -0,026 | 5,974 | 0,280 | 5,694 | 5,324 | 0,224 | 5,100 | 4,891 | 8H | 0 | 6,000 | 5,350 | 0,238 | 5,538 | 4,917 | 0,375 | 5,292 | | |
| (Pas 0,75) | | | | | | | | | | | | | | | | | | | | | | | |
| M 7x0,75 | | | | | | | | | | | | | | | | | | | | | | | |
| Courte | | 2,4 | fine | 3h 4h | 0 | 7,000 | 0,090 | 6,910 | 6,513 | 0,050 | 6,463 | 6,188 | 4H | 0 | 7,000 | 6,513 | 0,028 | 6,598 | 6,188 | 0,118 | 6,308 | | |
| | | | moyenne | 5h 6h | 0 | 7,000 | 0,140 | 6,860 | 6,513 | 0,050 | 6,433 | 6,188 | 5H | 0 | 7,000 | 6,513 | 0,108 | 6,619 | 6,188 | 0,150 | 6,338 | | |
| Normale | 2,4 | 7,1 | fine | 5g 6g | -0,022 | 6,978 | 0,140 | 6,838 | 6,491 | 0,080 | 6,411 | 6,166 | 5G | +0,022 | 7,022 | 6,535 | 0,106 | 6,641 | 6,210 | 0,150 | 6,360 | | |
| | | | fine | 4h | 0 | 7,000 | 0,090 | 6,910 | 6,513 | 0,053 | 6,450 | 6,188 | 4H 5H | 0 | 7,000 | 6,513 | 0,085 | 6,598 | 6,188 | 0,150 | 6,338 | | |
| | | | moyenne | 6h | 0 | 7,000 | 0,140 | 6,860 | 6,513 | 0,100 | 6,413 | 6,188 | 6H | 0 | 7,000 | 6,513 | 0,132 | 6,645 | 6,188 | 0,190 | 6,378 | | |
| | | | moyenne | 6g | -0,022 | 6,978 | 0,140 | 6,838 | 6,491 | 0,100 | 6,391 | 6,166 | 6G | +0,022 | 7,022 | 6,535 | 0,132 | 6,667 | 6,210 | 0,190 | 6,400 | | |
| | | | moyenne | 6f | -0,038 | 6,952 | 0,140 | 6,822 | 6,475 | 0,100 | 6,375 | 6,150 | — | — | — | — | — | — | — | — | | | |
| | | | moyenne | 6e | -0,056 | 6,944 | 0,140 | 6,804 | 6,457 | 0,100 | 6,367 | 6,132 | — | — | — | — | — | — | — | — | | | |
| Longue | 7,1 | | grossière | 8g | — | — | — | — | — | — | — | — | 7H | 0 | 7,000 | 6,513 | 0,170 | 6,833 | 6,188 | 0,238 | 6,424 | | |
| | | | fine | 5h 4h | 0 | 7,000 | 0,090 | 6,910 | 6,513 | 0,080 | 6,433 | 6,188 | 7G | +0,022 | 7,022 | 6,535 | 0,170 | 6,705 | 6,210 | 0,236 | 6,446 | | |
| | | | moyenne | 7h 6h | 0 | 7,000 | 0,140 | 6,860 | 6,513 | 0,125 | 6,388 | 6,188 | 6H | 0 | 7,000 | 6,513 | 0,132 | 6,645 | 6,188 | 0,190 | 6,378 | | |
| | | | moyenne | 7g 6g | -0,022 | 6,978 | 0,140 | 6,838 | 6,491 | 0,125 | 6,366 | 6,166 | 7H | 0 | 7,000 | 6,513 | 0,170 | 6,883 | 6,188 | 0,238 | 6,424 | | |
| | | | moyenne | 7e 6e | -0,056 | 6,944 | 0,140 | 6,804 | 6,457 | 0,125 | 6,332 | 6,132 | 7G | +0,022 | 7,022 | 6,535 | 0,170 | 6,705 | 6,210 | 0,236 | 6,446 | | |
| | | | moyenne | 9g 8g | — | — | — | — | — | — | — | — | 8H | — | — | — | — | — | — | — | — | | |

| | | | |
|--|--|----------------|-----------------|
| Academie AMIENS | Examen B.E.P | Coefficient:09 | Premiere phase |
| E.P.1 -MISE EN ŒUVRE D'UNE FABRICATION | PRODUCTIQUE MECANIQUE option :DECOLLETAGE | | Session 2001 |
| Temps alloué: 7heures | C.11 Décoder et analyser | | 11 / 12 |

TABLES DES VALEURS TRIGONOMETRIQUES NATURELLES

| DEGRES | SINUS NATURELS | | | | | | DEGRES | COSINUS NATURELS | | | | | | DEGRES |
|--------|----------------|---------|---------|---------|---------|---------|--------|------------------|---------|---------|---------|---------|---------|--------|
| | 0° | 10° | 20° | 30° | 40° | 50° | | 0° | 10° | 20° | 30° | 40° | 50° | |
| 0 | 0.00000 | 0.00291 | 0.00582 | 0.00873 | 0.01164 | 0.01454 | 0 | 1.00000 | 0.99998 | 0.99996 | 0.99994 | 0.99991 | 0.99989 | |
| 1 | 0.01745 | 0.02036 | 0.02327 | 0.02618 | 0.02908 | 0.03199 | 1 | 0.99998 | 0.99997 | 0.99995 | 0.99993 | 0.99990 | 0.99988 | |
| 2 | 0.03490 | 0.03781 | 0.04072 | 0.04362 | 0.04653 | 0.04943 | 2 | 0.99997 | 0.99996 | 0.99994 | 0.99992 | 0.99989 | 0.99987 | |
| 3 | 0.05234 | 0.05525 | 0.05815 | 0.06105 | 0.06395 | 0.06685 | 3 | 0.99996 | 0.99995 | 0.99993 | 0.99991 | 0.99988 | 0.99986 | |
| 4 | 0.06978 | 0.07269 | 0.07559 | 0.07849 | 0.08139 | 0.08429 | 4 | 0.99995 | 0.99994 | 0.99992 | 0.99990 | 0.99987 | 0.99985 | |
| 5 | 0.08722 | 0.09013 | 0.09303 | 0.09593 | 0.09883 | 0.10173 | 5 | 0.99994 | 0.99993 | 0.99991 | 0.99989 | 0.99986 | 0.99984 | |
| 6 | 0.10466 | 0.10757 | 0.11047 | 0.11337 | 0.11627 | 0.11917 | 6 | 0.99993 | 0.99992 | 0.99990 | 0.99988 | 0.99985 | 0.99983 | |
| 7 | 0.12210 | 0.12501 | 0.12791 | 0.13081 | 0.13371 | 0.13661 | 7 | 0.99992 | 0.99991 | 0.99989 | 0.99987 | 0.99984 | 0.99982 | |
| 8 | 0.13954 | 0.14245 | 0.14535 | 0.14825 | 0.15115 | 0.15405 | 8 | 0.99991 | 0.99990 | 0.99988 | 0.99986 | 0.99983 | 0.99981 | |
| 9 | 0.15648 | 0.15939 | 0.16229 | 0.16519 | 0.16809 | 0.17099 | 9 | 0.99990 | 0.99989 | 0.99987 | 0.99985 | 0.99982 | 0.99980 | |
| 10 | 0.17342 | 0.17633 | 0.17923 | 0.18213 | 0.18503 | 0.18793 | 10 | 0.99989 | 0.99988 | 0.99986 | 0.99984 | 0.99981 | 0.99979 | |
| 11 | 0.19086 | 0.19377 | 0.19667 | 0.19957 | 0.20247 | 0.20537 | 11 | 0.99988 | 0.99987 | 0.99985 | 0.99983 | 0.99980 | 0.99978 | |
| 12 | 0.20830 | 0.21121 | 0.21411 | 0.21701 | 0.21991 | 0.22281 | 12 | 0.99987 | 0.99986 | 0.99984 | 0.99982 | 0.99979 | 0.99977 | |
| 13 | 0.22574 | 0.22865 | 0.23155 | 0.23445 | 0.23735 | 0.24025 | 13 | 0.99986 | 0.99985 | 0.99983 | 0.99981 | 0.99978 | 0.99976 | |
| 14 | 0.24268 | 0.24559 | 0.24849 | 0.25139 | 0.25429 | 0.25719 | 14 | 0.99985 | 0.99984 | 0.99982 | 0.99980 | 0.99977 | 0.99975 | |
| 15 | 0.26462 | 0.26753 | 0.27043 | 0.27333 | 0.27623 | 0.27913 | 15 | 0.99984 | 0.99983 | 0.99981 | 0.99979 | 0.99976 | 0.99974 | |
| 16 | 0.28156 | 0.28447 | 0.28737 | 0.29027 | 0.29317 | 0.29607 | 16 | 0.99983 | 0.99982 | 0.99980 | 0.99978 | 0.99975 | 0.99973 | |
| 17 | 0.29850 | 0.30141 | 0.30431 | 0.30721 | 0.31011 | 0.31301 | 17 | 0.99982 | 0.99981 | 0.99979 | 0.99977 | 0.99974 | 0.99972 | |
| 18 | 0.31494 | 0.31785 | 0.32075 | 0.32365 | 0.32655 | 0.32945 | 18 | 0.99981 | 0.99980 | 0.99978 | 0.99976 | 0.99973 | 0.99971 | |
| 19 | 0.33138 | 0.33429 | 0.33719 | 0.34009 | 0.34299 | 0.34589 | 19 | 0.99980 | 0.99979 | 0.99977 | 0.99975 | 0.99972 | 0.99970 | |
| 20 | 0.35282 | 0.35573 | 0.35863 | 0.36153 | 0.36443 | 0.36733 | 20 | 0.99979 | 0.99978 | 0.99976 | 0.99974 | 0.99971 | 0.99969 | |
| 21 | 0.37426 | 0.37717 | 0.38007 | 0.38297 | 0.38587 | 0.38877 | 21 | 0.99978 | 0.99977 | 0.99975 | 0.99973 | 0.99970 | 0.99968 | |
| 22 | 0.39570 | 0.39861 | 0.40151 | 0.40441 | 0.40731 | 0.41021 | 22 | 0.99977 | 0.99976 | 0.99974 | 0.99972 | 0.99969 | 0.99967 | |
| 23 | 0.41164 | 0.41455 | 0.41745 | 0.42035 | 0.42325 | 0.42615 | 23 | 0.99976 | 0.99975 | 0.99973 | 0.99971 | 0.99968 | 0.99966 | |
| 24 | 0.43208 | 0.43499 | 0.43789 | 0.44079 | 0.44369 | 0.44659 | 24 | 0.99975 | 0.99974 | 0.99972 | 0.99970 | 0.99967 | 0.99965 | |
| 25 | 0.45352 | 0.45643 | 0.45933 | 0.46223 | 0.46513 | 0.46803 | 25 | 0.99974 | 0.99973 | 0.99971 | 0.99969 | 0.99966 | 0.99964 | |
| 26 | 0.47496 | 0.47787 | 0.48077 | 0.48367 | 0.48657 | 0.48947 | 26 | 0.99973 | 0.99972 | 0.99970 | 0.99968 | 0.99965 | 0.99963 | |
| 27 | 0.49140 | 0.49431 | 0.49721 | 0.50011 | 0.50301 | 0.50591 | 27 | 0.99972 | 0.99971 | 0.99969 | 0.99967 | 0.99964 | 0.99962 | |
| 28 | 0.51284 | 0.51575 | 0.51865 | 0.52155 | 0.52445 | 0.52735 | 28 | 0.99971 | 0.99970 | 0.99968 | 0.99966 | 0.99963 | 0.99961 | |
| 29 | 0.53428 | 0.53719 | 0.54009 | 0.54299 | 0.54589 | 0.54879 | 29 | 0.99970 | 0.99969 | 0.99967 | 0.99965 | 0.99962 | 0.99960 | |
| 30 | 0.56022 | 0.56313 | 0.56603 | 0.56893 | 0.57183 | 0.57473 | 30 | 0.99969 | 0.99968 | 0.99966 | 0.99964 | 0.99961 | 0.99959 | |
| 31 | 0.58616 | 0.58907 | 0.59197 | 0.59487 | 0.59777 | 0.60067 | 31 | 0.99968 | 0.99967 | 0.99965 | 0.99963 | 0.99960 | 0.99958 | |
| 32 | 0.61210 | 0.61501 | 0.61791 | 0.62081 | 0.62371 | 0.62661 | 32 | 0.99967 | 0.99966 | 0.99964 | 0.99962 | 0.99959 | 0.99957 | |
| 33 | 0.63804 | 0.64095 | 0.64385 | 0.64675 | 0.64965 | 0.65255 | 33 | 0.99966 | 0.99965 | 0.99963 | 0.99961 | 0.99958 | 0.99956 | |
| 34 | 0.66448 | 0.66739 | 0.67029 | 0.67319 | 0.67609 | 0.67899 | 34 | 0.99965 | 0.99964 | 0.99962 | 0.99960 | 0.99957 | 0.99955 | |
| 35 | 0.69092 | 0.69383 | 0.69673 | 0.69963 | 0.70253 | 0.70543 | 35 | 0.99964 | 0.99963 | 0.99961 | 0.99959 | 0.99956 | 0.99954 | |
| 36 | 0.71186 | 0.71477 | 0.71767 | 0.72057 | 0.72347 | 0.72637 | 36 | 0.99963 | 0.99962 | 0.99960 | 0.99958 | 0.99955 | 0.99953 | |
| 37 | 0.73280 | 0.73571 | 0.73861 | 0.74151 | 0.74441 | 0.74731 | 37 | 0.99962 | 0.99961 | 0.99959 | 0.99957 | 0.99954 | 0.99952 | |
| 38 | 0.75374 | 0.75665 | 0.75955 | 0.76245 | 0.76535 | 0.76825 | 38 | 0.99961 | 0.99960 | 0.99958 | 0.99956 | 0.99953 | 0.99951 | |
| 39 | 0.77468 | 0.77759 | 0.78049 | 0.78339 | 0.78629 | 0.78919 | 39 | 0.99960 | 0.99959 | 0.99957 | 0.99955 | 0.99952 | 0.99950 | |
| 40 | 0.80012 | 0.80303 | 0.80593 | 0.80883 | 0.81173 | 0.81463 | 40 | 0.99959 | 0.99958 | 0.99956 | 0.99954 | 0.99951 | 0.99949 | |
| 41 | 0.82506 | 0.82797 | 0.83087 | 0.83377 | 0.83667 | 0.83957 | 41 | 0.99958 | 0.99957 | 0.99955 | 0.99953 | 0.99950 | 0.99948 | |
| 42 | 0.84550 | 0.84841 | 0.85131 | 0.85421 | 0.85711 | 0.86001 | 42 | 0.99957 | 0.99956 | 0.99954 | 0.99952 | 0.99949 | 0.99947 | |
| 43 | 0.86044 | 0.86335 | 0.86625 | 0.86915 | 0.87205 | 0.87495 | 43 | 0.99956 | 0.99955 | 0.99953 | 0.99951 | 0.99948 | 0.99946 | |
| 44 | 0.87538 | 0.87829 | 0.88119 | 0.88409 | 0.88699 | 0.88989 | 44 | 0.99955 | 0.99954 | 0.99952 | 0.99950 | 0.99947 | 0.99945 | |
| 45 | 0.89032 | 0.89323 | 0.89613 | 0.89903 | 0.90193 | 0.90483 | 45 | 0.99954 | 0.99953 | 0.99951 | 0.99949 | 0.99946 | 0.99944 | |

| DEGRES | TANGENTES NATURELLES | | | | | | DEGRES | COTANGENTES NATURELLES | | | | | | DEGRES |
|--------|----------------------|---------|---------|---------|---------|---------|--------|------------------------|---------|---------|---------|---------|---------|--------|
| | 0° | 10° | 20° | 30° | 40° | 50° | | 0° | 10° | 20° | 30° | 40° | 50° | |
| 0 | 0.00000 | 0.00291 | 0.00582 | 0.00873 | 0.01164 | 0.01455 | 0 | 1.00000 | 0.99998 | 0.99996 | 0.99994 | 0.99991 | 0.99989 | |
| 1 | 0.01745 | 0.02036 | 0.02327 | 0.02618 | 0.02908 | 0.03199 | 1 | 0.99998 | 0.99997 | 0.99995 | 0.99993 | 0.99990 | 0.99988 | |
| 2 | 0.03490 | 0.03781 | 0.04072 | 0.04362 | 0.04653 | 0.04943 | 2 | 0.99997 | 0.99996 | 0.99994 | 0.99992 | 0.99989 | 0.99987 | |
| 3 | 0.05234 | 0.05525 | 0.05815 | 0.06105 | 0.06395 | 0.06685 | 3 | 0.99996 | 0.99995 | 0.99993 | 0.99991 | 0.99988 | 0.99986 | |
| 4 | 0.06978 | 0.07269 | 0.07559 | 0.07849 | 0.08139 | 0.08429 | 4 | 0.99995 | 0.99994 | 0.99992 | 0.99990 | 0.99987 | 0.99985 | |
| 5 | 0.08722 | 0.09013 | 0.09303 | 0.09593 | 0.09883 | 0.10173 | 5 | 0.99994 | 0.99993 | 0.99991 | 0.99989 | 0.99986 | 0.99984 | |
| 6 | 0.10466 | 0.10757 | 0.11047 | 0.11337 | 0.11627 | 0.11917 | 6 | 0.99993 | 0.99992 | 0.99990 | 0.99988 | 0.99985 | 0.99983 | |
| 7 | 0.12210 | 0.12501 | 0.12791 | 0.13081 | 0.13371 | 0.13661 | 7 | 0.99992 | 0.99991 | 0.99989 | 0.99987 | 0.99984 | 0.99982 | |
| 8 | 0.13954 | 0.14245 | 0.14535 | 0.14825 | 0.15115 | 0.15405 | 8 | 0.99991 | 0.99990 | 0.99988 | 0.99986 | 0.99983 | 0.99981 | |
| 9 | 0.15648 | 0.15939 | 0.16229 | 0.16519 | 0.16809 | 0.17099 | 9 | 0.99990 | 0.99989 | 0.99987 | 0.99985 | 0.99982 | 0.99980 | |
| 10 | 0.17342 | 0.17633 | 0.17923 | 0.18213 | 0.18503 | 0.18793 | 10 | 0.99989 | 0.99988 | 0.99986 | 0.99984 | 0.99981 | 0.99979 | |
| 11 | 0.19086 | 0.19377 | 0.19667 | 0.19957 | 0.20247 | 0.20537 | 11 | 0.99988 | 0.99987 | 0.99985 | 0.99983 | 0.99980 | 0.99978 | |
| 12 | 0.20830 | 0.21121 | 0.21411 | 0.21701 | 0.21991 | 0.22281 | 12 | 0.99987 | 0.99986 | 0.99984 | 0.99982 | 0.99979 | 0.99977 | |
| 13 | 0.22574 | 0.22865 | 0.23155 | 0.23445 | 0.23735 | 0.24025 | 13 | 0.99986 | 0.99985 | 0.99983 | 0.99981 | 0.99978 | 0.99976 | |
| 14 | 0.24268 | 0.24559 | 0.24849 | 0.25139 | 0.25429 | 0.25719 | 14 | 0.99985 | 0.99984 | 0.99982 | 0.99980 | 0.99977 | 0.99975 | |
| 15 | 0.26462 | 0.26753 | 0.27043 | 0.27333 | 0.27623 | 0.27913 | 15 | 0.99984 | 0.99983 | 0.99981 | 0.99979 | 0.99976 | 0.99974 | |
| 16 | 0.28156 | 0.28447 | 0.28737 | 0.29027 | 0.29317 | 0.29607 | 16 | 0.99983 | 0.99982 | 0.99980 | 0.99978 | 0.99975 | 0.99973 | |
| 17 | 0.29850 | 0.30141 | 0.30431 | 0.30721 | 0.31011 | 0.31301 | 17 | 0.99982 | 0.99981 | 0.99979 | 0.99977 | 0.99974 | 0.99972 | |
| 18 | 0.31494 | 0.31785 | 0.32075 | 0.32365 | 0.32655 | 0.32945 | 18 | 0.99981 | 0.99980 | 0.99978 | 0.99976 | 0.99973 | 0.99971 | |
| 19 | 0.33138 | 0.33429 | 0.33719 | 0.34009 | 0.34299 | 0.34589 | 19 | 0.99980 | 0.99979 | 0.99977 | 0.99975 | 0.99972 | 0.99970 | |
| 20 | 0.35282 | 0.35573 | 0.35863 | 0.36153 | 0.36443 | 0.36733 | 20 | 0.99979 | 0.99978 | 0.99976 | 0.99974 | 0.99971 | 0.99969 | |
| 21 | 0.37426 | 0.37717 | 0.38007 | 0.38297 | 0.38587 | 0.38877 | 21 | 0.99978 | 0.99977 | 0.99975 | 0.99973 | 0.99970 | 0.99968 | |
| 22 | 0.39570 | 0.39861 | 0.40151 | 0.40441 | 0.40731 | 0.41021 | 22 | 0.99977 | 0.99976 | 0.99974 | 0.99972 | 0.99969 | 0.99967 | |
| 23 | 0.41164 | 0.41455 | 0.41745 | 0.42035 | 0.42325 | 0.42615 | 23 | 0.99976 | 0.99975 | 0.99973 | 0.99971 | 0.99968 | 0.99966 | |
| 24 | 0.43208 | 0.43499 | 0.43789 | 0.44079 | 0.44369 | 0.44659 | 24 | 0.99975 | 0.99974 | 0.99972 | 0.99970 | 0.99967 | 0.99965 | |
| 25 | 0.45352 | 0.45643 | 0.45933 | 0.46223 | 0.46513 | 0.46803 | 25 | 0.99974 | 0.99973 | 0.99971 | 0.99969 | 0.99966 | 0.99964 | |
| 26 | 0.47496 | 0.47787 | 0.48077 | 0.48367 | 0.48657 | 0.48947 | 26 | 0.99973 | 0.99972 | 0.99970 | | | | |