

氣壓缸理論出力表：



單位：N

| 缸徑 (mm)                   |     | 12  | 16  | 20  | 25  | 32  | 40   | 50   | 63   | 80   | 100  | 125   | 150   | 200   |       |
|---------------------------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|-------|-------|-------|-------|
| 桿徑 (mm)                   |     | 6   | 6   | 8   | 10  | 12  | 16   | 20   | 20   | 25   | 25   | 35    | 40    | 50    |       |
| 活塞受壓面積 (mm <sup>2</sup> ) | A   | 113 | 201 | 314 | 491 | 804 | 1257 | 1963 | 3117 | 5027 | 7854 | 12271 | 17671 | 31400 |       |
|                           | B   | 85  | 173 | 264 | 412 | 691 | 1056 | 1649 | 2803 | 4536 | 7363 | 11309 | 16415 | 29437 |       |
| 操作壓力 (MPa)                | 0.1 | A   | 11  | 20  | 31  | 49  | 80   | 126  | 196  | 312  | 502  | 785   | 1227  | 1767  | 3140  |
|                           |     | B   | 8.5 | 17  | 26  | 41  | 69   | 106  | 165  | 280  | 453  | 736   | 1131  | 1642  | 2944  |
|                           | 0.2 | A   | 23  | 40  | 63  | 98  | 161  | 251  | 393  | 623  | 1005 | 1571  | 2454  | 3534  | 6280  |
|                           |     | B   | 17  | 35  | 53  | 82  | 138  | 211  | 330  | 561  | 907  | 1473  | 2262  | 3283  | 5888  |
|                           | 0.3 | A   | 34  | 60  | 94  | 147 | 241  | 377  | 589  | 935  | 1508 | 2356  | 3681  | 5301  | 9420  |
|                           |     | B   | 25  | 52  | 79  | 124 | 207  | 317  | 495  | 841  | 1361 | 2209  | 3393  | 4925  | 8832  |
|                           | 0.4 | A   | 45  | 80  | 126 | 196 | 322  | 503  | 785  | 1247 | 2011 | 3142  | 4908  | 7068  | 12560 |
|                           |     | B   | 34  | 69  | 106 | 165 | 276  | 422  | 660  | 1121 | 1814 | 2945  | 4524  | 6566  | 11776 |
|                           | 0.5 | A   | 57  | 101 | 157 | 245 | 402  | 629  | 982  | 1559 | 2514 | 3927  | 6135  | 8836  | 15700 |
|                           |     | B   | 42  | 87  | 132 | 206 | 346  | 528  | 825  | 1402 | 2268 | 3682  | 5655  | 8208  | 14720 |
|                           | 0.6 | A   | 68  | 121 | 189 | 294 | 482  | 754  | 1178 | 1870 | 3016 | 4712  | 7363  | 10603 | 18840 |
|                           |     | B   | 51  | 104 | 158 | 247 | 415  | 634  | 989  | 1682 | 2722 | 4418  | 6785  | 9849  | 17664 |
|                           | 0.7 | A   | 79  | 141 | 220 | 343 | 563  | 880  | 1374 | 2182 | 3519 | 5498  | 8589  | 12370 | 21980 |
|                           |     | B   | 59  | 121 | 185 | 289 | 484  | 739  | 1154 | 1962 | 3175 | 5154  | 7916  | 11491 | 20608 |
|                           | 0.8 | A   | 90  | 161 | 251 | 393 | 643  | 1006 | 1570 | 2494 | 4022 | 6283  | 9816  | 14137 | 25120 |
|                           |     | B   | 68  | 138 | 211 | 330 | 553  | 845  | 1319 | 2242 | 3629 | 5890  | 9047  | 13132 | 23552 |
|                           | 0.9 | A   | 102 | 181 | 283 | 442 | 724  | 1131 | 1767 | 2805 | 4524 | 7069  | 11043 | 15904 | 28260 |
|                           |     | B   | 76  | 155 | 238 | 371 | 622  | 950  | 1484 | 2523 | 4082 | 6627  | 10178 | 14774 | 26496 |
|                           | 1.0 | A   | 113 | 201 | 314 | 491 | 804  | 1257 | 1963 | 3117 | 5027 | 7854  | 12271 | 17671 | 31400 |
|                           |     | B   | 85  | 173 | 264 | 412 | 691  | 1056 | 1649 | 2803 | 4536 | 7363  | 11309 | 16415 | 29440 |

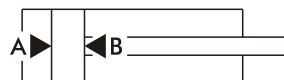
氣缸出力計算方式：

$$F = P \times A - f$$

|    |        |                    |
|----|--------|--------------------|
| F： | 氣缸出力   | (N)                |
| P： | 操作壓力   | (MPa)              |
| A： | 活塞受壓面積 | (mm <sup>2</sup> ) |
| f： | 摩擦阻力   | (N)                |

壓力單位變換表：

| Pa              | kPa                       | MPa                       | bar                      | mbar                     | kgf/cm <sup>2</sup>      | cmH <sub>2</sub> O      | mmH <sub>2</sub> O        | mmHg                     | p.s.i.                   |
|-----------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------------------|---------------------------|--------------------------|--------------------------|
| 1               | 10 <sup>-3</sup>          | 10 <sup>-6</sup>          | 10 <sup>-5</sup>         | 10 <sup>-2</sup>         | 10.2 × 10 <sup>-6</sup>  | 10.2 × 10 <sup>-3</sup> | 101.97 × 10 <sup>-3</sup> | 7.5 × 10 <sup>-3</sup>   | 0.15 × 10 <sup>-3</sup>  |
| 10 <sup>3</sup> | 1                         | 10 <sup>-3</sup>          | 10 <sup>-2</sup>         | 10                       | 10.2 × 10 <sup>-3</sup>  | 10.2                    | 101.97                    | 7.5                      | 0.15                     |
| 10 <sup>6</sup> | 10 <sup>3</sup>           | 1                         | 10                       | 10 <sup>4</sup>          | 10.2                     | 10.2 × 10 <sup>3</sup>  | 101.97 × 10 <sup>3</sup>  | 7.5 × 10 <sup>3</sup>    | 0.15 × 10 <sup>3</sup>   |
| 10 <sup>5</sup> | 10 <sup>2</sup>           | 10 <sup>-1</sup>          | 1                        | 10 <sup>3</sup>          | 1.02                     | 1.02 × 10 <sup>3</sup>  | 10.2 × 10 <sup>3</sup>    | 750.06                   | 14.5                     |
| 10 <sup>2</sup> | 10 <sup>-1</sup>          | 10 <sup>-4</sup>          | 10 <sup>-3</sup>         | 1                        | 1.02 × 10 <sup>-3</sup>  | 1.02                    | 10.2                      | 0.75                     | 14.5 × 10 <sup>-3</sup>  |
| 98066.5         | 98.07                     | 98.07 × 10 <sup>-3</sup>  | 0.98                     | 980.67                   | 1                        | 1000                    | 10000                     | 735.56                   | 14.22                    |
| 98.0665         | 98.07 × 10 <sup>-3</sup>  | 98.07 × 10 <sup>-6</sup>  | 0.98 × 10 <sup>-3</sup>  | 0.98                     | 10 <sup>-3</sup>         | 1                       | 10                        | 0.74                     | 14.22 × 10 <sup>-3</sup> |
| 9.80665         | 9.807 × 10 <sup>-3</sup>  | 9.807 × 10 <sup>-6</sup>  | 98.07 × 10 <sup>-6</sup> | 98.07 × 10 <sup>-3</sup> | 10 <sup>-4</sup>         | 0.1                     | 1                         | 73.56 × 10 <sup>-3</sup> | 1.42 × 10 <sup>-3</sup>  |
| 133.32          | 133.32 × 10 <sup>-3</sup> | 133.32 × 10 <sup>-6</sup> | 1.33 × 10 <sup>-3</sup>  | 1.33                     | 1.36 × 10 <sup>-3</sup>  | 1.36                    | 13.6                      | 1                        | 19.34 × 10 <sup>-3</sup> |
| 6894.76         | 6.89                      | 6.89 × 10 <sup>-3</sup>   | 68.95 × 10 <sup>-3</sup> | 68.95                    | 70.31 × 10 <sup>-3</sup> | 70.31                   | 703.07                    | 51.71                    | 1                        |



空氣消耗量：

單位：ℓ/min

| 缸徑 (mm)                   |     | 12    | 16    | 20    | 25    | 32    | 40    | 50    | 63    | 80     | 100    | 125    | 150    | 200    |
|---------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 桿徑 (mm)                   |     | 6     | 6     | 8     | 10    | 12    | 16    | 20    | 20    | 25     | 25     | 35     | 40     | 50     |
| 活塞受壓面積 (mm <sup>2</sup> ) | A   | 113   | 201   | 314   | 491   | 804   | 1257  | 1963  | 3117  | 5027   | 7854   | 12271  | 17671  | 31416  |
|                           | B   | 85    | 173   | 264   | 412   | 691   | 1056  | 1649  | 2803  | 4536   | 7363   | 11309  | 16415  | 29452  |
| 操作壓力 (MPa)                | 0.1 | 0.040 | 0.075 | 0.116 | 0.181 | 0.299 | 0.462 | 0.722 | 1.183 | 1.912  | 3.042  | 4.714  | 6.814  | 12.168 |
|                           | 0.2 | 0.059 | 0.112 | 0.173 | 0.271 | 0.448 | 0.693 | 1.083 | 1.775 | 2.867  | 4.563  | 7.071  | 10.221 | 18.252 |
|                           | 0.3 | 0.079 | 0.150 | 0.231 | 0.361 | 0.598 | 0.924 | 1.444 | 2.367 | 3.823  | 6.084  | 9.428  | 13.628 | 24.336 |
|                           | 0.4 | 0.099 | 0.187 | 0.289 | 0.451 | 0.747 | 1.156 | 1.805 | 2.959 | 4.779  | 7.605  | 11.785 | 17.035 | 30.420 |
|                           | 0.5 | 0.119 | 0.224 | 0.347 | 0.542 | 0.897 | 1.387 | 2.167 | 3.550 | 5.734  | 9.126  | 14.142 | 20.441 | 36.502 |
|                           | 0.6 | 0.138 | 0.262 | 0.405 | 0.632 | 1.046 | 1.618 | 2.528 | 4.142 | 6.690  | 10.647 | 16.499 | 23.848 | 42.586 |
|                           | 0.7 | 0.158 | 0.299 | 0.463 | 0.722 | 1.196 | 1.849 | 2.889 | 4.734 | 7.646  | 12.168 | 18.856 | 27.255 | 48.670 |
|                           | 0.8 | 0.178 | 0.336 | 0.520 | 0.812 | 1.345 | 2.080 | 3.250 | 5.325 | 8.602  | 13.689 | 21.213 | 30.662 | 54.754 |
|                           | 0.9 | 0.198 | 0.374 | 0.578 | 0.903 | 1.495 | 2.311 | 3.611 | 5.917 | 9.557  | 15.209 | 23.570 | 34.069 | 60.838 |
|                           | 1.0 | 0.218 | 0.411 | 0.636 | 0.993 | 1.644 | 2.542 | 3.972 | 6.509 | 10.513 | 16.927 | 25.927 | 37.476 | 66.922 |

●上表所列數值，是指行程100mm之氣缸，於一分鐘內往復一次，所需的空氣消耗量。

空氣消耗量計算方式：

$$Q_n = (A_a + A_b) \times L \times \frac{P + 0.101}{0.101} \times n \times 10^{-6}$$

|                  |         |                    |
|------------------|---------|--------------------|
| Q <sub>n</sub> ： | 空氣消耗量   | (ℓ/min)            |
| A <sub>a</sub> ： | 活塞A端面面積 | (mm <sup>2</sup> ) |
| A <sub>b</sub> ： | 活塞B端面面積 | (mm <sup>2</sup> ) |
| L：               | 氣缸行程    | (mm)               |
| P：               | 操作壓力    | (MPa)              |
| n：               | 每分鐘作動次數 | (次/min)            |

流量單位變換表

| m <sup>3</sup> /s        | ℓ/s                      | cm <sup>3</sup> /s      | m <sup>3</sup> /h      | m <sup>3</sup> /min      | ℓ/h                     | ℓ/min                    | ft <sup>3</sup> /min (scfm) | gallon min UK             | gallon min USA           |
|--------------------------|--------------------------|-------------------------|------------------------|--------------------------|-------------------------|--------------------------|-----------------------------|---------------------------|--------------------------|
| 1                        | 10 <sup>3</sup>          | 10 <sup>6</sup>         | 3.6 × 10 <sup>6</sup>  | 60                       | 3.6 × 10 <sup>6</sup>   | 60 × 10 <sup>3</sup>     | 2.12 × 10 <sup>3</sup>      | 13.2 × 10 <sup>3</sup>    | 15.85 × 10 <sup>3</sup>  |
| 10 <sup>-3</sup>         | 1                        | 10 <sup>3</sup>         | 3.6                    | 60 × 10 <sup>-3</sup>    | 3.6 × 10 <sup>3</sup>   | 60                       | 2.12                        | 13.2                      | 15.85                    |
| 10 <sup>-6</sup>         | 10 <sup>-3</sup>         | 1                       | 3.6 × 10 <sup>-3</sup> | 60 × 10 <sup>-6</sup>    | 3.6                     | 60 × 10 <sup>-3</sup>    | 2.12 × 10 <sup>-3</sup>     | 13.2 × 10 <sup>-3</sup>   | 15.85 × 10 <sup>-3</sup> |
| 0.28 × 10 <sup>-3</sup>  | 0.28                     | 0.28 × 10 <sup>3</sup>  | 1                      | 16.67 × 10 <sup>-3</sup> | 10 <sup>3</sup>         | 16.67                    | 0.59                        | 3.67                      | 4.4                      |
| 16.67 × 10 <sup>-3</sup> | 16.67                    | 16.67 × 10 <sup>3</sup> | 60                     | 1                        | 60 × 10 <sup>3</sup>    | 10 <sup>3</sup>          | 35.31                       | 219.97                    | 264.17                   |
| 0.28 × 10 <sup>-6</sup>  | 0.28 × 10 <sup>-3</sup>  | 0.28                    | 10 <sup>-3</sup>       | 16.67 × 10 <sup>-6</sup> | 1                       | 16.67 × 10 <sup>-3</sup> | 0.59 × 10 <sup>-3</sup>     | 3.67 × 10 <sup>-3</sup>   | 4.4 × 10 <sup>-3</sup>   |
| 16.67 × 10 <sup>-6</sup> | 16.67 × 10 <sup>-3</sup> | 16.67                   | 60 × 10 <sup>-3</sup>  | 10 <sup>-3</sup>         | 60                      | 1                        | 35.31 × 10 <sup>-3</sup>    | 219.97 × 10 <sup>-3</sup> | 264 × 10 <sup>-3</sup>   |
| 0.47 × 10 <sup>-3</sup>  | 0.47                     | 0.47 × 10 <sup>3</sup>  | 1.699                  | 28.32 × 10 <sup>-3</sup> | 1.699 × 10 <sup>3</sup> | 28.32                    | 1                           | 6.23                      | 7.48                     |
| 75.79 × 10 <sup>-6</sup> | 75.77 × 10 <sup>-3</sup> | 75.77                   | 0.273                  | 4.55 × 10 <sup>-3</sup>  | 0.273 × 10 <sup>3</sup> | 4.55                     | 0.16                        | 1                         | 1.2                      |
| 63.09 × 10 <sup>-6</sup> | 63.09 × 10 <sup>-3</sup> | 63.09                   | 0.227                  | 3.79 × 10 <sup>-3</sup>  | 0.227 × 10 <sup>3</sup> | 3.79                     | 0.13                        | 0.83                      | 1                        |