

## 管路内空気圧の算定

当初管路内空気容量 :  $V_0 = 679.752 \text{ (m}^3\text{)}$   
 水位上昇による管路内の空気排除量 :  $Q = 6.300 \text{ (m}^3\text{/s)}$   
 空気排気面積 :  $a \text{ (m}^2\text{)}$

| 計算ケース |         | a                       |
|-------|---------|-------------------------|
| ケース1  | 開口径φ100 | 0.0079(m <sup>2</sup> ) |
| ケース2  | 開口径φ150 | 0.0256(m <sup>2</sup> ) |
| ケース3  | 開口径φ200 | 0.0393(m <sup>2</sup> ) |
| ケース4  | 開口径φ250 | 0.0570(m <sup>2</sup> ) |
| ケース5  | 開口径φ300 | 0.0786(m <sup>2</sup> ) |

計算対象時間 :  $t_{\max} = V_0 / Q = 107 \text{ s}$

管路内空気圧

$$P_i = 75482 \cdot \left( \frac{(2 \cdot V_{\text{AVE}} + Q_{\text{AVE}}) \cdot \rho_{i-1} - 2 \cdot m_{\text{AVE}}}{2 \cdot V_{\text{AVE}} - Q_{\text{AVE}}} \right)^{1.4}, P_0 = 98000 \text{ (Pa)}$$

ただし、

$V_{\text{AVE}}$  : 検討対象時間時点の管路内空気量と、その1秒前の管路内空気量との平均値

$Q_{\text{AVE}}$  : 検討対象時間時点の管路内空気排除量と、その1秒前の管路内空気排除量との平均値

$m_{\text{AVE}}$  : 検討対象時間時点の蓋等から流出する質量流量と、その1秒前の質量流量との平均値

その他定数

75482 : 98000 / (1.205<sup>1.4</sup>) より

1.205 : 大気と同等の空気密度

98000 : 大気圧 単位 Pa(パスカル)

ここで、

$V_i$  : 管路内空気量 (m<sup>3</sup>)

$$V_i = V_0 - t \cdot Q$$

$$\therefore V_{\text{AVE}} = \frac{V_i + V_{i-1}}{2}$$

$Q_i$  : 空気排除量 (m<sup>3</sup>/s)

$$Q_i = V_0 - V_i$$

$$\therefore Q_{\text{AVE}} = \frac{Q_i + Q_{i-1}}{2}$$

$\rho_i$  : 空気密度 (kg/m<sup>3</sup>)

$$\rho_i = \left( \frac{P_i(\text{仮})}{75482} \right)^{1/1.4}$$

$\therefore P_i(\text{仮})$  : 流入開始より*i*秒後の管路内空気圧の仮定値

したがって、計算開始時空気密度は大気圧に等しいから

$$\rho_0 = \left( \frac{98000}{75482} \right)^{1/1.4} = 1.205 \text{ (kg/m}^3\text{)} \text{ となる}$$

$m_i$  : 蓋等から流出する質量流量 (kg/s)

ただし、

○  $P_i / 98000 \geq 1 / 0.5282$  のとき

$$m_i = 0.5786 \cdot \rho_i \cdot a \cdot C$$

○  $1 \leq P_i / 98000 < 1 / 0.5282$  のとき

$$m_i = 1.205 \cdot C_0 \cdot a \cdot \left( \frac{2}{r - 1} \right)^{0.5} \cdot \left( \left( \frac{P_i(\text{仮})}{98000} \right)^{1-1/r} - 1 \right)^{0.5}$$

ここに、

$$C : \text{空気音速(m/sec)} = (r \cdot P_i / \rho_i)^{0.5} = (1.4 \cdot P_i / \rho_i)^{0.5}$$

$$C_0 : \text{大気音速(m/sec)} = (r \cdot P_0 / \rho_0)^{0.5} = (1.4 \cdot 98000 / 1.205)^{0.5} = 337.43$$

$$r : \text{空気の比熱比} = 1.4$$

$$\therefore m_{\text{AVE}} = \frac{m_i + m_{i-1}}{2}$$

以上の算定を経過時間1秒単位で行ない、蓋に作用する空気圧 ( $\rho_i - 98000$ ) Pa を求める。  
なお、計算は先に示した空気排気面積  $a$  の計算ケース毎に行なう。

ケース1:開口径φ100 - 1

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 1              | 673.452              | 6.300                 | 676.602                           | 3.150                               | 98615                   | 1.210                    | 0.304            | 0.152                               | 98615                | 615                           |
| 2              | 667.152              | 6.300                 | 670.302                           | 6.300                               | 99851                   | 1.221                    | 0.526            | 0.415                               | 99850                | 1850                          |
| 3              | 660.852              | 6.300                 | 664.002                           | 6.300                               | 101082                  | 1.232                    | 0.677            | 0.601                               | 101082               | 3082                          |
| 4              | 654.552              | 6.300                 | 657.702                           | 6.300                               | 102317                  | 1.243                    | 0.800            | 0.738                               | 102317               | 4317                          |
| 5              | 648.252              | 6.300                 | 651.402                           | 6.300                               | 103560                  | 1.253                    | 0.905            | 0.853                               | 103560               | 5560                          |
| 6              | 641.952              | 6.300                 | 645.102                           | 6.300                               | 104814                  | 1.264                    | 1.000            | 0.953                               | 104813               | 6813                          |
| 7              | 635.652              | 6.300                 | 638.802                           | 6.300                               | 106080                  | 1.275                    | 1.087            | 1.043                               | 106080               | 8080                          |
| 8              | 629.352              | 6.300                 | 632.502                           | 6.300                               | 107361                  | 1.286                    | 1.167            | 1.127                               | 107360               | 9360                          |
| 9              | 623.052              | 6.300                 | 626.202                           | 6.300                               | 108658                  | 1.297                    | 1.243            | 1.205                               | 108657               | 10657                         |
| 10             | 616.752              | 6.300                 | 619.902                           | 6.300                               | 109972                  | 1.308                    | 1.314            | 1.278                               | 109971               | 11971                         |
| 11             | 610.452              | 6.300                 | 613.602                           | 6.300                               | 111304                  | 1.320                    | 1.382            | 1.348                               | 111303               | 13303                         |
| 12             | 604.152              | 6.300                 | 607.302                           | 6.300                               | 112655                  | 1.331                    | 1.448            | 1.415                               | 112655               | 14655                         |
| 13             | 597.852              | 6.300                 | 601.002                           | 6.300                               | 114027                  | 1.343                    | 1.511            | 1.479                               | 114026               | 16026                         |
| 14             | 591.552              | 6.300                 | 594.702                           | 6.300                               | 115420                  | 1.354                    | 1.571            | 1.541                               | 115420               | 17420                         |
| 15             | 585.252              | 6.300                 | 588.402                           | 6.300                               | 116836                  | 1.366                    | 1.630            | 1.601                               | 116836               | 18836                         |
| 16             | 578.952              | 6.300                 | 582.102                           | 6.300                               | 118276                  | 1.378                    | 1.688            | 1.659                               | 118275               | 20275                         |
| 17             | 572.652              | 6.300                 | 575.802                           | 6.300                               | 119741                  | 1.390                    | 1.743            | 1.715                               | 119740               | 21740                         |
| 18             | 566.352              | 6.300                 | 569.502                           | 6.300                               | 121232                  | 1.403                    | 1.798            | 1.771                               | 121231               | 23231                         |
| 19             | 560.052              | 6.300                 | 563.202                           | 6.300                               | 122750                  | 1.415                    | 1.852            | 1.825                               | 122750               | 24750                         |
| 20             | 553.752              | 6.300                 | 556.902                           | 6.300                               | 124297                  | 1.428                    | 1.904            | 1.878                               | 124296               | 26296                         |
| 21             | 547.452              | 6.300                 | 550.602                           | 6.300                               | 125873                  | 1.441                    | 1.956            | 1.930                               | 125873               | 27873                         |
| 22             | 541.152              | 6.300                 | 544.302                           | 6.300                               | 127480                  | 1.454                    | 2.006            | 1.981                               | 127480               | 29480                         |
| 23             | 534.852              | 6.300                 | 538.002                           | 6.300                               | 129120                  | 1.467                    | 2.057            | 2.031                               | 129119               | 31119                         |
| 24             | 528.552              | 6.300                 | 531.702                           | 6.300                               | 130793                  | 1.481                    | 2.106            | 2.081                               | 130793               | 32793                         |
| 25             | 522.252              | 6.300                 | 525.402                           | 6.300                               | 132501                  | 1.495                    | 2.155            | 2.130                               | 132501               | 34501                         |
| 26             | 515.952              | 6.300                 | 519.102                           | 6.300                               | 134246                  | 1.509                    | 2.203            | 2.179                               | 134245               | 36245                         |
| 27             | 509.652              | 6.300                 | 512.802                           | 6.300                               | 136029                  | 1.523                    | 2.251            | 2.227                               | 136028               | 38028                         |
| 28             | 503.352              | 6.300                 | 506.502                           | 6.300                               | 137851                  | 1.538                    | 2.298            | 2.275                               | 137851               | 39851                         |
| 29             | 497.052              | 6.300                 | 500.202                           | 6.300                               | 139715                  | 1.552                    | 2.345            | 2.322                               | 139714               | 41714                         |
| 30             | 490.752              | 6.300                 | 493.902                           | 6.300                               | 141622                  | 1.567                    | 2.392            | 2.369                               | 141622               | 43622                         |
| 31             | 484.452              | 6.300                 | 487.602                           | 6.300                               | 143574                  | 1.583                    | 2.439            | 2.416                               | 143574               | 45574                         |
| 32             | 478.152              | 6.300                 | 481.302                           | 6.300                               | 145573                  | 1.599                    | 2.485            | 2.462                               | 145573               | 47573                         |
| 33             | 471.852              | 6.300                 | 475.002                           | 6.300                               | 147621                  | 1.615                    | 2.531            | 2.508                               | 147621               | 49621                         |
| 34             | 465.552              | 6.300                 | 468.702                           | 6.300                               | 149720                  | 1.631                    | 2.577            | 2.554                               | 149720               | 51720                         |
| 35             | 459.252              | 6.300                 | 462.402                           | 6.300                               | 151873                  | 1.648                    | 2.623            | 2.600                               | 151872               | 53872                         |
| 36             | 452.952              | 6.300                 | 456.102                           | 6.300                               | 154082                  | 1.665                    | 2.668            | 2.646                               | 154081               | 56081                         |
| 37             | 446.652              | 6.300                 | 449.802                           | 6.300                               | 156349                  | 1.682                    | 2.714            | 2.691                               | 156349               | 58349                         |
| 38             | 440.352              | 6.300                 | 443.502                           | 6.300                               | 158677                  | 1.700                    | 2.760            | 2.737                               | 158677               | 60677                         |
| 39             | 434.052              | 6.300                 | 437.202                           | 6.300                               | 161069                  | 1.718                    | 2.805            | 2.782                               | 161069               | 63069                         |
| 40             | 427.752              | 6.300                 | 430.902                           | 6.300                               | 163528                  | 1.737                    | 2.851            | 2.828                               | 163528               | 65528                         |
| 41             | 421.452              | 6.300                 | 424.602                           | 6.300                               | 166058                  | 1.756                    | 2.896            | 2.874                               | 166057               | 68057                         |
| 42             | 415.152              | 6.300                 | 418.302                           | 6.300                               | 168661                  | 1.776                    | 2.942            | 2.919                               | 168661               | 70661                         |
| 43             | 408.852              | 6.300                 | 412.002                           | 6.300                               | 171342                  | 1.796                    | 2.988            | 2.965                               | 171341               | 73341                         |
| 44             | 402.552              | 6.300                 | 405.702                           | 6.300                               | 174104                  | 1.817                    | 3.034            | 3.011                               | 174103               | 76103                         |
| 45             | 396.252              | 6.300                 | 399.402                           | 6.300                               | 176951                  | 1.838                    | 3.080            | 3.057                               | 176951               | 78951                         |

ケース1:開口径φ100 - 2

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 46             | 389.952              | 6.300                 | 393.102                                  | 6.300                                      | 179888                  | 1.860             | 3.127            | 3.104                                      | 179887               | 81887                         |
| 47             | 383.652              | 6.300                 | 386.802                                  | 6.300                                      | 182919                  | 1.882             | 3.173            | 3.150                                      | 182919               | 84919                         |
| 48             | 377.352              | 6.300                 | 380.502                                  | 6.300                                      | 186050                  | 1.905             | 3.220            | 3.196                                      | 186049               | 88049                         |
| 49             | 371.052              | 6.300                 | 374.202                                  | 6.300                                      | 189286                  | 1.928             | 3.268            | 3.244                                      | 189285               | 91285                         |
| 50             | 364.752              | 6.300                 | 367.902                                  | 6.300                                      | 192632                  | 1.953             | 3.317            | 3.292                                      | 192631               | 94631                         |
| 51             | 358.452              | 6.300                 | 361.602                                  | 6.300                                      | 196093                  | 1.978             | 3.368            | 3.343                                      | 196093               | 98093                         |
| 52             | 352.152              | 6.300                 | 355.302                                  | 6.300                                      | 199676                  | 2.003             | 3.421            | 3.394                                      | 199676               | 101676                        |
| 53             | 345.852              | 6.300                 | 349.002                                  | 6.300                                      | 203387                  | 2.030             | 3.475            | 3.448                                      | 203387               | 105387                        |
| 54             | 339.552              | 6.300                 | 342.702                                  | 6.300                                      | 207234                  | 2.057             | 3.531            | 3.503                                      | 207233               | 109233                        |
| 55             | 333.252              | 6.300                 | 336.402                                  | 6.300                                      | 211223                  | 2.086             | 3.590            | 3.561                                      | 211223               | 113223                        |
| 56             | 326.952              | 6.300                 | 330.102                                  | 6.300                                      | 215363                  | 2.115             | 3.650            | 3.620                                      | 215363               | 117363                        |
| 57             | 320.652              | 6.300                 | 323.802                                  | 6.300                                      | 219663                  | 2.145             | 3.712            | 3.681                                      | 219662               | 121662                        |
| 58             | 314.352              | 6.300                 | 317.502                                  | 6.300                                      | 224132                  | 2.176             | 3.777            | 3.745                                      | 224131               | 126131                        |
| 59             | 308.052              | 6.300                 | 311.202                                  | 6.300                                      | 228780                  | 2.208             | 3.844            | 3.810                                      | 228779               | 130779                        |
| 60             | 301.752              | 6.300                 | 304.902                                  | 6.300                                      | 233617                  | 2.241             | 3.913            | 3.879                                      | 233617               | 135617                        |
| 61             | 295.452              | 6.300                 | 298.602                                  | 6.300                                      | 238656                  | 2.276             | 3.986            | 3.950                                      | 238656               | 140656                        |
| 62             | 289.152              | 6.300                 | 292.302                                  | 6.300                                      | 243910                  | 2.311             | 4.061            | 4.023                                      | 243909               | 145909                        |
| 63             | 282.852              | 6.300                 | 286.002                                  | 6.300                                      | 249392                  | 2.348             | 4.139            | 4.100                                      | 249392               | 151392                        |
| 64             | 276.552              | 6.300                 | 279.702                                  | 6.300                                      | 255118                  | 2.387             | 4.220            | 4.180                                      | 255117               | 157117                        |
| 65             | 270.252              | 6.300                 | 273.402                                  | 6.300                                      | 261104                  | 2.426             | 4.305            | 4.263                                      | 261104               | 163104                        |
| 66             | 263.952              | 6.300                 | 267.102                                  | 6.300                                      | 267368                  | 2.468             | 4.393            | 4.349                                      | 267368               | 169368                        |
| 67             | 257.652              | 6.300                 | 260.802                                  | 6.300                                      | 273931                  | 2.511             | 4.486            | 4.439                                      | 273930               | 175930                        |
| 68             | 251.352              | 6.300                 | 254.502                                  | 6.300                                      | 280813                  | 2.556             | 4.582            | 4.534                                      | 280813               | 182813                        |
| 69             | 245.052              | 6.300                 | 248.202                                  | 6.300                                      | 288039                  | 2.603             | 4.683            | 4.632                                      | 288039               | 190039                        |
| 70             | 238.752              | 6.300                 | 241.902                                  | 6.300                                      | 295635                  | 2.652             | 4.789            | 4.736                                      | 295635               | 197635                        |
| 71             | 232.452              | 6.300                 | 235.602                                  | 6.300                                      | 303631                  | 2.703             | 4.899            | 4.844                                      | 303630               | 205630                        |
| 72             | 226.152              | 6.300                 | 229.302                                  | 6.300                                      | 312058                  | 2.756             | 5.016            | 4.957                                      | 312058               | 214058                        |
| 73             | 219.852              | 6.300                 | 223.002                                  | 6.300                                      | 320953                  | 2.812             | 5.138            | 5.077                                      | 320952               | 222952                        |
| 74             | 213.552              | 6.300                 | 216.702                                  | 6.300                                      | 330355                  | 2.870             | 5.267            | 5.202                                      | 330355               | 232355                        |
| 75             | 207.252              | 6.300                 | 210.402                                  | 6.300                                      | 340310                  | 2.932             | 5.402            | 5.335                                      | 340309               | 242309                        |
| 76             | 200.952              | 6.300                 | 204.102                                  | 6.300                                      | 350867                  | 2.997             | 5.546            | 5.474                                      | 350866               | 252866                        |
| 77             | 194.652              | 6.300                 | 197.802                                  | 6.300                                      | 362082                  | 3.065             | 5.697            | 5.622                                      | 362082               | 264082                        |
| 78             | 188.352              | 6.300                 | 191.502                                  | 6.300                                      | 374020                  | 3.137             | 5.858            | 5.778                                      | 374019               | 276019                        |
| 79             | 182.052              | 6.300                 | 185.202                                  | 6.300                                      | 386752                  | 3.213             | 6.029            | 5.943                                      | 386752               | 288752                        |
| 80             | 175.752              | 6.300                 | 178.902                                  | 6.300                                      | 400361                  | 3.293             | 6.210            | 6.119                                      | 400360               | 302360                        |
| 81             | 169.452              | 6.300                 | 172.602                                  | 6.300                                      | 414940                  | 3.378             | 6.403            | 6.307                                      | 414940               | 316940                        |
| 82             | 163.152              | 6.300                 | 166.302                                  | 6.300                                      | 430597                  | 3.469             | 6.610            | 6.506                                      | 430597               | 332597                        |
| 83             | 156.852              | 6.300                 | 160.002                                  | 6.300                                      | 447457                  | 3.565             | 6.831            | 6.720                                      | 447457               | 349457                        |
| 84             | 150.552              | 6.300                 | 153.702                                  | 6.300                                      | 465664                  | 3.668             | 7.069            | 6.950                                      | 465664               | 367664                        |
| 85             | 144.252              | 6.300                 | 147.402                                  | 6.300                                      | 485387                  | 3.778             | 7.324            | 7.196                                      | 485387               | 387387                        |
| 86             | 137.952              | 6.300                 | 141.102                                  | 6.300                                      | 506825                  | 3.897             | 7.601            | 7.463                                      | 506824               | 408824                        |
| 87             | 131.652              | 6.300                 | 134.802                                  | 6.300                                      | 530212                  | 4.025             | 7.900            | 7.751                                      | 530211               | 432211                        |
| 88             | 125.352              | 6.300                 | 128.502                                  | 6.300                                      | 555828                  | 4.163             | 8.227            | 8.064                                      | 555827               | 457827                        |
| 89             | 119.052              | 6.300                 | 122.202                                  | 6.300                                      | 584009                  | 4.312             | 8.583            | 8.405                                      | 584009               | 486009                        |
| 90             | 112.752              | 6.300                 | 115.902                                  | 6.300                                      | 615164                  | 4.475             | 8.974            | 8.778                                      | 615163               | 517163                        |

ケース1:開口径φ100 - 3

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 91             | 106.452              | 6.300                 | 109.602                           | 6.300                               | 649793                  | 4.654                    | 9.405            | 9.189                               | 649792               | 551792                        |
| 92             | 100.152              | 6.300                 | 103.302                           | 6.300                               | 688516                  | 4.850                    | 9.883            | 9.644                               | 688516               | 590516                        |
| 93             | 93.852               | 6.300                 | 97.002                            | 6.300                               | 732112                  | 5.068                    | 10.417           | 10.150                              | 732111               | 634111                        |
| 94             | 87.552               | 6.300                 | 90.702                            | 6.300                               | 781571                  | 5.310                    | 11.018           | 10.718                              | 781570               | 683570                        |
| 95             | 81.252               | 6.300                 | 84.402                            | 6.300                               | 838174                  | 5.582                    | 11.698           | 11.358                              | 838174               | 740174                        |
| 96             | 74.952               | 6.300                 | 78.102                            | 6.300                               | 903610                  | 5.890                    | 12.477           | 12.088                              | 903609               | 805609                        |
| 97             | 68.652               | 6.300                 | 71.802                            | 6.300                               | 980150                  | 6.242                    | 13.378           | 12.927                              | 980150               | 882150                        |
| 98             | 62.352               | 6.300                 | 65.502                            | 6.300                               | 1070928                 | 6.650                    | 14.433           | 13.905                              | 1070927              | 972927                        |
| 99             | 56.052               | 6.300                 | 59.202                            | 6.300                               | 1180394                 | 7.128                    | 15.688           | 15.061                              | 1180393              | 1082393                       |
| 100            | 49.752               | 6.300                 | 52.902                            | 6.300                               | 1315099                 | 7.700                    | 17.211           | 16.450                              | 1315099              | 1217099                       |
| 101            | 43.452               | 6.300                 | 46.602                            | 6.300                               | 1485114                 | 8.399                    | 19.101           | 18.156                              | 1485114              | 1387114                       |
| 102            | 37.152               | 6.300                 | 40.302                            | 6.300                               | 1706799                 | 9.277                    | 21.521           | 20.311                              | 1706798              | 1608798                       |
| 103            | 30.852               | 6.300                 | 34.002                            | 6.300                               | 2008706                 | 10.421                   | 24.745           | 23.133                              | 2008706              | 1910706                       |
| 104            | 24.552               | 6.300                 | 27.702                            | 6.300                               | 2445793                 | 11.995                   | 29.293           | 27.019                              | 2445792              | 2347792                       |
| 105            | 18.252               | 6.300                 | 21.402                            | 6.300                               | 3140001                 | 14.338                   | 36.289           | 32.791                              | 3140000              | 3042000                       |
| 106            | 11.952               | 6.300                 | 15.102                            | 6.300                               | 4431365                 | 18.338                   | 48.755           | 42.522                              | 4431365              | 4333365                       |
| 107            | 5.652                | 6.300                 | 8.802                             | 6.300                               | 7799911                 | 27.463                   | 79.157           | 63.956                              | 7799911              | 7701911                       |

ケース2:開口径φ150 - 1

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 1              | 673.452              | 6.300                 | 676.602                                  | 3.150                                      | 98562                   | 1.210             | 0.941            | 0.471                                      | 98561                | 561                           |
| 2              | 667.152              | 6.300                 | 670.302                                  | 6.300                                      | 99649                   | 1.219             | 1.609            | 1.275                                      | 99649                | 1649                          |
| 3              | 660.852              | 6.300                 | 664.002                                  | 6.300                                      | 100665                  | 1.228             | 2.042            | 1.825                                      | 100664               | 2664                          |
| 4              | 654.552              | 6.300                 | 657.702                                  | 6.300                                      | 101636                  | 1.237             | 2.381            | 2.211                                      | 101635               | 3635                          |
| 5              | 648.252              | 6.300                 | 651.402                                  | 6.300                                      | 102573                  | 1.245             | 2.666            | 2.523                                      | 102572               | 4572                          |
| 6              | 641.952              | 6.300                 | 645.102                                  | 6.300                                      | 103483                  | 1.253             | 2.914            | 2.790                                      | 103482               | 5482                          |
| 7              | 635.652              | 6.300                 | 638.802                                  | 6.300                                      | 104370                  | 1.260             | 3.136            | 3.025                                      | 104370               | 6370                          |
| 8              | 629.352              | 6.300                 | 632.502                                  | 6.300                                      | 105238                  | 1.268             | 3.338            | 3.237                                      | 105237               | 7237                          |
| 9              | 623.052              | 6.300                 | 626.202                                  | 6.300                                      | 106089                  | 1.275             | 3.524            | 3.431                                      | 106089               | 8089                          |
| 10             | 616.752              | 6.300                 | 619.902                                  | 6.300                                      | 106926                  | 1.282             | 3.696            | 3.610                                      | 106925               | 8925                          |
| 11             | 610.452              | 6.300                 | 613.602                                  | 6.300                                      | 107750                  | 1.289             | 3.858            | 3.777                                      | 107750               | 9750                          |
| 12             | 604.152              | 6.300                 | 607.302                                  | 6.300                                      | 108563                  | 1.296             | 4.010            | 3.934                                      | 108562               | 10562                         |
| 13             | 597.852              | 6.300                 | 601.002                                  | 6.300                                      | 109366                  | 1.303             | 4.154            | 4.082                                      | 109365               | 11365                         |
| 14             | 591.552              | 6.300                 | 594.702                                  | 6.300                                      | 110159                  | 1.310             | 4.291            | 4.222                                      | 110159               | 12159                         |
| 15             | 585.252              | 6.300                 | 588.402                                  | 6.300                                      | 110944                  | 1.317             | 4.421            | 4.356                                      | 110944               | 12944                         |
| 16             | 578.952              | 6.300                 | 582.102                                  | 6.300                                      | 111722                  | 1.323             | 4.546            | 4.484                                      | 111721               | 13721                         |
| 17             | 572.652              | 6.300                 | 575.802                                  | 6.300                                      | 112493                  | 1.330             | 4.666            | 4.606                                      | 112493               | 14493                         |
| 18             | 566.352              | 6.300                 | 569.502                                  | 6.300                                      | 113258                  | 1.336             | 4.782            | 4.724                                      | 113258               | 15258                         |
| 19             | 560.052              | 6.300                 | 563.202                                  | 6.300                                      | 114018                  | 1.343             | 4.894            | 4.838                                      | 114017               | 16017                         |
| 20             | 553.752              | 6.300                 | 556.902                                  | 6.300                                      | 114773                  | 1.349             | 5.001            | 4.947                                      | 114773               | 16773                         |
| 21             | 547.452              | 6.300                 | 550.602                                  | 6.300                                      | 115524                  | 1.355             | 5.106            | 5.054                                      | 115523               | 17523                         |
| 22             | 541.152              | 6.300                 | 544.302                                  | 6.300                                      | 116271                  | 1.362             | 5.207            | 5.157                                      | 116270               | 18270                         |
| 23             | 534.852              | 6.300                 | 538.002                                  | 6.300                                      | 117014                  | 1.368             | 5.306            | 5.257                                      | 117014               | 19014                         |
| 24             | 528.552              | 6.300                 | 531.702                                  | 6.300                                      | 117755                  | 1.374             | 5.402            | 5.354                                      | 117754               | 19754                         |
| 25             | 522.252              | 6.300                 | 525.402                                  | 6.300                                      | 118493                  | 1.380             | 5.496            | 5.449                                      | 118492               | 20492                         |
| 26             | 515.952              | 6.300                 | 519.102                                  | 6.300                                      | 119229                  | 1.386             | 5.587            | 5.541                                      | 119228               | 21228                         |
| 27             | 509.652              | 6.300                 | 512.802                                  | 6.300                                      | 119963                  | 1.392             | 5.676            | 5.632                                      | 119962               | 21962                         |
| 28             | 503.352              | 6.300                 | 506.502                                  | 6.300                                      | 120695                  | 1.398             | 5.764            | 5.720                                      | 120695               | 22695                         |
| 29             | 497.052              | 6.300                 | 500.202                                  | 6.300                                      | 121426                  | 1.404             | 5.849            | 5.806                                      | 121426               | 23426                         |
| 30             | 490.752              | 6.300                 | 493.902                                  | 6.300                                      | 122156                  | 1.410             | 5.933            | 5.891                                      | 122156               | 24156                         |
| 31             | 484.452              | 6.300                 | 487.602                                  | 6.300                                      | 122886                  | 1.416             | 6.015            | 5.974                                      | 122885               | 24885                         |
| 32             | 478.152              | 6.300                 | 481.302                                  | 6.300                                      | 123616                  | 1.422             | 6.096            | 6.056                                      | 123615               | 25615                         |
| 33             | 471.852              | 6.300                 | 475.002                                  | 6.300                                      | 124346                  | 1.428             | 6.175            | 6.136                                      | 124345               | 26345                         |
| 34             | 465.552              | 6.300                 | 468.702                                  | 6.300                                      | 125076                  | 1.434             | 6.254            | 6.215                                      | 125076               | 27076                         |
| 35             | 459.252              | 6.300                 | 462.402                                  | 6.300                                      | 125807                  | 1.440             | 6.330            | 6.292                                      | 125806               | 27806                         |
| 36             | 452.952              | 6.300                 | 456.102                                  | 6.300                                      | 126539                  | 1.446             | 6.406            | 6.368                                      | 126538               | 28538                         |
| 37             | 446.652              | 6.300                 | 449.802                                  | 6.300                                      | 127272                  | 1.452             | 6.481            | 6.444                                      | 127271               | 29271                         |
| 38             | 440.352              | 6.300                 | 443.502                                  | 6.300                                      | 128006                  | 1.458             | 6.555            | 6.518                                      | 128006               | 30006                         |
| 39             | 434.052              | 6.300                 | 437.202                                  | 6.300                                      | 128742                  | 1.464             | 6.627            | 6.591                                      | 128742               | 30742                         |
| 40             | 427.752              | 6.300                 | 430.902                                  | 6.300                                      | 129480                  | 1.470             | 6.699            | 6.663                                      | 129480               | 31480                         |
| 41             | 421.452              | 6.300                 | 424.602                                  | 6.300                                      | 130221                  | 1.476             | 6.770            | 6.735                                      | 130220               | 32220                         |
| 42             | 415.152              | 6.300                 | 418.302                                  | 6.300                                      | 130964                  | 1.482             | 6.840            | 6.805                                      | 130964               | 32964                         |
| 43             | 408.852              | 6.300                 | 412.002                                  | 6.300                                      | 131710                  | 1.488             | 6.910            | 6.875                                      | 131710               | 33710                         |
| 44             | 402.552              | 6.300                 | 405.702                                  | 6.300                                      | 132460                  | 1.494             | 6.979            | 6.944                                      | 132459               | 34459                         |
| 45             | 396.252              | 6.300                 | 399.402                                  | 6.300                                      | 133213                  | 1.500             | 7.047            | 7.013                                      | 133213               | 35213                         |

ケース2:開口径φ150 - 2

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 46             | 389.952              | 6.300                 | 393.102                                  | 6.300                                      | 133970                  | 1.507             | 7.115            | 7.081                                      | 133970               | 35970                         |
| 47             | 383.652              | 6.300                 | 386.802                                  | 6.300                                      | 134731                  | 1.513             | 7.182            | 7.148                                      | 134731               | 36731                         |
| 48             | 377.352              | 6.300                 | 380.502                                  | 6.300                                      | 135497                  | 1.519             | 7.249            | 7.215                                      | 135496               | 37496                         |
| 49             | 371.052              | 6.300                 | 374.202                                  | 6.300                                      | 136268                  | 1.525             | 7.315            | 7.282                                      | 136267               | 38267                         |
| 50             | 364.752              | 6.300                 | 367.902                                  | 6.300                                      | 137044                  | 1.531             | 7.381            | 7.348                                      | 137044               | 39044                         |
| 51             | 358.452              | 6.300                 | 361.602                                  | 6.300                                      | 137826                  | 1.537             | 7.446            | 7.413                                      | 137825               | 39825                         |
| 52             | 352.152              | 6.300                 | 355.302                                  | 6.300                                      | 138614                  | 1.544             | 7.511            | 7.478                                      | 138613               | 40613                         |
| 53             | 345.852              | 6.300                 | 349.002                                  | 6.300                                      | 139408                  | 1.550             | 7.576            | 7.543                                      | 139408               | 41408                         |
| 54             | 339.552              | 6.300                 | 342.702                                  | 6.300                                      | 140209                  | 1.556             | 7.640            | 7.608                                      | 140208               | 42208                         |
| 55             | 333.252              | 6.300                 | 336.402                                  | 6.300                                      | 141017                  | 1.563             | 7.705            | 7.672                                      | 141017               | 43017                         |
| 56             | 326.952              | 6.300                 | 330.102                                  | 6.300                                      | 141833                  | 1.569             | 7.769            | 7.737                                      | 141832               | 43832                         |
| 57             | 320.652              | 6.300                 | 323.802                                  | 6.300                                      | 142657                  | 1.576             | 7.833            | 7.801                                      | 142657               | 44657                         |
| 58             | 314.352              | 6.300                 | 317.502                                  | 6.300                                      | 143490                  | 1.582             | 7.896            | 7.864                                      | 143489               | 45489                         |
| 59             | 308.052              | 6.300                 | 311.202                                  | 6.300                                      | 144332                  | 1.589             | 7.960            | 7.928                                      | 144331               | 46331                         |
| 60             | 301.752              | 6.300                 | 304.902                                  | 6.300                                      | 145184                  | 1.596             | 8.024            | 7.992                                      | 145183               | 47183                         |
| 61             | 295.452              | 6.300                 | 298.602                                  | 6.300                                      | 146046                  | 1.602             | 8.088            | 8.056                                      | 146045               | 48045                         |
| 62             | 289.152              | 6.300                 | 292.302                                  | 6.300                                      | 146919                  | 1.609             | 8.151            | 8.119                                      | 146918               | 48918                         |
| 63             | 282.852              | 6.300                 | 286.002                                  | 6.300                                      | 147804                  | 1.616             | 8.215            | 8.183                                      | 147803               | 49803                         |
| 64             | 276.552              | 6.300                 | 279.702                                  | 6.300                                      | 148701                  | 1.623             | 8.279            | 8.247                                      | 148700               | 50700                         |
| 65             | 270.252              | 6.300                 | 273.402                                  | 6.300                                      | 149611                  | 1.630             | 8.343            | 8.311                                      | 149610               | 51610                         |
| 66             | 263.952              | 6.300                 | 267.102                                  | 6.300                                      | 150535                  | 1.637             | 8.407            | 8.375                                      | 150534               | 52534                         |
| 67             | 257.652              | 6.300                 | 260.802                                  | 6.300                                      | 151473                  | 1.645             | 8.472            | 8.440                                      | 151473               | 53473                         |
| 68             | 251.352              | 6.300                 | 254.502                                  | 6.300                                      | 152427                  | 1.652             | 8.537            | 8.504                                      | 152426               | 54426                         |
| 69             | 245.052              | 6.300                 | 248.202                                  | 6.300                                      | 153398                  | 1.660             | 8.602            | 8.569                                      | 153397               | 55397                         |
| 70             | 238.752              | 6.300                 | 241.902                                  | 6.300                                      | 154386                  | 1.667             | 8.667            | 8.634                                      | 154386               | 56386                         |
| 71             | 232.452              | 6.300                 | 235.602                                  | 6.300                                      | 155393                  | 1.675             | 8.733            | 8.700                                      | 155393               | 57393                         |
| 72             | 226.152              | 6.300                 | 229.302                                  | 6.300                                      | 156420                  | 1.683             | 8.799            | 8.766                                      | 156420               | 58420                         |
| 73             | 219.852              | 6.300                 | 223.002                                  | 6.300                                      | 157468                  | 1.691             | 8.866            | 8.833                                      | 157468               | 59468                         |
| 74             | 213.552              | 6.300                 | 216.702                                  | 6.300                                      | 158539                  | 1.699             | 8.934            | 8.900                                      | 158539               | 60539                         |
| 75             | 207.252              | 6.300                 | 210.402                                  | 6.300                                      | 159635                  | 1.707             | 9.002            | 8.968                                      | 159634               | 61634                         |
| 76             | 200.952              | 6.300                 | 204.102                                  | 6.300                                      | 160757                  | 1.716             | 9.071            | 9.037                                      | 160757               | 62757                         |
| 77             | 194.652              | 6.300                 | 197.802                                  | 6.300                                      | 161907                  | 1.725             | 9.141            | 9.106                                      | 161907               | 63907                         |
| 78             | 188.352              | 6.300                 | 191.502                                  | 6.300                                      | 163088                  | 1.734             | 9.212            | 9.176                                      | 163087               | 65087                         |
| 79             | 182.052              | 6.300                 | 185.202                                  | 6.300                                      | 164301                  | 1.743             | 9.284            | 9.248                                      | 164301               | 66301                         |
| 80             | 175.752              | 6.300                 | 178.902                                  | 6.300                                      | 165550                  | 1.752             | 9.357            | 9.320                                      | 165549               | 67549                         |
| 81             | 169.452              | 6.300                 | 172.602                                  | 6.300                                      | 166837                  | 1.762             | 9.431            | 9.394                                      | 166836               | 68836                         |
| 82             | 163.152              | 6.300                 | 166.302                                  | 6.300                                      | 168165                  | 1.772             | 9.506            | 9.469                                      | 168165               | 70165                         |
| 83             | 156.852              | 6.300                 | 160.002                                  | 6.300                                      | 169539                  | 1.782             | 9.583            | 9.545                                      | 169538               | 71538                         |
| 84             | 150.552              | 6.300                 | 153.702                                  | 6.300                                      | 170962                  | 1.793             | 9.662            | 9.623                                      | 170962               | 72962                         |
| 85             | 144.252              | 6.300                 | 147.402                                  | 6.300                                      | 172440                  | 1.804             | 9.743            | 9.702                                      | 172439               | 74439                         |
| 86             | 137.952              | 6.300                 | 141.102                                  | 6.300                                      | 173977                  | 1.816             | 9.825            | 9.784                                      | 173977               | 75977                         |
| 87             | 131.652              | 6.300                 | 134.802                                  | 6.300                                      | 175580                  | 1.828             | 9.910            | 9.868                                      | 175580               | 77580                         |
| 88             | 125.352              | 6.300                 | 128.502                                  | 6.300                                      | 177257                  | 1.840             | 9.998            | 9.954                                      | 177256               | 79256                         |
| 89             | 119.052              | 6.300                 | 122.202                                  | 6.300                                      | 179015                  | 1.853             | 10.088           | 10.043                                     | 179015               | 81015                         |
| 90             | 112.752              | 6.300                 | 115.902                                  | 6.300                                      | 180865                  | 1.867             | 10.181           | 10.135                                     | 180865               | 82865                         |

ケース2:開口径φ150 - 3

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 91             | 106.452              | 6.300                 | 109.602                           | 6.300                               | 182819                  | 1.881                    | 10.278           | 10.230                              | 182818               | 84818                         |
| 92             | 100.152              | 6.300                 | 103.302                           | 6.300                               | 184891                  | 1.896                    | 10.379           | 10.329                              | 184890               | 86890                         |
| 93             | 93.852               | 6.300                 | 97.002                            | 6.300                               | 187099                  | 1.912                    | 10.484           | 10.432                              | 187099               | 89099                         |
| 94             | 87.552               | 6.300                 | 90.702                            | 6.300                               | 189463                  | 1.930                    | 10.597           | 10.540                              | 189462               | 91462                         |
| 95             | 81.252               | 6.300                 | 84.402                            | 6.300                               | 192004                  | 1.948                    | 10.719           | 10.658                              | 192004               | 94004                         |
| 96             | 74.952               | 6.300                 | 78.102                            | 6.300                               | 194751                  | 1.968                    | 10.850           | 10.784                              | 194750               | 96750                         |
| 97             | 68.652               | 6.300                 | 71.802                            | 6.300                               | 197739                  | 1.990                    | 10.993           | 10.921                              | 197738               | 99738                         |
| 98             | 62.352               | 6.300                 | 65.502                            | 6.300                               | 201013                  | 2.013                    | 11.148           | 11.071                              | 201012               | 103012                        |
| 99             | 56.052               | 6.300                 | 59.202                            | 6.300                               | 204633                  | 2.039                    | 11.320           | 11.234                              | 204632               | 106632                        |
| 100            | 49.752               | 6.300                 | 52.902                            | 6.300                               | 208679                  | 2.068                    | 11.512           | 11.416                              | 208679               | 110679                        |
| 101            | 43.452               | 6.300                 | 46.602                            | 6.300                               | 213264                  | 2.100                    | 11.728           | 11.620                              | 213263               | 115263                        |
| 102            | 37.152               | 6.300                 | 40.302                            | 6.300                               | 218551                  | 2.137                    | 11.977           | 11.853                              | 218550               | 120550                        |
| 103            | 30.852               | 6.300                 | 34.002                            | 6.300                               | 224792                  | 2.180                    | 12.270           | 12.123                              | 224792               | 126792                        |
| 104            | 24.552               | 6.300                 | 27.702                            | 6.300                               | 232405                  | 2.233                    | 12.625           | 12.447                              | 232405               | 134405                        |
| 105            | 18.252               | 6.300                 | 21.402                            | 6.300                               | 242165                  | 2.299                    | 13.078           | 12.852                              | 242165               | 144165                        |
| 106            | 11.952               | 6.300                 | 15.102                            | 6.300                               | 255774                  | 2.391                    | 13.706           | 13.392                              | 255773               | 157773                        |
| 107            | 5.652                | 6.300                 | 8.802                             | 6.300                               | 278362                  | 2.540                    | 14.737           | 14.221                              | 278362               | 180362                        |



ケース3:開口径φ200 - 1

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 1              | 673.452              | 6.300                 | 676.602                                  | 3.150                                      | 98523                   | 1.210             | 1.394            | 0.697                                      | 98523                | 523                           |
| 2              | 667.152              | 6.300                 | 670.302                                  | 6.300                                      | 99506                   | 1.218             | 2.361            | 1.878                                      | 99506                | 1506                          |
| 3              | 660.852              | 6.300                 | 664.002                                  | 6.300                                      | 100375                  | 1.226             | 2.961            | 2.661                                      | 100375               | 2375                          |
| 4              | 654.552              | 6.300                 | 657.702                                  | 6.300                                      | 101171                  | 1.233             | 3.416            | 3.188                                      | 101170               | 3170                          |
| 5              | 648.252              | 6.300                 | 651.402                                  | 6.300                                      | 101910                  | 1.239             | 3.788            | 3.602                                      | 101910               | 3910                          |
| 6              | 641.952              | 6.300                 | 645.102                                  | 6.300                                      | 102603                  | 1.245             | 4.105            | 3.947                                      | 102603               | 4603                          |
| 7              | 635.652              | 6.300                 | 638.802                                  | 6.300                                      | 103258                  | 1.251             | 4.383            | 4.244                                      | 103257               | 5257                          |
| 8              | 629.352              | 6.300                 | 632.502                                  | 6.300                                      | 103879                  | 1.256             | 4.629            | 4.506                                      | 103878               | 5878                          |
| 9              | 623.052              | 6.300                 | 626.202                                  | 6.300                                      | 104470                  | 1.261             | 4.851            | 4.740                                      | 104469               | 6469                          |
| 10             | 616.752              | 6.300                 | 619.902                                  | 6.300                                      | 105034                  | 1.266             | 5.053            | 4.952                                      | 105033               | 7033                          |
| 11             | 610.452              | 6.300                 | 613.602                                  | 6.300                                      | 105573                  | 1.271             | 5.239            | 5.146                                      | 105573               | 7573                          |
| 12             | 604.152              | 6.300                 | 607.302                                  | 6.300                                      | 106090                  | 1.275             | 5.410            | 5.324                                      | 106090               | 8090                          |
| 13             | 597.852              | 6.300                 | 601.002                                  | 6.300                                      | 106587                  | 1.280             | 5.569            | 5.489                                      | 106586               | 8586                          |
| 14             | 591.552              | 6.300                 | 594.702                                  | 6.300                                      | 107065                  | 1.284             | 5.717            | 5.643                                      | 107064               | 9064                          |
| 15             | 585.252              | 6.300                 | 588.402                                  | 6.300                                      | 107525                  | 1.288             | 5.856            | 5.786                                      | 107524               | 9524                          |
| 16             | 578.952              | 6.300                 | 582.102                                  | 6.300                                      | 107968                  | 1.291             | 5.986            | 5.921                                      | 107968               | 9968                          |
| 17             | 572.652              | 6.300                 | 575.802                                  | 6.300                                      | 108396                  | 1.295             | 6.108            | 6.047                                      | 108395               | 10395                         |
| 18             | 566.352              | 6.300                 | 569.502                                  | 6.300                                      | 108809                  | 1.299             | 6.224            | 6.166                                      | 108808               | 10808                         |
| 19             | 560.052              | 6.300                 | 563.202                                  | 6.300                                      | 109208                  | 1.302             | 6.334            | 6.279                                      | 109208               | 11208                         |
| 20             | 553.752              | 6.300                 | 556.902                                  | 6.300                                      | 109594                  | 1.305             | 6.438            | 6.386                                      | 109593               | 11593                         |
| 21             | 547.452              | 6.300                 | 550.602                                  | 6.300                                      | 109967                  | 1.308             | 6.537            | 6.487                                      | 109967               | 11967                         |
| 22             | 541.152              | 6.300                 | 544.302                                  | 6.300                                      | 110328                  | 1.311             | 6.630            | 6.583                                      | 110328               | 12328                         |
| 23             | 534.852              | 6.300                 | 538.002                                  | 6.300                                      | 110678                  | 1.314             | 6.720            | 6.675                                      | 110678               | 12678                         |
| 24             | 528.552              | 6.300                 | 531.702                                  | 6.300                                      | 111017                  | 1.317             | 6.805            | 6.763                                      | 111017               | 13017                         |
| 25             | 522.252              | 6.300                 | 525.402                                  | 6.300                                      | 111346                  | 1.320             | 6.887            | 6.846                                      | 111345               | 13345                         |
| 26             | 515.952              | 6.300                 | 519.102                                  | 6.300                                      | 111665                  | 1.323             | 6.965            | 6.926                                      | 111664               | 13664                         |
| 27             | 509.652              | 6.300                 | 512.802                                  | 6.300                                      | 111974                  | 1.325             | 7.040            | 7.003                                      | 111974               | 13974                         |
| 28             | 503.352              | 6.300                 | 506.502                                  | 6.300                                      | 112274                  | 1.328             | 7.112            | 7.076                                      | 112273               | 14273                         |
| 29             | 497.052              | 6.300                 | 500.202                                  | 6.300                                      | 112565                  | 1.330             | 7.180            | 7.146                                      | 112565               | 14565                         |
| 30             | 490.752              | 6.300                 | 493.902                                  | 6.300                                      | 112848                  | 1.333             | 7.247            | 7.213                                      | 112847               | 14847                         |
| 31             | 484.452              | 6.300                 | 487.602                                  | 6.300                                      | 113122                  | 1.335             | 7.310            | 7.278                                      | 113122               | 15122                         |
| 32             | 478.152              | 6.300                 | 481.302                                  | 6.300                                      | 113388                  | 1.337             | 7.371            | 7.340                                      | 113388               | 15388                         |
| 33             | 471.852              | 6.300                 | 475.002                                  | 6.300                                      | 113646                  | 1.339             | 7.429            | 7.400                                      | 113646               | 15646                         |
| 34             | 465.552              | 6.300                 | 468.702                                  | 6.300                                      | 113897                  | 1.342             | 7.485            | 7.457                                      | 113897               | 15897                         |
| 35             | 459.252              | 6.300                 | 462.402                                  | 6.300                                      | 114141                  | 1.344             | 7.540            | 7.512                                      | 114140               | 16140                         |
| 36             | 452.952              | 6.300                 | 456.102                                  | 6.300                                      | 114378                  | 1.346             | 7.592            | 7.566                                      | 114377               | 16377                         |
| 37             | 446.652              | 6.300                 | 449.802                                  | 6.300                                      | 114608                  | 1.348             | 7.642            | 7.617                                      | 114607               | 16607                         |
| 38             | 440.352              | 6.300                 | 443.502                                  | 6.300                                      | 114831                  | 1.349             | 7.691            | 7.666                                      | 114831               | 16831                         |
| 39             | 434.052              | 6.300                 | 437.202                                  | 6.300                                      | 115048                  | 1.351             | 7.737            | 7.714                                      | 115047               | 17047                         |
| 40             | 427.752              | 6.300                 | 430.902                                  | 6.300                                      | 115258                  | 1.353             | 7.782            | 7.760                                      | 115258               | 17258                         |
| 41             | 421.452              | 6.300                 | 424.602                                  | 6.300                                      | 115462                  | 1.355             | 7.825            | 7.804                                      | 115462               | 17462                         |
| 42             | 415.152              | 6.300                 | 418.302                                  | 6.300                                      | 115660                  | 1.356             | 7.867            | 7.846                                      | 115660               | 17660                         |
| 43             | 408.852              | 6.300                 | 412.002                                  | 6.300                                      | 115853                  | 1.358             | 7.908            | 7.887                                      | 115852               | 17852                         |
| 44             | 402.552              | 6.300                 | 405.702                                  | 6.300                                      | 116040                  | 1.360             | 7.947            | 7.927                                      | 116039               | 18039                         |
| 45             | 396.252              | 6.300                 | 399.402                                  | 6.300                                      | 116221                  | 1.361             | 7.984            | 7.965                                      | 116221               | 18221                         |

ケース3:開口径φ200 - 2

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρ i(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|--------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 46             | 389.952              | 6.300                 | 393.102                                  | 6.300                                      | 116397                  | 1.363              | 8.020            | 8.002                                      | 116397               | 18397                         |
| 47             | 383.652              | 6.300                 | 386.802                                  | 6.300                                      | 116568                  | 1.364              | 8.055            | 8.038                                      | 116567               | 18567                         |
| 48             | 377.352              | 6.300                 | 380.502                                  | 6.300                                      | 116734                  | 1.365              | 8.089            | 8.072                                      | 116733               | 18733                         |
| 49             | 371.052              | 6.300                 | 374.202                                  | 6.300                                      | 116895                  | 1.367              | 8.122            | 8.105                                      | 116894               | 18894                         |
| 50             | 364.752              | 6.300                 | 367.902                                  | 6.300                                      | 117051                  | 1.368              | 8.153            | 8.137                                      | 117050               | 19050                         |
| 51             | 358.452              | 6.300                 | 361.602                                  | 6.300                                      | 117202                  | 1.369              | 8.183            | 8.168                                      | 117202               | 19202                         |
| 52             | 352.152              | 6.300                 | 355.302                                  | 6.300                                      | 117348                  | 1.371              | 8.213            | 8.198                                      | 117348               | 19348                         |
| 53             | 345.852              | 6.300                 | 349.002                                  | 6.300                                      | 117490                  | 1.372              | 8.241            | 8.227                                      | 117489               | 19489                         |
| 54             | 339.552              | 6.300                 | 342.702                                  | 6.300                                      | 117627                  | 1.373              | 8.268            | 8.254                                      | 117627               | 19627                         |
| 55             | 333.252              | 6.300                 | 336.402                                  | 6.300                                      | 117760                  | 1.374              | 8.294            | 8.281                                      | 117759               | 19759                         |
| 56             | 326.952              | 6.300                 | 330.102                                  | 6.300                                      | 117889                  | 1.375              | 8.319            | 8.307                                      | 117888               | 19888                         |
| 57             | 320.652              | 6.300                 | 323.802                                  | 6.300                                      | 118013                  | 1.376              | 8.344            | 8.332                                      | 118013               | 20013                         |
| 58             | 314.352              | 6.300                 | 317.502                                  | 6.300                                      | 118133                  | 1.377              | 8.367            | 8.355                                      | 118133               | 20133                         |
| 59             | 308.052              | 6.300                 | 311.202                                  | 6.300                                      | 118249                  | 1.378              | 8.390            | 8.378                                      | 118249               | 20249                         |
| 60             | 301.752              | 6.300                 | 304.902                                  | 6.300                                      | 118361                  | 1.379              | 8.411            | 8.400                                      | 118361               | 20361                         |
| 61             | 295.452              | 6.300                 | 298.602                                  | 6.300                                      | 118470                  | 1.380              | 8.432            | 8.422                                      | 118469               | 20469                         |
| 62             | 289.152              | 6.300                 | 292.302                                  | 6.300                                      | 118575                  | 1.381              | 8.453            | 8.442                                      | 118574               | 20574                         |
| 63             | 282.852              | 6.300                 | 286.002                                  | 6.300                                      | 118676                  | 1.382              | 8.472            | 8.462                                      | 118675               | 20675                         |
| 64             | 276.552              | 6.300                 | 279.702                                  | 6.300                                      | 118773                  | 1.382              | 8.491            | 8.481                                      | 118773               | 20773                         |
| 65             | 270.252              | 6.300                 | 273.402                                  | 6.300                                      | 118867                  | 1.383              | 8.508            | 8.499                                      | 118866               | 20866                         |
| 66             | 263.952              | 6.300                 | 267.102                                  | 6.300                                      | 118957                  | 1.384              | 8.526            | 8.517                                      | 118957               | 20957                         |
| 67             | 257.652              | 6.300                 | 260.802                                  | 6.300                                      | 119044                  | 1.385              | 8.542            | 8.534                                      | 119043               | 21043                         |
| 68             | 251.352              | 6.300                 | 254.502                                  | 6.300                                      | 119127                  | 1.385              | 8.558            | 8.550                                      | 119127               | 21127                         |
| 69             | 245.052              | 6.300                 | 248.202                                  | 6.300                                      | 119207                  | 1.386              | 8.573            | 8.565                                      | 119207               | 21207                         |
| 70             | 238.752              | 6.300                 | 241.902                                  | 6.300                                      | 119284                  | 1.387              | 8.587            | 8.580                                      | 119283               | 21283                         |
| 71             | 232.452              | 6.300                 | 235.602                                  | 6.300                                      | 119358                  | 1.387              | 8.601            | 8.594                                      | 119357               | 21357                         |
| 72             | 226.152              | 6.300                 | 229.302                                  | 6.300                                      | 119429                  | 1.388              | 8.615            | 8.608                                      | 119428               | 21428                         |
| 73             | 219.852              | 6.300                 | 223.002                                  | 6.300                                      | 119497                  | 1.388              | 8.627            | 8.621                                      | 119496               | 21496                         |
| 74             | 213.552              | 6.300                 | 216.702                                  | 6.300                                      | 119561                  | 1.389              | 8.639            | 8.633                                      | 119561               | 21561                         |
| 75             | 207.252              | 6.300                 | 210.402                                  | 6.300                                      | 119623                  | 1.389              | 8.651            | 8.645                                      | 119622               | 21622                         |
| 76             | 200.952              | 6.300                 | 204.102                                  | 6.300                                      | 119682                  | 1.390              | 8.662            | 8.657                                      | 119681               | 21681                         |
| 77             | 194.652              | 6.300                 | 197.802                                  | 6.300                                      | 119738                  | 1.390              | 8.672            | 8.667                                      | 119737               | 21737                         |
| 78             | 188.352              | 6.300                 | 191.502                                  | 6.300                                      | 119791                  | 1.391              | 8.682            | 8.677                                      | 119791               | 21791                         |
| 79             | 182.052              | 6.300                 | 185.202                                  | 6.300                                      | 119841                  | 1.391              | 8.692            | 8.687                                      | 119841               | 21841                         |
| 80             | 175.752              | 6.300                 | 178.902                                  | 6.300                                      | 119889                  | 1.392              | 8.700            | 8.696                                      | 119888               | 21888                         |
| 81             | 169.452              | 6.300                 | 172.602                                  | 6.300                                      | 119934                  | 1.392              | 8.709            | 8.705                                      | 119934               | 21934                         |
| 82             | 163.152              | 6.300                 | 166.302                                  | 6.300                                      | 119977                  | 1.392              | 8.717            | 8.713                                      | 119976               | 21976                         |
| 83             | 156.852              | 6.300                 | 160.002                                  | 6.300                                      | 120017                  | 1.393              | 8.724            | 8.720                                      | 120017               | 22017                         |
| 84             | 150.552              | 6.300                 | 153.702                                  | 6.300                                      | 120055                  | 1.393              | 8.731            | 8.728                                      | 120054               | 22054                         |
| 85             | 144.252              | 6.300                 | 147.402                                  | 6.300                                      | 120090                  | 1.393              | 8.738            | 8.734                                      | 120090               | 22090                         |
| 86             | 137.952              | 6.300                 | 141.102                                  | 6.300                                      | 120123                  | 1.394              | 8.744            | 8.741                                      | 120123               | 22123                         |
| 87             | 131.652              | 6.300                 | 134.802                                  | 6.300                                      | 120154                  | 1.394              | 8.749            | 8.747                                      | 120153               | 22153                         |
| 88             | 125.352              | 6.300                 | 128.502                                  | 6.300                                      | 120183                  | 1.394              | 8.755            | 8.752                                      | 120182               | 22182                         |
| 89             | 119.052              | 6.300                 | 122.202                                  | 6.300                                      | 120209                  | 1.394              | 8.759            | 8.757                                      | 120209               | 22209                         |
| 90             | 112.752              | 6.300                 | 115.902                                  | 6.300                                      | 120233                  | 1.394              | 8.764            | 8.762                                      | 120233               | 22233                         |

ケース3:開口径φ200 - 3

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 91             | 106.452              | 6.300                 | 109.602                           | 6.300                               | 120255                  | 1.395                    | 8.768            | 8.766                               | 120255               | 22255                         |
| 92             | 100.152              | 6.300                 | 103.302                           | 6.300                               | 120276                  | 1.395                    | 8.772            | 8.770                               | 120275               | 22275                         |
| 93             | 93.852               | 6.300                 | 97.002                            | 6.300                               | 120295                  | 1.395                    | 8.775            | 8.774                               | 120294               | 22294                         |
| 94             | 87.552               | 6.300                 | 90.702                            | 6.300                               | 120312                  | 1.395                    | 8.778            | 8.777                               | 120311               | 22311                         |
| 95             | 81.252               | 6.300                 | 84.402                            | 6.300                               | 120327                  | 1.395                    | 8.781            | 8.780                               | 120326               | 22326                         |
| 96             | 74.952               | 6.300                 | 78.102                            | 6.300                               | 120340                  | 1.395                    | 8.783            | 8.782                               | 120340               | 22340                         |
| 97             | 68.652               | 6.300                 | 71.802                            | 6.300                               | 120352                  | 1.395                    | 8.786            | 8.785                               | 120351               | 22351                         |
| 98             | 62.352               | 6.300                 | 65.502                            | 6.300                               | 120362                  | 1.396                    | 8.788            | 8.787                               | 120361               | 22361                         |
| 99             | 56.052               | 6.300                 | 59.202                            | 6.300                               | 120371                  | 1.396                    | 8.789            | 8.788                               | 120370               | 22370                         |
| 100            | 49.752               | 6.300                 | 52.902                            | 6.300                               | 120378                  | 1.396                    | 8.790            | 8.790                               | 120377               | 22377                         |
| 101            | 43.452               | 6.300                 | 46.602                            | 6.300                               | 120384                  | 1.396                    | 8.792            | 8.791                               | 120383               | 22383                         |
| 102            | 37.152               | 6.300                 | 40.302                            | 6.300                               | 120389                  | 1.396                    | 8.792            | 8.792                               | 120388               | 22388                         |
| 103            | 30.852               | 6.300                 | 34.002                            | 6.300                               | 120392                  | 1.396                    | 8.793            | 8.793                               | 120392               | 22392                         |
| 104            | 24.552               | 6.300                 | 27.702                            | 6.300                               | 120394                  | 1.396                    | 8.793            | 8.793                               | 120394               | 22394                         |
| 105            | 18.252               | 6.300                 | 21.402                            | 6.300                               | 120396                  | 1.396                    | 8.794            | 8.794                               | 120395               | 22395                         |
| 106            | 11.952               | 6.300                 | 15.102                            | 6.300                               | 120397                  | 1.396                    | 8.794            | 8.794                               | 120396               | 22396                         |
| 107            | 5.652                | 6.300                 | 8.802                             | 6.300                               | 120397                  | 1.396                    | 8.794            | 8.794                               | 120395               | 22395                         |

ケース4:開口径φ250 - 1

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 1              | 673.452              | 6.300                 | 676.602                           | 3.150                               | 98478                   | 1.209                    | 1.933            | 0.966                               | 98477                | 477                           |
| 2              | 667.152              | 6.300                 | 670.302                           | 6.300                               | 99340                   | 1.217                    | 3.231            | 2.582                               | 99340                | 1340                          |
| 3              | 660.852              | 6.300                 | 664.002                           | 6.300                               | 100043                  | 1.223                    | 3.985            | 3.608                               | 100042               | 2042                          |
| 4              | 654.552              | 6.300                 | 657.702                           | 6.300                               | 100647                  | 1.228                    | 4.531            | 4.258                               | 100647               | 2647                          |
| 5              | 648.252              | 6.300                 | 651.402                           | 6.300                               | 101177                  | 1.233                    | 4.959            | 4.745                               | 101177               | 3177                          |
| 6              | 641.952              | 6.300                 | 645.102                           | 6.300                               | 101649                  | 1.237                    | 5.310            | 5.135                               | 101648               | 3648                          |
| 7              | 635.652              | 6.300                 | 638.802                           | 6.300                               | 102072                  | 1.241                    | 5.606            | 5.458                               | 102072               | 4072                          |
| 8              | 629.352              | 6.300                 | 632.502                           | 6.300                               | 102454                  | 1.244                    | 5.859            | 5.732                               | 102454               | 4454                          |
| 9              | 623.052              | 6.300                 | 626.202                           | 6.300                               | 102800                  | 1.247                    | 6.078            | 5.968                               | 102800               | 4800                          |
| 10             | 616.752              | 6.300                 | 619.902                           | 6.300                               | 103115                  | 1.250                    | 6.271            | 6.175                               | 103115               | 5115                          |
| 11             | 610.452              | 6.300                 | 613.602                           | 6.300                               | 103403                  | 1.252                    | 6.442            | 6.356                               | 103402               | 5402                          |
| 12             | 604.152              | 6.300                 | 607.302                           | 6.300                               | 103666                  | 1.254                    | 6.594            | 6.518                               | 103665               | 5665                          |
| 13             | 597.852              | 6.300                 | 601.002                           | 6.300                               | 103907                  | 1.256                    | 6.730            | 6.662                               | 103906               | 5906                          |
| 14             | 591.552              | 6.300                 | 594.702                           | 6.300                               | 104128                  | 1.258                    | 6.852            | 6.791                               | 104127               | 6127                          |
| 15             | 585.252              | 6.300                 | 588.402                           | 6.300                               | 104331                  | 1.260                    | 6.962            | 6.907                               | 104330               | 6330                          |
| 16             | 578.952              | 6.300                 | 582.102                           | 6.300                               | 104517                  | 1.262                    | 7.061            | 7.012                               | 104517               | 6517                          |
| 17             | 572.652              | 6.300                 | 575.802                           | 6.300                               | 104688                  | 1.263                    | 7.151            | 7.106                               | 104688               | 6688                          |
| 18             | 566.352              | 6.300                 | 569.502                           | 6.300                               | 104845                  | 1.265                    | 7.233            | 7.192                               | 104845               | 6845                          |
| 19             | 560.052              | 6.300                 | 563.202                           | 6.300                               | 104990                  | 1.266                    | 7.307            | 7.270                               | 104989               | 6989                          |
| 20             | 553.752              | 6.300                 | 556.902                           | 6.300                               | 105123                  | 1.267                    | 7.375            | 7.341                               | 105123               | 7123                          |
| 21             | 547.452              | 6.300                 | 550.602                           | 6.300                               | 105246                  | 1.268                    | 7.436            | 7.405                               | 105245               | 7245                          |
| 22             | 541.152              | 6.300                 | 544.302                           | 6.300                               | 105359                  | 1.269                    | 7.493            | 7.464                               | 105359               | 7359                          |
| 23             | 534.852              | 6.300                 | 538.002                           | 6.300                               | 105463                  | 1.270                    | 7.544            | 7.518                               | 105462               | 7462                          |
| 24             | 528.552              | 6.300                 | 531.702                           | 6.300                               | 105559                  | 1.271                    | 7.591            | 7.568                               | 105558               | 7558                          |
| 25             | 522.252              | 6.300                 | 525.402                           | 6.300                               | 105647                  | 1.271                    | 7.634            | 7.613                               | 105646               | 7646                          |
| 26             | 515.952              | 6.300                 | 519.102                           | 6.300                               | 105728                  | 1.272                    | 7.673            | 7.654                               | 105727               | 7727                          |
| 27             | 509.652              | 6.300                 | 512.802                           | 6.300                               | 105802                  | 1.273                    | 7.709            | 7.691                               | 105802               | 7802                          |
| 28             | 503.352              | 6.300                 | 506.502                           | 6.300                               | 105870                  | 1.273                    | 7.742            | 7.725                               | 105870               | 7870                          |
| 29             | 497.052              | 6.300                 | 500.202                           | 6.300                               | 105933                  | 1.274                    | 7.772            | 7.757                               | 105932               | 7932                          |
| 30             | 490.752              | 6.300                 | 493.902                           | 6.300                               | 105991                  | 1.274                    | 7.799            | 7.785                               | 105990               | 7990                          |
| 31             | 484.452              | 6.300                 | 487.602                           | 6.300                               | 106044                  | 1.275                    | 7.824            | 7.812                               | 106043               | 8043                          |
| 32             | 478.152              | 6.300                 | 481.302                           | 6.300                               | 106092                  | 1.275                    | 7.847            | 7.836                               | 106092               | 8092                          |
| 33             | 471.852              | 6.300                 | 475.002                           | 6.300                               | 106136                  | 1.276                    | 7.868            | 7.857                               | 106136               | 8136                          |
| 34             | 465.552              | 6.300                 | 468.702                           | 6.300                               | 106176                  | 1.276                    | 7.887            | 7.877                               | 106176               | 8176                          |
| 35             | 459.252              | 6.300                 | 462.402                           | 6.300                               | 106213                  | 1.276                    | 7.904            | 7.895                               | 106212               | 8212                          |
| 36             | 452.952              | 6.300                 | 456.102                           | 6.300                               | 106247                  | 1.277                    | 7.920            | 7.912                               | 106246               | 8246                          |
| 37             | 446.652              | 6.300                 | 449.802                           | 6.300                               | 106278                  | 1.277                    | 7.934            | 7.927                               | 106277               | 8277                          |
| 38             | 440.352              | 6.300                 | 443.502                           | 6.300                               | 106306                  | 1.277                    | 7.947            | 7.941                               | 106305               | 8305                          |
| 39             | 434.052              | 6.300                 | 437.202                           | 6.300                               | 106331                  | 1.277                    | 7.959            | 7.953                               | 106331               | 8331                          |
| 40             | 427.752              | 6.300                 | 430.902                           | 6.300                               | 106354                  | 1.278                    | 7.969            | 7.964                               | 106354               | 8354                          |
| 41             | 421.452              | 6.300                 | 424.602                           | 6.300                               | 106375                  | 1.278                    | 7.979            | 7.974                               | 106374               | 8374                          |
| 42             | 415.152              | 6.300                 | 418.302                           | 6.300                               | 106394                  | 1.278                    | 7.988            | 7.984                               | 106393               | 8393                          |
| 43             | 408.852              | 6.300                 | 412.002                           | 6.300                               | 106411                  | 1.278                    | 7.996            | 7.992                               | 106411               | 8411                          |
| 44             | 402.552              | 6.300                 | 405.702                           | 6.300                               | 106427                  | 1.278                    | 8.003            | 8.000                               | 106426               | 8426                          |
| 45             | 396.252              | 6.300                 | 399.402                           | 6.300                               | 106441                  | 1.278                    | 8.010            | 8.006                               | 106440               | 8440                          |

ケース4:開口径φ250 - 2

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 46             | 389.952              | 6.300                 | 393.102                                  | 6.300                                      | 106454                  | 1.278             | 8.016            | 8.013                                      | 106453               | 8453                          |
| 47             | 383.652              | 6.300                 | 386.802                                  | 6.300                                      | 106465                  | 1.278             | 8.021            | 8.018                                      | 106465               | 8465                          |
| 48             | 377.352              | 6.300                 | 380.502                                  | 6.300                                      | 106475                  | 1.279             | 8.025            | 8.023                                      | 106475               | 8475                          |
| 49             | 371.052              | 6.300                 | 374.202                                  | 6.300                                      | 106484                  | 1.279             | 8.029            | 8.027                                      | 106484               | 8484                          |
| 50             | 364.752              | 6.300                 | 367.902                                  | 6.300                                      | 106492                  | 1.279             | 8.033            | 8.031                                      | 106492               | 8492                          |
| 51             | 358.452              | 6.300                 | 361.602                                  | 6.300                                      | 106499                  | 1.279             | 8.036            | 8.035                                      | 106499               | 8499                          |
| 52             | 352.152              | 6.300                 | 355.302                                  | 6.300                                      | 106506                  | 1.279             | 8.040            | 8.038                                      | 106505               | 8505                          |
| 53             | 345.852              | 6.300                 | 349.002                                  | 6.300                                      | 106512                  | 1.279             | 8.042            | 8.041                                      | 106511               | 8511                          |
| 54             | 339.552              | 6.300                 | 342.702                                  | 6.300                                      | 106517                  | 1.279             | 8.045            | 8.043                                      | 106517               | 8517                          |
| 55             | 333.252              | 6.300                 | 336.402                                  | 6.300                                      | 106522                  | 1.279             | 8.047            | 8.046                                      | 106521               | 8521                          |
| 56             | 326.952              | 6.300                 | 330.102                                  | 6.300                                      | 106526                  | 1.279             | 8.049            | 8.048                                      | 106525               | 8525                          |
| 57             | 320.652              | 6.300                 | 323.802                                  | 6.300                                      | 106529                  | 1.279             | 8.050            | 8.049                                      | 106529               | 8529                          |
| 58             | 314.352              | 6.300                 | 317.502                                  | 6.300                                      | 106532                  | 1.279             | 8.052            | 8.051                                      | 106532               | 8532                          |
| 59             | 308.052              | 6.300                 | 311.202                                  | 6.300                                      | 106535                  | 1.279             | 8.053            | 8.052                                      | 106534               | 8534                          |
| 60             | 301.752              | 6.300                 | 304.902                                  | 6.300                                      | 106537                  | 1.279             | 8.054            | 8.053                                      | 106537               | 8537                          |
| 61             | 295.452              | 6.300                 | 298.602                                  | 6.300                                      | 106539                  | 1.279             | 8.055            | 8.054                                      | 106539               | 8539                          |
| 62             | 289.152              | 6.300                 | 292.302                                  | 6.300                                      | 106541                  | 1.279             | 8.056            | 8.055                                      | 106540               | 8540                          |
| 63             | 282.852              | 6.300                 | 286.002                                  | 6.300                                      | 106543                  | 1.279             | 8.057            | 8.056                                      | 106542               | 8542                          |
| 64             | 276.552              | 6.300                 | 279.702                                  | 6.300                                      | 106544                  | 1.279             | 8.057            | 8.057                                      | 106544               | 8544                          |
| 65             | 270.252              | 6.300                 | 273.402                                  | 6.300                                      | 106545                  | 1.279             | 8.057            | 8.057                                      | 106545               | 8545                          |
| 66             | 263.952              | 6.300                 | 267.102                                  | 6.300                                      | 106546                  | 1.279             | 8.058            | 8.058                                      | 106545               | 8545                          |
| 67             | 257.652              | 6.300                 | 260.802                                  | 6.300                                      | 106547                  | 1.279             | 8.058            | 8.058                                      | 106546               | 8546                          |
| 68             | 251.352              | 6.300                 | 254.502                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106547               | 8547                          |
| 69             | 245.052              | 6.300                 | 248.202                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 70             | 238.752              | 6.300                 | 241.902                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 71             | 232.452              | 6.300                 | 235.602                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 72             | 226.152              | 6.300                 | 229.302                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 73             | 219.852              | 6.300                 | 223.002                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 74             | 213.552              | 6.300                 | 216.702                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 75             | 207.252              | 6.300                 | 210.402                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 76             | 200.952              | 6.300                 | 204.102                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 77             | 194.652              | 6.300                 | 197.802                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 78             | 188.352              | 6.300                 | 191.502                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 79             | 182.052              | 6.300                 | 185.202                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 80             | 175.752              | 6.300                 | 178.902                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 81             | 169.452              | 6.300                 | 172.602                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 82             | 163.152              | 6.300                 | 166.302                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 83             | 156.852              | 6.300                 | 160.002                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 84             | 150.552              | 6.300                 | 153.702                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 85             | 144.252              | 6.300                 | 147.402                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 86             | 137.952              | 6.300                 | 141.102                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 87             | 131.652              | 6.300                 | 134.802                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 88             | 125.352              | 6.300                 | 128.502                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 89             | 119.052              | 6.300                 | 122.202                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |
| 90             | 112.752              | 6.300                 | 115.902                                  | 6.300                                      | 106548                  | 1.279             | 8.059            | 8.059                                      | 106548               | 8548                          |

ケース4:開口径φ250 - 3

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 91             | 106.452              | 6.300                 | 109.602                           | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 92             | 100.152              | 6.300                 | 103.302                           | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 93             | 93.852               | 6.300                 | 97.002                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 94             | 87.552               | 6.300                 | 90.702                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 95             | 81.252               | 6.300                 | 84.402                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 96             | 74.952               | 6.300                 | 78.102                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 97             | 68.652               | 6.300                 | 71.802                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 98             | 62.352               | 6.300                 | 65.502                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 99             | 56.052               | 6.300                 | 59.202                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 100            | 49.752               | 6.300                 | 52.902                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 101            | 43.452               | 6.300                 | 46.602                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 102            | 37.152               | 6.300                 | 40.302                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 103            | 30.852               | 6.300                 | 34.002                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 104            | 24.552               | 6.300                 | 27.702                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 105            | 18.252               | 6.300                 | 21.402                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 106            | 11.952               | 6.300                 | 15.102                            | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106548               | 8548                          |
| 107            | 5.652                | 6.300                 | 8.802                             | 6.300                               | 106548                  | 1.279                    | 8.059            | 8.059                               | 106547               | 8547                          |

ケース5:開口径φ300 - 1

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | V <sub>AVE</sub><br>(Vi+Vi-1)<br>/2 (m³) | Q <sub>AVE</sub><br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>ρi(kg/m³) | 質量流量<br>mi(kg/s) | m <sub>AVE</sub><br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|------------------------------------------|--------------------------------------------|-------------------------|-------------------|------------------|--------------------------------------------|----------------------|-------------------------------|
| 1              | 673.452              | 6.300                 | 676.602                                  | 3.150                                      | 98428                   | 1.209             | 2.522            | 1.261                                      | 98428                | 428                           |
| 2              | 667.152              | 6.300                 | 670.302                                  | 6.300                                      | 99161                   | 1.215             | 4.149            | 3.336                                      | 99160                | 1160                          |
| 3              | 660.852              | 6.300                 | 664.002                                  | 6.300                                      | 99694                   | 1.220             | 5.007            | 4.578                                      | 99693                | 1693                          |
| 4              | 654.552              | 6.300                 | 657.702                                  | 6.300                                      | 100112                  | 1.223             | 5.586            | 5.297                                      | 100112               | 2112                          |
| 5              | 648.252              | 6.300                 | 651.402                                  | 6.300                                      | 100450                  | 1.226             | 6.013            | 5.800                                      | 100449               | 2449                          |
| 6              | 641.952              | 6.300                 | 645.102                                  | 6.300                                      | 100727                  | 1.229             | 6.341            | 6.177                                      | 100727               | 2727                          |
| 7              | 635.652              | 6.300                 | 638.802                                  | 6.300                                      | 100957                  | 1.231             | 6.600            | 6.470                                      | 100957               | 2957                          |
| 8              | 629.352              | 6.300                 | 632.502                                  | 6.300                                      | 101149                  | 1.233             | 6.809            | 6.704                                      | 101149               | 3149                          |
| 9              | 623.052              | 6.300                 | 626.202                                  | 6.300                                      | 101310                  | 1.234             | 6.978            | 6.894                                      | 101310               | 3310                          |
| 10             | 616.752              | 6.300                 | 619.902                                  | 6.300                                      | 101446                  | 1.235             | 7.119            | 7.049                                      | 101445               | 3445                          |
| 11             | 610.452              | 6.300                 | 613.602                                  | 6.300                                      | 101560                  | 1.236             | 7.234            | 7.176                                      | 101560               | 3560                          |
| 12             | 604.152              | 6.300                 | 607.302                                  | 6.300                                      | 101657                  | 1.237             | 7.331            | 7.282                                      | 101656               | 3656                          |
| 13             | 597.852              | 6.300                 | 601.002                                  | 6.300                                      | 101739                  | 1.238             | 7.411            | 7.371                                      | 101738               | 3738                          |
| 14             | 591.552              | 6.300                 | 594.702                                  | 6.300                                      | 101808                  | 1.238             | 7.478            | 7.445                                      | 101808               | 3808                          |
| 15             | 585.252              | 6.300                 | 588.402                                  | 6.300                                      | 101866                  | 1.239             | 7.534            | 7.506                                      | 101866               | 3866                          |
| 16             | 578.952              | 6.300                 | 582.102                                  | 6.300                                      | 101915                  | 1.239             | 7.581            | 7.558                                      | 101915               | 3915                          |
| 17             | 572.652              | 6.300                 | 575.802                                  | 6.300                                      | 101957                  | 1.240             | 7.621            | 7.601                                      | 101956               | 3956                          |
| 18             | 566.352              | 6.300                 | 569.502                                  | 6.300                                      | 101992                  | 1.240             | 7.654            | 7.638                                      | 101992               | 3992                          |
| 19             | 560.052              | 6.300                 | 563.202                                  | 6.300                                      | 102022                  | 1.240             | 7.683            | 7.669                                      | 102021               | 4021                          |
| 20             | 553.752              | 6.300                 | 556.902                                  | 6.300                                      | 102047                  | 1.240             | 7.706            | 7.695                                      | 102047               | 4047                          |
| 21             | 547.452              | 6.300                 | 550.602                                  | 6.300                                      | 102068                  | 1.241             | 7.726            | 7.716                                      | 102068               | 4068                          |
| 22             | 541.152              | 6.300                 | 544.302                                  | 6.300                                      | 102086                  | 1.241             | 7.743            | 7.734                                      | 102085               | 4085                          |
| 23             | 534.852              | 6.300                 | 538.002                                  | 6.300                                      | 102101                  | 1.241             | 7.757            | 7.750                                      | 102100               | 4100                          |
| 24             | 528.552              | 6.300                 | 531.702                                  | 6.300                                      | 102113                  | 1.241             | 7.768            | 7.762                                      | 102113               | 4113                          |
| 25             | 522.252              | 6.300                 | 525.402                                  | 6.300                                      | 102123                  | 1.241             | 7.777            | 7.773                                      | 102123               | 4123                          |
| 26             | 515.952              | 6.300                 | 519.102                                  | 6.300                                      | 102132                  | 1.241             | 7.786            | 7.781                                      | 102131               | 4131                          |
| 27             | 509.652              | 6.300                 | 512.802                                  | 6.300                                      | 102139                  | 1.241             | 7.792            | 7.789                                      | 102139               | 4139                          |
| 28             | 503.352              | 6.300                 | 506.502                                  | 6.300                                      | 102145                  | 1.241             | 7.798            | 7.795                                      | 102145               | 4145                          |
| 29             | 497.052              | 6.300                 | 500.202                                  | 6.300                                      | 102150                  | 1.241             | 7.802            | 7.800                                      | 102150               | 4150                          |
| 30             | 490.752              | 6.300                 | 493.902                                  | 6.300                                      | 102154                  | 1.241             | 7.806            | 7.804                                      | 102154               | 4154                          |
| 31             | 484.452              | 6.300                 | 487.602                                  | 6.300                                      | 102157                  | 1.241             | 7.809            | 7.807                                      | 102157               | 4157                          |
| 32             | 478.152              | 6.300                 | 481.302                                  | 6.300                                      | 102160                  | 1.241             | 7.812            | 7.810                                      | 102159               | 4159                          |
| 33             | 471.852              | 6.300                 | 475.002                                  | 6.300                                      | 102162                  | 1.241             | 7.813            | 7.813                                      | 102162               | 4162                          |
| 34             | 465.552              | 6.300                 | 468.702                                  | 6.300                                      | 102164                  | 1.241             | 7.815            | 7.814                                      | 102164               | 4164                          |
| 35             | 459.252              | 6.300                 | 462.402                                  | 6.300                                      | 102166                  | 1.241             | 7.817            | 7.816                                      | 102165               | 4165                          |
| 36             | 452.952              | 6.300                 | 456.102                                  | 6.300                                      | 102167                  | 1.241             | 7.818            | 7.818                                      | 102167               | 4167                          |
| 37             | 446.652              | 6.300                 | 449.802                                  | 6.300                                      | 102168                  | 1.241             | 7.819            | 7.819                                      | 102168               | 4168                          |
| 38             | 440.352              | 6.300                 | 443.502                                  | 6.300                                      | 102169                  | 1.241             | 7.820            | 7.819                                      | 102168               | 4168                          |
| 39             | 434.052              | 6.300                 | 437.202                                  | 6.300                                      | 102170                  | 1.241             | 7.821            | 7.820                                      | 102169               | 4169                          |
| 40             | 427.752              | 6.300                 | 430.902                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.821                                      | 102170               | 4170                          |
| 41             | 421.452              | 6.300                 | 424.602                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.822                                      | 102171               | 4171                          |
| 42             | 415.152              | 6.300                 | 418.302                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.822                                      | 102171               | 4171                          |
| 43             | 408.852              | 6.300                 | 412.002                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.822                                      | 102171               | 4171                          |
| 44             | 402.552              | 6.300                 | 405.702                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.822                                      | 102171               | 4171                          |
| 45             | 396.252              | 6.300                 | 399.402                                  | 6.300                                      | 102171                  | 1.241             | 7.822            | 7.822                                      | 102171               | 4171                          |

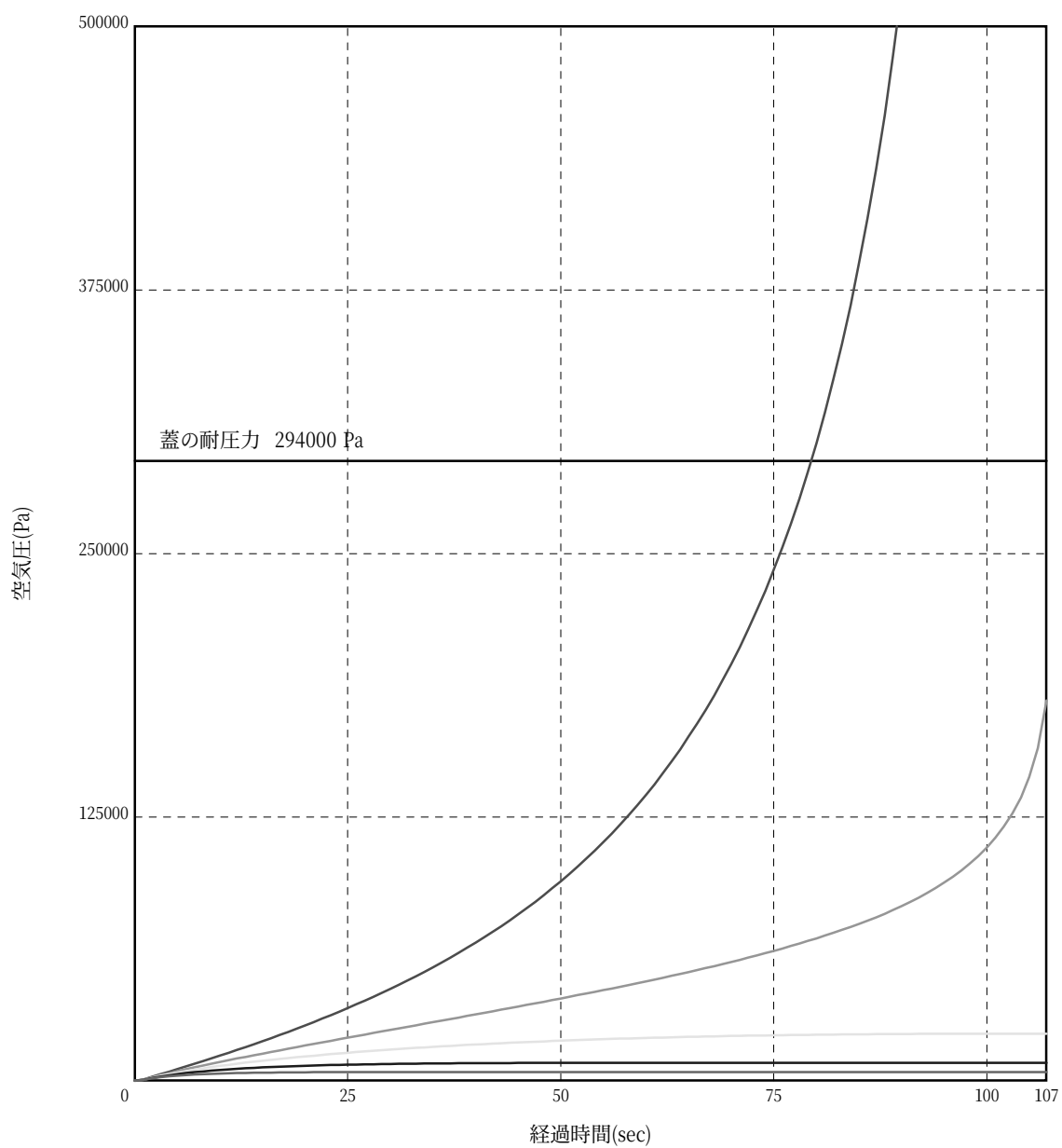
ケース5:開口径φ300 - 2

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 46             | 389.952              | 6.300                 | 393.102                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 47             | 383.652              | 6.300                 | 386.802                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 48             | 377.352              | 6.300                 | 380.502                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 49             | 371.052              | 6.300                 | 374.202                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 50             | 364.752              | 6.300                 | 367.902                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 51             | 358.452              | 6.300                 | 361.602                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 52             | 352.152              | 6.300                 | 355.302                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 53             | 345.852              | 6.300                 | 349.002                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 54             | 339.552              | 6.300                 | 342.702                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 55             | 333.252              | 6.300                 | 336.402                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 56             | 326.952              | 6.300                 | 330.102                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 57             | 320.652              | 6.300                 | 323.802                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 58             | 314.352              | 6.300                 | 317.502                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 59             | 308.052              | 6.300                 | 311.202                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 60             | 301.752              | 6.300                 | 304.902                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 61             | 295.452              | 6.300                 | 298.602                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 62             | 289.152              | 6.300                 | 292.302                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 63             | 282.852              | 6.300                 | 286.002                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 64             | 276.552              | 6.300                 | 279.702                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 65             | 270.252              | 6.300                 | 273.402                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 66             | 263.952              | 6.300                 | 267.102                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 67             | 257.652              | 6.300                 | 260.802                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 68             | 251.352              | 6.300                 | 254.502                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 69             | 245.052              | 6.300                 | 248.202                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 70             | 238.752              | 6.300                 | 241.902                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 71             | 232.452              | 6.300                 | 235.602                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 72             | 226.152              | 6.300                 | 229.302                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 73             | 219.852              | 6.300                 | 223.002                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 74             | 213.552              | 6.300                 | 216.702                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 75             | 207.252              | 6.300                 | 210.402                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 76             | 200.952              | 6.300                 | 204.102                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 77             | 194.652              | 6.300                 | 197.802                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102171               | 4171                          |
| 78             | 188.352              | 6.300                 | 191.502                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 79             | 182.052              | 6.300                 | 185.202                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 80             | 175.752              | 6.300                 | 178.902                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 81             | 169.452              | 6.300                 | 172.602                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 82             | 163.152              | 6.300                 | 166.302                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 83             | 156.852              | 6.300                 | 160.002                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 84             | 150.552              | 6.300                 | 153.702                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 85             | 144.252              | 6.300                 | 147.402                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 86             | 137.952              | 6.300                 | 141.102                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 87             | 131.652              | 6.300                 | 134.802                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 88             | 125.352              | 6.300                 | 128.502                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 89             | 119.052              | 6.300                 | 122.202                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 90             | 112.752              | 6.300                 | 115.902                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |



ケース5:開口径φ300 - 3

| 経過時間<br>t(sec) | 管路内<br>空気量<br>Vi(m³) | 空気<br>排除量<br>Qi(m³/s) | $V_{AVE}$<br>(Vi+Vi-1)<br>/2 (m³) | $Q_{AVE}$<br>(Qi+Qi-1)<br>/2 (m³/s) | 管路内<br>空気圧<br>Pi(仮)(Pa) | 空気密度<br>$\rho_i$ (kg/m³) | 質量流量<br>mi(kg/s) | $m_{AVE}$<br>(mi+mi-1)<br>/2 (kg/s) | 管路内<br>空気圧<br>Pi(Pa) | 蓋に作用する<br>空気圧<br>Pi-98000(Pa) |
|----------------|----------------------|-----------------------|-----------------------------------|-------------------------------------|-------------------------|--------------------------|------------------|-------------------------------------|----------------------|-------------------------------|
| 91             | 106.452              | 6.300                 | 109.602                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 92             | 100.152              | 6.300                 | 103.302                           | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 93             | 93.852               | 6.300                 | 97.002                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 94             | 87.552               | 6.300                 | 90.702                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 95             | 81.252               | 6.300                 | 84.402                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 96             | 74.952               | 6.300                 | 78.102                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 97             | 68.652               | 6.300                 | 71.802                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102170               | 4170                          |
| 98             | 62.352               | 6.300                 | 65.502                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102169               | 4169                          |
| 99             | 56.052               | 6.300                 | 59.202                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102169               | 4169                          |
| 100            | 49.752               | 6.300                 | 52.902                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.822                               | 102169               | 4169                          |
| 101            | 43.452               | 6.300                 | 46.602                            | 6.300                               | 102170                  | 1.241                    | 7.821            | 7.821                               | 102170               | 4170                          |
| 102            | 37.152               | 6.300                 | 40.302                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.821                               | 102169               | 4169                          |
| 103            | 30.852               | 6.300                 | 34.002                            | 6.300                               | 102170                  | 1.241                    | 7.821            | 7.821                               | 102170               | 4170                          |
| 104            | 24.552               | 6.300                 | 27.702                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.821                               | 102168               | 4168                          |
| 105            | 18.252               | 6.300                 | 21.402                            | 6.300                               | 102170                  | 1.241                    | 7.821            | 7.821                               | 102169               | 4169                          |
| 106            | 11.952               | 6.300                 | 15.102                            | 6.300                               | 102171                  | 1.241                    | 7.822            | 7.821                               | 102166               | 4166                          |
| 107            | 5.652                | 6.300                 | 8.802                             | 6.300                               | 102170                  | 1.241                    | 7.821            | 7.821                               | 102163               | 4163                          |



- 蓋の耐圧力
- ケース1:開口径φ100
- ケース2:開口径φ150
- ケース3:開口径φ200
- ケース4:開口径φ250
- ケース5:開口径φ300