**Supplementary data:**

Table S1: Estimated values of model parameters for working volume 32.5 L.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr no** | ***N (n)*** | ***ω,***  ***rpm*** | ***ʋo,***  ***(lph)*** | ***ʋr, (lph)*** | ***ʋm,*** | ***R*** | ***α*** | ***β*** |
| 1 | 2(1) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.98** | **0.14** |
| 2 | 2(1) | 10 | 19.16 | 58.5 | 77.66 | 3.05 | **0.94** | **0.32** |
| 3 | 2(1) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.98** | **0.14** |
| 4 | 2(1) | 20 | 19.16 | 58.5 | 77.66 | 3.05 | **0.99** | **0.35** |
| 5 | 3(2) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.98** | **0.11** |
| 6 | 3(2) | 10 | 19.16 | 58.5 | 77.66 | 3.05 | **0.91** | **0.23** |
| 7 | 3(2) | 15 | 6 | 58.5 | 64.5 | 9.75 | **0.98** | **0.10** |
| 8 | 3(2) | 15 | 19.16 | 58.5 | 77.66 | 3.05 | **0.96** | **0.24** |
| 9 | 3(1) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.97** | **0.13** |
| 10 | 3(3) | 20 | 19.16 | 58.5 | 77.66 | 3.05 | **0.94** | **0.31** |
| 11 | 4(2) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.96** | **0.10** |
| 12 | 4(2) | 10 | 19.16 | 58.5 | 77.66 | 3.05 | **0.91** | **0.26** |
| 13 | 4(2) | 15 | 6 | 58.5 | 64.5 | 9.75 | **0.97** | **0.11** |
| 14 | 4(2) | 15 | 19.16 | 58.5 | 77.66 | 3.05 | **0.90** | **0.26** |
| 15 | 4(2) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.98** | **0.11** |
| 16 | 4(2) | 20 | 10.98 | 58.5 | 69.48 | 5.32 | **0.96** | **0.16** |
| 17 | 4(2) | 20 | 15.46 | 58.5 | 73.96 | 3.78 | **0.95** | **0.22** |
| 18 | 4(2) | 20 | 19.16 | 58.5 | 77.66 | 3.05 | **0.90** | **0.25** |

Table S2: Estimated values of model parameters for working volume 65 L.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr no** | ***N (n)*** | ***ω***  ***RPM*** | ***ʋo***  ***(lph)*** | ***ʋr (lph)*** | ***ʋm***  ***lph*** | ***R*** | ***α*** | ***β*** |
| 1 | 4(3) | 6 | 6 | 58.5 | 64.5 | 9.75 | **0.89** | **0.09** |
| 2 | 4(2) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.96** | **0.08** |
| 3 | 4(2) | 12 | 6 | 58.5 | 64.5 | 9.75 | **0.95** | **0.08** |
| 4 | 4(2) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.97** | **0.10** |
| 5 | 6(5) | 4 | 6 | 58.5 | 64.5 | 9.75 | **0.83** | **0.08** |
| 6 | 6(5) | 6 | 6 | 58.5 | 64.5 | 9.75 | **0.86** | **0.08** |
| 7 | 6(5) | 8 | 6 | 58.5 | 64.5 | 9.75 | **0.90** | **0.09** |
| 8 | 6(5) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.91** | **0.08** |
| 9 | 6(5) | 12 | 6 | 58.5 | 64.5 | 9.75 | **0.89** | **0.08** |
| 10 | 6(5) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.95** | **0.09** |
| 11 | 6(5) | 10 | 31.47 | 58.5 | 89.97 | 1.858 | **0.77** | **0.30** |
| 12 | 6(5) | 6 | 58.5 | 6 | 64.5 | 0.102 | **0.65** | **0.38** |
| 13 | 6(5) | 6 | 31.47 | 31.47 | 62.94 | 1 | **0.77** | **0.39** |
| 14 | 8(5) | 6 | 6 | 58.5 | 64.5 | 9.75 | **0.80** | **0.08** |
| 15 | 8(5) | 10 | 6 | 58.5 | 64.5 | 9.75 | **0.88** | **0.08** |
| 16 | 8(5) | 15 | 6 | 58.5 | 64.5 | 9.75 | **0.90** | **0.09** |
| 17 | 8(5) | 20 | 6 | 58.5 | 64.5 | 9.75 | **0.91** | **0.09** |
| 18 | 8(5) | 10 | 31.47 | 58.5 | 89.97 | 1.858 | **0.77** | **0.30** |