Supplementary material for Ahmadizar F and Eteghadipour J, Single-machine earliness-tardiness scheduling with two competing agents and idle time, *Engineering Optimization*, 2016

The detailed results corresponding to Table 3 are shown in Tables A.1–A.7, where the solution quality is measured by the mean percentage difference from the best found solution; the average CPU times (in seconds) spent by each heuristic procedure are also reported. In the tables, a value indicated in boldface corresponds to a solution whose optimality has been verified by CPLEX, and an asterisk indicates that CPLEX has failed to identify even a feasible solution within the time limit imposed. Moreover, if the time spent by CPLEX is less than 7200 seconds but its solution is not optimal, it implies that CPLEX has terminated due to memory limitations.
Table A.1 Results for instances with 10 jobs

| (TF, RDD) | PJA | Sequence-based model | Quality | Time | Min | Ave | Max | Time | Min | Ave | Max | Time | Min | Ave | Max | Time |
|-----------|-----|----------------------|---------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|           |     | AH1 | AH2 | AH3 |     |     |     |     |     |     |     |     |     |     |     |     |
| (0.25, 0.5) |   |   |   |   |  | | | | | | | | | | | |
| 40%       | 0  | 0.0 | 0   | 0.00 | 0.24 | 0.8 | 0   | 0.00 | 0.49 | 1.1 | 0   | 0.24 | 0.97 | 1.0 |
| 50%       | 0  | 0.0 | 0   | 0   | 0.7 | 0   | 0   | 0   | 1.2 | 0   | 0   | 1.0 |
| 60%       | 0  | 0.0 | 0   | 0   | 0.9 | 0   | 0   | 0   | 1.3 | 0   | 0   | 1.1 |
| Average   | 0  | 0.0 | 0   | 0   | 0.0 | 0.0 | 0   | 0   | 0.16 | 1.2 | 0   | 0.08 | 0.32 | 1.0 |
| (0.25, 0.75) | |   |   |   | | | | | | | | | | | | |
| 40%       | 0  | 0.0 | 0   | 4.00 | 4.00 | 1.1 | 1.5 | 4.00 | 8.50 | 1.1 | 0   | 0.00 | 1.00 | 1.1 |
| 50%       | 0  | 0.0 | 0   | 0   | 0   | 0   | 0   | 0   | 1.2 | 0   | 0   | 1.2 |
| 60%       | 0  | 0.0 | 0   | 0   | 0   | 0   | 0   | 0   | 0.9 | 0   | 0   | 0.9 |
| Average   | 0  | 0.0 | 1.33 | 1.33 | 1.33 | 1.1 | 0.5 | 1.33 | 2.83 | 1.1 | 0   | 0   | 0.33 | 1.1 |
| (0.5, 0.5) |   |   |   |   |  | | | | | | | | | | | |
| 40%       | 0  | 0.0 | 1.96 | 1.96 | 1.96 | 0.7 | 0   | 0   | 1.0 | 0   | 0   | 0.9 |
| 50%       | 0  | 0.0 | 0   | 0   | 0   | 0   | 0   | 0   | 0.9 | 0   | 0   | 1.0 |
| 60%       | 0  | 0.0 | 4.25 | 4.25 | 4.25 | 0.9 | 0   | 0   | 1.1 | 0   | 0   | 1.0 |
| Average   | 0  | 0.0 | 2.07 | 2.07 | 2.07 | 0.8 | 0   | 0   | 1.0 | 0   | 0   | 0.9 |
| (0.5, 0.75) | |   |   |   | | | | | | | | | | | | |
| 40%       | 0  | 0.0 | 5.54 | 5.54 | 5.54 | 1.1 | 0   | 0   | 1.2 | 0   | 0   | 1.1 |
| 50%       | 0  | 0.0 | 0   | 0   | 0   | 0   | 0   | 0   | 0.8 | 0   | 0   | 0.9 |
| 60%       | 0  | 0.0 | 0   | 0   | 0   | 0   | 0   | 0   | 1.1 | 0   | 0   | 1.1 |
| Average   | 0  | 0.0 | 1.85 | 1.85 | 1.85 | 1.0 | 0   | 0   | 1.0 | 0   | 0   | 1.0 |
| Overall average | 0  | 0.0 | 1.31 | 1.31 | 1.33 | 0.9 | 0.13 | 0.33 | 0.75 | 1.1 | 0   | 0.02 | 0.16 | 1.0 |
Table A.2 Results for instances with 15 jobs

|        | Sequence-based model |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|--------|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|        | Quality | Time | Min   | Ave   | Max   | Time | Min   | Ave   | Max   | Time | Min   | Ave   | Max   | Time | Min   | Ave   | Max   | Time |
| (0.25, 0.5) | 40%   | 59.1 | 0.50  | 1.17  | 2.1   | 0.67 | 0.67  | 0.67  | 2.2   | 0    | 0.33  | 0.67  | 2.2   | 0    |
|        | 50%    | 15.2 | 6.86  | 6.86  | 1.1   | 0    | 0     | 0     | 2.1   | 0    | 0     | 0     | 2.3   | 0    |
|        | 60%    | 7.4  | 0.79  | 1.58  | 3.35  | 2.1  | 0.20  | 1.38  | 3.35  | 3.0  | 0     | 0.59  | 1.58  | 2.1  |
| Average| 0      | 27.2 | 2.55  | 2.98  | 3.79  | 1.8  | 0.29  | 0.68  | 1.34  | 2.4  | 0     | 0.31  | 0.75  | 2.2  |
| (0.25, 0.75) | 40%   | 2.0  | 9.83  | 9.83  | 9.83  | 2.3  | 5.42  | 5.42  | 5.42  | 3.1  | 2.03  | 2.03  | 2.03  | 0.8  |
|        | 50%    | 0.4  | 0     | 1.32  | 2.63  | 1.4  | 35.53 | 44.74 | 56.58 | 2.1  | 0     | 3.95  | 9.21  | 1.6  |
|        | 60%    | 1.1  | 0     | 1.77  | 5.05  | 1.8  | 31.82 | 31.82 | 31.82 | 2.7  | 0     | 0.76  | 1.77  | 2.0  |
| Average| 0      | 1.2  | 3.28  | 4.30  | 5.84  | 1.8  | 24.26 | 27.33 | 31.27 | 2.6  | 0.68  | 2.25  | 4.34  | 1.5  |
| (0.5, 0.5) | 40%   | 141.3| 1.95  | 1.95  | 1.95  | 1.9  | 0     | 0     | 0     | 2.8  | 0     | 0.22  | 0.87  | 2.2  |
|        | 50%    | 60.4 | 0     | 0     | 0     | 1.3  | 0     | 0     | 0     | 2.3  | 0     | 0     | 0     | 2.1  |
|        | 60%    | 29.7 | 4.30  | 8.92  | 15.61 | 2.1  | 0     | 3.50  | 7.80  | 3.1  | 0     | 0.64  | 3.03  | 2.3  |
| Average| 0      | 77.1 | 2.08  | 3.62  | 5.85  | 1.8  | 0     | 1.17  | 2.60  | 2.7  | 0     | 0.28  | 1.30  | 2.2  |
| (0.5, 0.75) | 40%   | 0.3  | 0     | 0.90  | 1.80  | 2.2  | 0     | 0.90  | 2.70  | 2.8  | 0     | 1.80  | 3.60  | 2.3  |
|        | 50%    | 5.3  | 4.94  | 4.94  | 4.94  | 2.2  | 0     | 0     | 0     | 2.2  | 0     | 0     | 0     | 1.9  |
|        | 60%    | 1.4  | 2.40  | 12.57 | 19.16 | 2.2  | 19.16 | 33.23 | 44.01 | 2.4  | 0     | 0.60  | 1.20  | 2.1  |
| Average| 0      | 2.3  | 2.45  | 6.14  | 8.63  | 2.2  | 6.39  | 11.38 | 15.57 | 2.5  | 0     | 0.80  | 1.60  | 2.1  |
| Overall average | 0    | 27.0 | 2.59  | 4.26  | 6.03  | 1.9  | 7.73  | 10.14 | 12.70 | 2.6  | 0.17  | 0.91  | 2.00  | 2.0  |
Table A.3 Results for instances with 20 jobs

| (TF, RDD) | PJA | Quality | Time  | Min | Ave | Max | Time  | Min | Ave | Max | Time  | Min | Ave | Max | Time  |
|-----------|-----|---------|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|
| (0.25, 0.5) | 40% | 0       | 7200  | 5.09| 5.79| 7.89| 4.5   | 5.09| 6.32| 7.54| 10.3  | 0   | 0.88| 2.11| 7.1   |
|           | 50% | 0       | 7200  | 6.01| 6.29| 6.77| 4.9   | 0.48| 0.48| 0.55| 11.9  | 0   | 0.48| 1.38| 7.1   |
|           | 60% | 0       | 7200  | 12.56|13.99|16.45| 7.9   | 0   | 1.17| 1.55| 12.9  | 0   | 1.42| 3.76| 6.7   |
| Average   |     | 0       | 7200  | 7.89| 8.69| 10.37| 5.8   | 1.86| 2.66| 3.22| 11.7  | 0   | 0.93| 2.41| 7.0   |
| (0.25, 0.75) | 40% | 0       | 200.1 | 6.31| 6.72| 7.94| 5.1   | 0.81| 1.02| 1.22| 13.1  | 0   | 0.20| 1.22| 9.4   |
|           | 50% | 0       | 6.3    | 14.86|14.86|16.57| 5.7   | 31.43|31.43|32.00|12.6  | 0   | 3.43| 5.71| 8.8   |
|           | 60% | 0       | 53.7   | 8.50| 12.46|16.43| 6.2   | 0.57| 1.98| 3.40| 16.5  | 0   | 3.97| 5.67| 9.1   |
| Average   |     | 0       | 86.7   | 9.89| 11.35|13.65| 5.7   | 10.94|11.48|12.21|14.1  | 0   | 2.53| 4.20| 9.1   |
| (0.5, 0.5) | 40% | 0       | 7200  | 0   | 0   | 4.6  | 0.00  | 0   | 0   | 11.4 | 0     | 0   | 0   | 8.1  |       |
|           | 50% | 0       | 7200  | 1.77| 1.77| 1.77| 4.2   | 0.15| 0.15| 0.15| 10.9  | 0   | 0.04| 0.15| 5.9   |
|           | 60% | 0       | 7200  | 5.78| 5.78| 5.78| 5.0   | 0   | 0.00| 0.61| 14.8  | 0   | 0   | 9.1  |       |
| Average   |     | 0       | 7200  | 2.52| 2.52| 2.52| 4.6   | 0.05| 0.05| 0.25| 12.4  | 0   | 0.01| 0.05| 7.7   |
| (0.5, 0.75) | 40% | 0       | 1.1    | 16.77|19.35|24.52| 5.1   | 2.58| 3.23| 5.16| 10.8  | 0   | 2.58| 4.52| 8.2   |
|           | 50% | 0       | 4.4    | 10.39|10.75|11.47| 5.0   | 0   | 0.00| 0.36| 14.1  | 0   | 0   | 9.0  |       |
|           | 60% | 0       | 1.3    | 7.46| 11.94|14.18| 5.7   | 0   | 0   | 0   | 12.3  | 0   | 0.75| 2.24| 7.2   |
| Average   |     | 0       | 2.3    | 11.54|14.02|16.72| 5.3   | 0.86| 1.08| 1.84| 12.4  | 0   | 1.11| 2.25| 8.1   |
| Overall average | 0   | 3622  | 7.96 | 9.14|10.81|10.81| 5.3   | 3.43| 3.82| 4.38|12.6  | 0   | 1.15| 2.23| 8.0   |
### Table A.4 Results for instances with 30 jobs

| (TF, RDD) | PJA | Sequence-based model | AH1 | AH2 | AH3 |
|-----------|-----|----------------------|-----|-----|-----|
|           |     | Quality | Time | Min | Ave | Max | Time | Min | Ave | Max | Time |
| (0.25, 0.5) | 40% | 1.05 | 7200 | 5.93 | 7.89 | 9.67 | 14.2 | 0.00 | 1.09 | 1.96 | 30.3 | 0.00 | 1.55 | 4.15 | 16.5 |
|           | 50% | 2.26 | 7200 | 4.74 | 7.88 | 10.69 | 15.4 | 0.00 | 2.12 | 5.62 | 33.8 | 0.00 | 1.80 | 4.01 | 23.9 |
|           | 60% | 2.52 | 7200 | 3.51 | 9.14 | 13.38 | 16.8 | 1.79 | 2.52 | 3.51 | 35.4 | 0.00 | 2.19 | 3.95 | 25.3 |
| Average   |     | 1.94 | 7200 | 4.73 | 8.30 | 11.24 | 15.5 | 0.60 | 1.91 | 3.70 | 32.2 | 0.00 | 1.85 | 4.03 | 21.9 |
| (0.25, 0.75) | 40% | 0.00 | 9.3 | 11.48 | 12.08 | 13.29 | 14.3 | 4.83 | 6.34 | 8.16 | 33.8 | 0.00 | 2.42 | 3.93 | 14.7 |
|           | 50% | 0.00 | 2.4 | 16.56 | 33.13 | 45.63 | 14.5 | 18.75 | 29.06 | 46.25 | 32.6 | 0.00 | 2.50 | 5.31 | 19.6 |
|           | 60% | 0.00 | 106.3 | 33.47 | 42.05 | 48.12 | 13.4 | 34.10 | 43.93 | 55.23 | 38.8 | 1.05 | 4.81 | 7.11 | 18.2 |
| Average   |     | 0.00 | 39.3 | 20.51 | 29.09 | 35.68 | 14.1 | 19.23 | 26.45 | 36.55 | 33.6 | 0.35 | 3.24 | 5.45 | 17.5 |
| (0.5, 0.5) | 40% | 4.03 | 7200 | 3.25 | 5.72 | 8.32 | 13.3 | 8.51 | 9.16 | 9.75 | 28.1 | 0.00 | 2.21 | 4.55 | 21.7 |
|           | 50% | 2.66 | 7200 | 16.75 | 23.41 | 32.38 | 13.5 | 4.25 | 7.48 | 30.4 | 0.00 | 1.28 | 2.10 | 24.7 |
|           | 60% | 11.48 | 7200 | 8.32 | 9.06 | 9.68 | 18.3 | 1.58 | 4.65 | 9.23 | 33.9 | 0.00 | 2.65 | 5.16 | 17.5 |
| Average   |     | 6.06 | 7200 | 9.44 | 12.73 | 16.79 | 15.0 | 3.36 | 6.02 | 8.82 | 30.8 | 0.00 | 2.05 | 3.94 | 21.3 |
| (0.5, 0.75) | 40% | 22.07 | 7200 | 8.63 | 10.77 | 14.10 | 14.3 | 0.00 | 0.44 | 0.96 | 32.9 | 0.59 | 1.62 | 3.32 | 18.8 |
|           | 50% | 28.72 | 7200 | 2.87 | 7.05 | 12.27 | 14.5 | 0.00 | 0.78 | 4.44 | 35.4 | 0.00 | 1.57 | 3.39 | 22.6 |
|           | 60% | 26.82 | 6143 | 4.60 | 6.34 | 8.03 | 16.6 | 1.34 | 2.41 | 3.39 | 38.3 | 0.00 | 2.23 | 3.21 | 27.6 |
| Average   |     | 25.87 | 6848 | 5.37 | 8.05 | 11.47 | 15.1 | 0.45 | 1.21 | 2.93 | 35.5 | 0.20 | 1.81 | 3.31 | 23.0 |
| Overall average | | 8.47 | 5322 | 10.01 | 14.54 | 18.80 | 14.9 | 5.91 | 8.90 | 13.00 | 33.3 | 0.14 | 2.24 | 4.18 | 20.9 |
### Table A.5 Results for instances with 50 jobs

| (TF, RDD) | PJ | Quality | Time | AH1 | Time | AH2 | Time | AH3 | Time |
|-----------|----|---------|------|-----|------|-----|------|-----|------|
| (0.25, 0.5) | 40% | 41.15  | 7200 | 13.83 | 21.65 | 29.38 | 51.0 | 0   | 3.09 | 5.59 | 123.0 | 0.65 | 2.81 | 3.16 | 106.3 |
|           | 50% | 15.51  | 7200 | 6.57  | 7.93  | 9.84  | 50.4 | 0   | 3.40 | 6.49 | 98.1  | 0    | 3.07 | 4.76 | 123.5 |
|           | 60% | 11.57  | 7200 | 20.22 | 23.08 | 26.90 | 54.7 | 9.58 | 10.75 | 12.82 | 115.4 | 0    | 1.40 | 2.95 | 142.4 |
| Average   |     | 22.74  | 7200 | 13.54 | 17.55 | 22.04 | 52.0 | 3.19 | 5.75 | 8.30 | 112.2 | 0.22 | 2.43 | 3.62 | 124.1 |
| (0.25, 0.75) | 40% | 7.63   | 5771 | 8.04  | 11.65 | 16.71 | 58.6 | 46.39 | 52.57 | 56.45 | 89.7  | 0    | 2.98 | 4.58 | 93.2  |
|           | 50% | 1.18   | 7200 | 0.14  | 4.80  | 11.61 | 55.5 | 5.29 | 6.88  | 8.14  | 117.1 | 0    | 2.50 | 3.20 | 83.6  |
|           | 60% | 0.44   | 7200 | 37.78 | 47.42 | 56.26 | 59.0 | 6.64 | 7.40  | 8.00  | 100.2 | 0    | 2.72 | 5.52 | 88.9  |
| Average   |     | 3.08   | 6724 | 15.32 | 21.29 | 28.20 | 57.7 | 19.44 | 22.28 | 24.20 | 102.3 | 0    | 2.74 | 4.43 | 88.6  |
| (0.5, 0.5) | 40% | 70.92  | 7200 | 0    | 6.27  | 8.14  | 45.7 | 0   | 3.62 | 6.53 | 80.4  | 0    | 0    | 0    | 78.5  |
|           | 50% | 1.81   | 7076 | 0    | 3.86  | 5.55  | 68.0 | 1.04 | 3.54  | 6.31  | 91.2  | 0    | 0    | 0    | 96.1  |
|           | 60% | 2.01   | 7200 | 9.98  | 12.82 | 14.54 | 69.9 | 0   | 2.05  | 3.79  | 100.4 | 0    | 1.10 | 3.70 | 100.6 |
| Average   |     | 24.91  | 7159 | 3.33  | 7.65  | 9.41  | 61.2 | 0.35 | 3.07  | 5.54  | 90.7  | 0    | 0.37 | 1.23 | 91.7  |
| (0.5, 0.75) | 40% | 8.30   | 7200 | 23.49 | 23.61 | 23.84 | 61.8 | 0   | 0.00  | 0.12  | 89.3  | 0    | 0    | 0    | 117.5 |
|           | 50% | 7.99   | 5469 | 10.74 | 13.52 | 16.56 | 68.0 | 0   | 1.50  | 2.93  | 99.9  | 0.55 | 0.55 | 0.70 | 122.6 |
|           | 60% | 8.18   | 7200 | 38.18 | 48.02 | 57.63 | 68.0 | 3.36 | 4.02  | 5.20  | 103.2 | 0    | 3.12 | 4.26 | 90.5  |
| Average   |     | 8.16   | 6623 | 24.13 | 28.38 | 32.68 | 65.9 | 1.12 | 1.84  | 2.75  | 97.5  | 0.18 | 1.22 | 1.65 | 110.2 |
| Overall average | | 14.72 | 6926 | 14.08 | 18.72 | 23.08 | 59.2 | 6.03 | 8.24 | 10.20 | 100.7 | 0.10 | 1.69 | 2.74 | 103.6 |
| (TF, RDD) | PJA | Quality | Time | Sequence-based model | AH1 | AH2 | AH3 |
|----------|-----|---------|------|----------------------|-----|-----|-----|
| (0.25, 0.5) | 40% | *       | 7200 |                      |     |     |     |
|          |     |         |      |                      | 0   | 7.18| 13.34| 130.2 |
|          |     |         |      |                      | 0.35| 4.14| 9.86 | 263.3 |
|          |     |         |      |                      | 0   | 3.48| 5.26 | 179.3 |
| Average  |     | 292.46  | 7200 |                      | 29.91| 35.59| 42.51| 158.2 |
| (0.25, 0.75) | 40% | 16.87   | 7200 |                      |     |      |      |
|          |     |         |      |                      | 0   | 6.28| 13.94| 151.6 |
|          |     |         |      |                      | 58.43| 78.30| 224.5 |      |
|          |     |         |      |                      | 0.35| 4.14| 9.86 | 263.3 |
|          |     |         |      |                      | 0   | 3.48| 5.26 | 179.3 |
| Average  |     | 6.18    | 7200 |                      | 18.25| 29.15| 40.18| 126.7 |
| (0.5, 0.5) | 40% | *       | 7200 |                      |     |      |      |
|          |     |         |      |                      | 275.24| 280.91| 290.14| 120.2 |
|          |     |         |      |                      | 67.39| 73.17| 77.70| 218.7 |
| Average  |     | 421.6   | 6912 |                      | 192.30| 204.96| 221.17| 123.2 |
| (0.5, 0.75) | 40% | 119.12  | 5944 |                      |     |      |      |
|          |     |         |      |                      | 74.14| 85.52| 94.01| 124.9 |
| Average  |     | 42.28   | 6783 |                      | 66.82| 82.52| 103.26| 143.2 |
| Overall average | 157.35 | 7024 | 76.82 | 88.06 | 101.78 | 137.8 | 29.55 | 39.88 | 49.25 | 260.4 | 0.16 | 5.66 | 8.37 | 203.1 |
Table A.7 Results for instances with 100 jobs

| (TF, RDD) | PJA | Quality | Time | Min | Ave | Max | Time | Min | Ave | Max | Time |
|-----------|-----|---------|------|-----|-----|-----|------|-----|-----|-----|------|
| (0.25, 0.5) | 40% | * | 7200 | 0 | 4.58 | 7.34 | 300.6 | 0 | 5.59 | 7.35 | 805.3 |
| 50% | 53.65 | 7200 | 2.45 | 3.77 | 4.38 | 301.1 | 5.77 | 8.08 | 10.87 | 770.7 |
| 60% | * | 7200 | 17.29 | 20.82 | 23.98 | 433.1 | 7.82 | 10.69 | 13.19 | 819.0 |
| Average | 53.65 | 7200 | 6.58 | 9.72 | 11.90 | 344.9 | 4.53 | 8.12 | 10.47 | 798.3 |
| (0.25, 0.75) | 40% | * | 7200 | 17.93 | 18.98 | 21.24 | 395.6 | 0 | 0.92 | 2.30 | 726.5 |
| 50% | 101.63 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| 60% | * | 7200 | 25.82 | 30.02 | 32.05 | 316.9 | 33.26 | 35.23 | 37.86 | 683.7 |
| Average | 80.48 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| (0.5, 0.5) | 40% | * | 7200 | 17.93 | 18.98 | 21.24 | 395.6 | 0 | 0.92 | 2.30 | 726.5 |
| 50% | 101.63 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| 60% | * | 7200 | 25.82 | 30.02 | 32.05 | 316.9 | 33.26 | 35.23 | 37.86 | 683.7 |
| Average | 80.48 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| (0.5, 0.75) | 40% | * | 7200 | 17.93 | 18.98 | 21.24 | 395.6 | 0 | 0.92 | 2.30 | 726.5 |
| 50% | 101.63 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| 60% | * | 7200 | 25.82 | 30.02 | 32.05 | 316.9 | 33.26 | 35.23 | 37.86 | 683.7 |
| Average | 80.48 | 7200 | 16.51 | 18.85 | 22.57 | 384.0 | 11.39 | 14.00 | 16.94 | 679.3 |
| Overall average | 135.75 | 7068 | 34.19 | 42.20 | 50.26 | 399.4 | 15.34 | 20.51 | 25.16 | 722.2 |