Table 7

Reference of the best solution of the HW benchmarks found by all algorithms in ten runs (*f*1 represents the total tardiness of orders, *f*2 represents the average traveling distance of vehicles, and =10000/3600)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| instance | *f1* | *f2* | *λ\* f1+ f2* | *f1* | *f2* | *λ\* f1+ f2* |
| HW1 | 0.00 | 130.00 | 130.00 | 0.00 | 129.56 | 359.89 |
| HW2 | 0.00 | 91.40 | 91.40 | 0.00 | 91.42 | 253.94 |
| HW3 | 0.00 | 96.50 | 96.50 | 0.00 | 94.26 | 261.83 |
| HW4 | 0.00 | 94.58 | 94.58 | 0.00 | 94.28 | 261.89 |
| HW5 | 1158.00 | 89.02 | 3305.69 | 1158.00 | 89.02 | 1405.28 |
| HW6 | 0.00 | 105.04 | 105.04 | 0.00 | 105.04 | 291.78 |
| HW7 | 1530.00 | 139.52 | 4389.52 | 1530.00 | 139.34 | 1917.06 |
| HW8 | 0.00 | 68.84 | 68.84 | 0.00 | 68.64 | 190.67 |
| HW9 | 0.00 | 152.22 | 152.22 | 0.00 | 160.34 | 445.39 |
| HW10 | 67300.00 | 220.00 | 187000.00 | 47651.00 | 207.06 | 48226.17 |
| HW11 | 0.00 | 197.76 | 197.76 | 0.00 | 180.06 | 500.17 |
| HW12 | 18990.00 | 197.54 | 52947.54 | 18990.00 | 197.54 | 19538.72 |
| HW13 | 32.00 | 188.00 | 277.00 | 32.00 | 188.38 | 555.28 |
| HW14 | 2760.00 | 161.00 | 7820.00 | 2140.00 | 175.74 | 2628.17 |
| HW15 | 4800.00 | 212.98 | 13546.31 | 4800.00 | 212.98 | 5391.61 |
| HW16 | 5968.00 | 180.72 | 16758.50 | 5968.00 | 180.72 | 6470.00 |
| HW17 | 0.00 | 81.73 | 81.73 | 0.00 | 83.87 | 232.96 |
| HW18 | 0.00 | 82.19 | 82.19 | 0.00 | 83.75 | 232.64 |
| HW19 | 0.00 | 108.55 | 108.56 | 3.00 | 112.27 | 314.86 |
| HW20 | 1153.00 | 93.55 | 3296.33 | 1237.00 | 91.98 | 1492.49 |
| HW21 | 0.00 | 113.33 | 113.33 | 0.00 | 105.92 | 294.22 |
| HW22 | 557.00 | 98.04 | 1645.26 | 557.00 | 95.81 | 823.14 |
| HW23 | 0.00 | 105.37 | 105.37 | 0.00 | 110.98 | 308.26 |
| HW24 | 0.00 | 94.41 | 94.42 | 0.00 | 90.95 | 252.63 |
| HW25 | 3640.00 | 145.83 | 10256.94 | 2084.00 | 141.09 | 2475.90 |
| HW26 | 3170.00 | 141.95 | 8947.51 | 4083.00 | 148.20 | 4494.65 |
| HW27 | 0.00 | 134.07 | 134.07 | 0.00 | 126.28 | 350.76 |
| HW28 | 2516.00 | 112.38 | 7101.27 | 2516.00 | 111.89 | 2826.79 |
| HW29 | 2255.00 | 134.44 | 6398.32 | 2492.00 | 139.44 | 2879.33 |
| HW30 | 0.00 | 118.93 | 118.94 | 0.00 | 120.99 | 336.07 |
| HW31 | 8081.00 | 149.85 | 22597.07 | 4116.00 | 148.65 | 4528.92 |
| HW32 | 2708.00 | 148.16 | 7670.38 | 2684.00 | 143.98 | 3083.94 |
| HW33 | 546.00 | 71.56 | 1588.23 | 978.00 | 74.88 | 1185.99 |
| HW34 | 3748.00 | 83.97 | 10495.09 | 3209.00 | 84.65 | 3444.14 |
| HW35 | 1208.00 | 86.00 | 3441.55 | 1208.00 | 82.15 | 1436.19 |
| HW36 | 6274.00 | 92.79 | 17520.57 | 5530.00 | 92.46 | 5786.83 |
| HW37 | 1810.00 | 106.00 | 5140.00 | 1813.00 | 105.70 | 2106.61 |
| HW38 | 5380.00 | 99.81 | 15044.25 | 4329.00 | 95.66 | 4594.73 |
| HW39 | 5338.00 | 91.62 | 14919.39 | 6812.00 | 88.30 | 7057.28 |
| HW40 | 3640.00 | 90.85 | 10201.96 | 3436.00 | 88.09 | 3680.71 |
| HW41 | 10487.00 | 144.43 | 29274.98 | 8640.00 | 146.70 | 9047.49 |
| HW42 | 18983.00 | 137.49 | 52868.04 | 8434.00 | 137.90 | 8817.06 |
| HW43 | 25060.00 | 143.21 | 69754.32 | 12358.00 | 154.23 | 12786.41 |
| HW44 | 27965.00 | 146.31 | 77826.87 | 16157.00 | 150.92 | 16576.23 |
| HW45 | 13005.00 | 143.22 | 36268.22 | 11637.00 | 140.30 | 12026.73 |
| HW46 | 11053.00 | 147.69 | 30850.47 | 9552.00 | 151.99 | 9974.20 |
| HW47 | 9605.00 | 134.56 | 26815.12 | 9154.00 | 142.56 | 9549.99 |
| HW48 | 5441.00 | 134.49 | 15248.38 | 4757.00 | 130.88 | 5120.55 |
| HW49 | 426000.00 | 115.00 | 1180000.00 | 426216.00 | 114.98 | 426535.40 |
| HW50 | 206000.00 | 118.00 | 572000.00 | 195813.00 | 109.70 | 196117.73 |
| HW51 | 26752.00 | 104.04 | 74415.15 | 90665.00 | 105.25 | 90957.35 |
| HW52 | 161000.00 | 108.00 | 448000.00 | 161114.00 | 108.38 | 161415.05 |
| HW53 | 30443.00 | 97.46 | 84661.35 | 96189.00 | 100.52 | 96468.21 |
| HW54 | 587000.00 | 106.00 | 1630000.00 | 586684.00 | 105.87 | 586978.07 |
| HW55 | 116188.00 | 91.96 | 322836.40 | 103798.00 | 92.25 | 104054.26 |
| HW56 | 663000.00 | 118.00 | 1840000.00 | 555497.00 | 99.71 | 555773.98 |
| HW57 | 3743056.00 | 110.92 | 10397488.69 | 3534713.00 | 109.52 | 3535017.23 |
| HW58 | 3601669.00 | 117.96 | 10004754.07 | 3169701.00 | 117.86 | 3170028.38 |
| HW59 | 2798564.00 | 118.64 | 7773907.52 | 3175959.00 | 121.29 | 3176295.91 |
| HW60 | 3847887.00 | 124.74 | 10688699.74 | 3752449.00 | 118.56 | 3752778.32 |
| HW61 | 2169013.00 | 109.46 | 6025145.57 | 2016012.00 | 111.17 | 2016320.81 |
| HW62 | 3169326.00 | 117.57 | 8803800.90 | 3908607.00 | 109.09 | 3908910.02 |
| HW63 | 4805859.00 | 113.29 | 13349721.62 | 5953802.00 | 111.88 | 5954112.77 |
| HW64 | 5655332.00 | 110.22 | 15709365.78 | 4695909.00 | 110.36 | 4696215.56 |