# 1. The pseudocode of of PORC.

|  |
| --- |
| **Algorithm 1.** PORC |
| **Input**: Trucks, All Nodes, Demand, Travel Time, Capacity, Battery  **Output**: RouteVRP-Dmm   1. Set= {All Customers Node} 2. **For** Car  Trucks 3. Initialize = [], = [],= []; 4. **If** 5. Call TRC to initialize  and 6. Update 7. **If**  && 8. Call DRC to update  and 9. Proceed to line (4) 10. **Else if** 11. Remove customer node of  to make 12. Record ,  for the truck 13. Proceed to line (2) 14. **Else if** 15. Record ,  for the truck 16. **End if** 17. **Else** 18. Record ,  for the truck 19. **End if** 20. **End** **for** 21. **Return** RouteVRP-Dmm (,  for each truck) |

# 2. The pseudocode of constructing a truck route (TRC)

|  |
| --- |
| **Function 1.** Truck route construction |
| **Input**:  - set of unvisited customers  - current truck load  *-* truck capacity  ,  **Output**:   1. **If** 2. **Return** 3. **End if** 4. **If** 5. ← from 6. ← from 7. **Return** 8. **Else** 9. Proceed to line (6) 10. **End if** |

# 3. The pseudocode of constructing drone routes (DRC)

|  |
| --- |
| **Function 2.** Drone route construction |
| **Input**:  - current drone load  *d\_hub -* set of drone trip  - drone capacity  , ,  **Output**:  1. **While**  2.  3. Update= - {}  4. Update  5. **If**  6． Remove  from  7. Update= + {}, Update  8.  under ERGR  9.  **Return**  10. **Else if**  11.  under ERGR  12. **Return**  13. **Else if**  14. Remove  from  15. Update= + {}, Update  16. Call TRC and proceed to line（1）  17. **End if**  18. **End while** |

# 4. The pseudocode of HAGM

|  |
| --- |
| **Algorithm 2.** HAGM |
| **Input:** Population\_Num, Develop\_Num, Pop\_Selectrate, Start\_Tem, Delta\_Tem, End\_Tem, Trucks, All Nodes, Demand, Travel Time, Capacity, Battery  **Output:** RGlobalBest  1. Initialize PopList ← PORC(Multiple initial solutions are generated by randomly selecting the first visit node of the truck), RGlobalBest = Best (PopList)  2. **While** Start\_Tem > End\_Tem  3. **For**  = 0 to Develop\_Num  4. Initialize operator weight  5. Selected\_PopList ← Roulette select individuals from PopList according to  Pop\_Selectrate  6. **For**  = 0 to (Population\_Num \* Pop\_Updaterate)  7. ℐ ← Operator Selection  8. New\_Individual ← ℐ (Selected\_PopList() )  9. **If** Cost (New\_Individual) < Cost (Selected\_PopList())  10. Update Selected\_PopList ← New\_Individual  11. Update operator ℐ weight  12. **If** Cost (New\_Individual) <Cost (RGlobalBest)  13. RGlobalBest = New\_Individual  14. **End if**  15.  **Else**  16. Update Selected\_PopList ← Call SA mechanism to accept New\_Individual  17. Update operator ℐ weight  18. **End if**  19. **End for**  20. Update PopList ← Randomly select from PopList according to Pop\_Selectrate base  on Selected\_PopList, proceed to line (3)  21. **End for**  22. Start\_Tem = Start\_Tem \* Delta\_Tem  23. **End while**  24. **Return** RGlobalBest |

# 5. The pseudocode of the crossover operation

|  |
| --- |
| **Function 3.** Crossover operators |
| **Input**: Crossover-λ-μ, RouteVRP-Dmm  **Output**: RouteVRP-Dmm   1. Randomly select TD1 and TD2 from RouteVRP-Dmm 2. Remove duplicate nodes from TD1 and TD2 3. Randomly select λ customers from TD1 and μ customers from TD2 4. TD1 TD2 5. TD1 TD2 6. Call PORC to Regenerate TD1 and TD2 7. **If** truck number increases in TD1 or TD2 8. Abandon existing results and proceed to line(1) 9. **Else** 10. RouteVRP-Dmm ← reconstruct TD1 and TD2 by PORC 11. **Return** RouteVRP-Dmm |

# 6. The pseudocode of the internal search operation

|  |
| --- |
| **Function 4.** Internal search operators |
| **Input**: ISO-off-down, ISO-truck-drone, RouteVRP-Dmm  **Output**: RouteVRP-Dmm   1. Randomly select a TD from RouteVRP-Dmm 2. Randomly select Drone Trip and Parallel Truck Route from TD 3. **If** ISO-off-down true 4. Perform an operation within launch / retrieve node → previous / next node 5. **Else if** ISO-truck-drone true 6. Randomly select a visit node from Drone Trip 7. Randomly select a visit node from Parallel Truck Route 8. Perform nodes exchange 9. **End if** 10. **Return** RouteVRP-Dmm |

# 7. Detailed experimental data in 5.1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | CVRP  (Optimal) | Dms | | | | | | |  | Dsm | | | | | | | | | Dmm | | | | | | | | |
| Instance | Q | q | PORC | | |  | HAGM | | | PORC | | |  | HAGM | | | |  | | | PORC | | | | HAGM | | |
| Best | Average | Time | Best | Average | Time |  | Best | Average | Time |  | | Best | Average | Time |  | | Best | | Average | Time |  | Best | Average | Time |
| A-n32-k5 | 100 | 35 | 784 | 898 | 903 | 0.06 |  | 687 | 714 | 11.51 |  | 746 | 752 | 0.15 |  | | 689 | 706 | 6.12 |  | | 701 | | 739 | 0.36 |  | 661 | 705 | 11.94 |
| A-n33-k5 | 100 | 35 | 661 | 755 | 759 | 0.05 |  | 564 | 591 | 9.18 |  | 606 | 621 | 0.13 |  | | 546 | 595 | 6.39 |  | | 589 | | 610 | 0.33 |  | 552 | 576 | 9.60 |
| A-n33-k6 | 100 | 35 | 742 | 713 | 724 | 0.04 |  | 653 | 671 | 7.87 |  | 661 | 676 | 0.13 |  | | 632 | 662 | 4.97 |  | | 622 | | 706 | 0.41 |  | 631 | 654 | 8.95 |
| A-n34-k5 | 100 | 35 | 778 | 860 | 870 | 0.04 |  | 675 | 700 | 10.35 |  | 737 | 755 | 0.15 |  | | 653 | 681 | 7.48 |  | | 705 | | 744 | 0.38 |  | 666 | 688 | 10.06 |
| A-n36-k5 | 100 | 35 | 799 | 967 | 976 | 0.05 |  | 752 | 764 | 11.58 |  | 784 | 794 | 0.15 |  | | 758 | 763 | 8.36 |  | | 718 | | 806 | 0.40 |  | 695 | 749 | 10.45 |
| A-n37-k5 | 100 | 35 | 669 | 826 | 834 | 0.05 |  | 577 | 611 | 15.10 |  | 619 | 635 | 0.14 |  | | 552 | 584 | 9.29 |  | | 598 | | 659 | 0.41 |  | 458 | 595 | 12.91 |
| A-n37-k6 | 100 | 35 | 949 | 1030 | 1050 | 0.05 |  | 814 | 849 | 9.58 |  | 895 | 903 | 0.14 |  | | 792 | 820 | 6.25 |  | | 856 | | 922 | 0.45 |  | 784 | 805 | 9.89 |
| A-n38-k5 | 100 | 35 | 730 | 858 | 867 | 0.05 |  | 643 | 663 | 10.98 |  | 696 | 714 | 0.14 |  | | 632 | 657 | 7.61 |  | | 654 | | 722 | 0.48 |  | 625 | 673 | 10.99 |
| A-n39-k5 | 100 | 35 | 822 | 1042 | 1053 | 0.05 |  | 688 | 768 | 12.39 |  | 788 | 808 | 0.15 |  | | 681 | 693 | 7.29 |  | | 742 | | 830 | 0.47 |  | 702 | 734 | 12.13 |
| A-n39-k6 | 100 | 35 | 831 | 1007 | 1022 | 0.06 |  | 730 | 782 | 10.96 |  | 763 | 783 | 0.15 |  | | 686 | 733 | 6.92 |  | | 721 | | 829 | 0.49 |  | 699 | 741 | 10.49 |
| A-n44-k6 | 100 | 35 | 937 | 963 | 982 | 0.07 |  | 826 | 863 | 13.12 |  | 896 | 909 | 0.16 |  | | 804 | 826 | 7.26 |  | | 813 | | 932 | 0.62 |  | 788 | 845 | 11.47 |
| A-n45-k6 | 100 | 35 | 944 | 1118 | 1141 | 0.07 |  | 855 | 913 | 11.47 |  | 926 | 936 | 0.16 |  | | 855 | 892 | 7.14 |  | | 888 | | 863 | 0.66 |  | 835 | 882 | 10.81 |
| A-n46-k7 | 100 | 35 | 914 | 969 | 999 | 0.08 |  | 821 | 865 | 11.73 |  | 913 | 920 | 0.16 |  | | 780 | 832 | 6.17 |  | | 866 | | 961 | 0.67 |  | 840 | 872 | 11.17 |
| A-n48-k7 | 100 | 35 | 1073 | 1333 | 1340 | 0.09 |  | 967 | 1002 | 12.57 |  | 1065 | 1090 | 0.17 |  | | 909 | 969 | 7.48 |  | | 997 | | 1074 | 0.75 |  | 918 | 994 | 13.16 |
| A-n53-k7 | 100 | 35 | 1010 | 1244 | 1256 | 0.10 |  | 923 | 980 | 12.65 |  | 994 | 1030 | 0.18 |  | | 915 | 942 | 9.33 |  | | 955 | | 1002 | 0.90 |  | 872 | 948 | 13.61 |
| A-n54-k7 | 100 | 35 | 1167 | 1489 | 1520 | 0.11 |  | 1023 | 1126 | 12.59 |  | 1160 | 1188 | 0.19 |  | | 1021 | 1057 | 8.12 |  | | 1067 | | 1232 | 0.93 |  | 992 | 1057 | 12.77 |
| A-n55-k9 | 100 | 35 | 1073 | 1153 | 1174 | 0.12 |  | 951 | 1004 | 10.02 |  | 1021 | 1055 | 0.19 |  | | 895 | 949 | 6.48 |  | | 974 | | 1077 | 1.02 |  | 934 | 977 | 10.05 |
| A-n62-k8 | 100 | 35 | 1288 | 1612 | 1618 | 0.15 |  | 1166 | 1251 | 15.15 |  | 1329 | 1350 | 0.21 |  | | 1100 | 1155 | 7.55 |  | | 1183 | | 1264 | 1.20 |  | 1132 | 1189 | 13.75 |
| A-n63-k10 | 100 | 35 | 1314 | 1611 | 1643 | 0.16 |  | 1182 | 1223 | 11.74 |  | 1242 | 1314 | 0.22 |  | | 1143 | 1171 | 6.74 |  | | 1261 | | 1345 | 1.33 |  | 1127 | 1211 | 10.51 |
| A-n65-k9 | 100 | 35 | 1174 | 1275 | 1287 | 0.16 |  | 1116 | 1149 | 12.39 |  | 1165 | 1199 | 0.22 |  | | 1098 | 1132 | 6.71 |  | | 1108 | | 1234 | 1.39 |  | 1073 | 1152 | 10.78 |
| A-n69-k9 | 100 | 35 | 1159 | 1702 | 1735 | 0.19 |  | 1150 | 1189 | 11.81 |  | 1197 | 1219 | 0.24 |  | | 1039 | 1080 | 8.92 |  | | 1146 | | 1252 | 1.57 |  | 1032 | 1124 | 12.27 |
| A-n80-k10 | 100 | 35 | 1763 | 2468 | 2497 | 0.26 |  | 1700 | 1801 | 14.98 |  | 1802 | 1824 | 0.33 |  | | 1665 | 1698 | 9.84 |  | | 1693 | | 1748 | 1.66 |  | 1519 | 1624 | 13.18 |
| B-n31-k5 | 100 | 35 | 672 | 605 | 623 | 0.03 |  | 580 | 605 | 10.43 |  | 582 | 585 | 0.13 |  | | 556 | 572 | 7.84 |  | | 578 | | 605 | 0.30 |  | 576 | 587 | 10.64 |
| B-n34-k5 | 100 | 35 | 788 | 869 | 877 | 0.04 |  | 674 | 691 | 11.26 |  | 664 | 694 | 0.13 |  | | 678 | 698 | 7.13 |  | | 658 | | 749 | 0.36 |  | 623 | 676 | 10.93 |
| B-n35-k5 | 100 | 35 | 955 | 989 | 991 | 0.04 |  | 772 | 793 | 12.91 |  | 767 | 774 | 0.13 |  | | 747 | 750 | 8.84 |  | | 749 | | 802 | 0.36 |  | 751 | 759 | 12.62 |
| B-n38-k6 | 100 | 35 | 805 | 914 | 920 | 0.05 |  | 666 | 716 | 11.01 |  | 644 | 655 | 0.14 |  | | 634 | 665 | 6.72 |  | | 641 | | 700 | 0.45 |  | 635 | 665 | 10.67 |
| B-n39-k5 | 100 | 35 | 549 | 715 | 716 | 0.05 |  | 548 | 565 | 11.51 |  | 534 | 538 | 0.14 |  | | 530 | 534 | 6.70 |  | | 535 | | 562 | 0.46 |  | 534 | 542 | 10.98 |
| B-n41-k6 | 100 | 35 | 829 | 931 | 940 | 0.06 |  | 742 | 776 | 10.46 |  | 778 | 785 | 0.15 |  | | 762 | 770 | 6.89 |  | | 772 | | 812 | 0.54 |  | 747 | 775 | 9.96 |
| B-n51-k7 | 100 | 35 | 1032 | 1247 | 1271 | 0.10 |  | 965 | 983 | 10.92 |  | 916 | 926 | 0.08 |  | | 903 | 920 | 10.73 |  | | 914 | | 941 | 0.95 |  | 881 | 900 | 13.73 |
| B-n56-k7 | 100 | 35 | 707 | 950 | 959 | 0.11 |  | 606 | 618 | 15.69 |  | 610 | 615 | 0.09 |  | | 599 | 613 | 13.39 |  | | 599 | | 603 | 1.09 |  | 550 | 571 | 15.32 |
| B-n63-k10 | 100 | 35 | 1496 | 1567 | 1590 | 0.15 |  | 1371 | 1438 | 10.49 |  | 1455 | 1492 | 0.12 |  | | 1411 | 1437 | 9.32 |  | | 1429 | | 1481 | 1.32 |  | 1340 | 1394 | 11.39 |
| B-n78-k10 | 100 | 35 | 1221 | 1792 | 1802 | 0.24 |  | 1226 | 1250 | 12.42 |  | 1206 | 1220 | 0.18 |  | | 1036 | 1120 | 11.29 |  | | 1203 | | 1210 | 1.89 |  | 1038 | 1076 | 19.29 |
| E-n51-k5 | 160 | 50 | 521 | 793 | 801 | 0.09 |  | 481 | 500 | 16.85 |  | 522 | 538 | 0.17 |  | | 451 | 467 | 9.00 |  | | 487 | | 555 | 1.78 |  | 447 | 487 | 16.08 |
| E-n76-k7 | 220 | 55 | 682 | 999 | 1008 | 0.21 |  | 644 | 693 | 20.13 |  | 727 | 745 | 0.27 |  | | 525 | 573 | 1.06 |  | | 646 | | 726 | 1.77 |  | 599 | 644 | 22.25 |
| E-n76-k8 | 180 | 45 | 735 | 993 | 999 | 0.22 |  | 798 | 809 | 15.63 |  | 796 | 812 | 0.27 |  | | 662 | 701 | 8.80 |  | | 720 | | 805 | 1.80 |  | 532 | 583 | 15.83 |
| E-n76-k10 | 140 | 40 | 830 | 969 | 981 | 0.23 |  | 816 | 856 | 11.15 |  | 886 | 897 | 0.27 |  | | 756 | 808 | 7.04 |  | | 836 | | 911 | 1.87 |  | 771 | 825 | 11.23 |
| E-n76-k14 | 100 | 35 | 1021 | 1049 | 1075 | 0.24 |  | 926 | 962 | 7.95 |  | 1010 | 1027 | 0.28 |  | | 890 | 922 | 5.26 |  | | 1079 | | 1171 | 2.03 |  | 922 | 954 | 8.53 |
| P-n40-k5 | 140 | 40 | 458 | 617 | 621 | 0.06 |  | 401 | 437 | 12.65 |  | 446 | 458 | 0.15 |  | | 397 | 413 | 7.16 |  | | 395 | | 467 | 0.48 |  | 380 | 413 | 12.71 |
| P-n45-k5 | 150 | 40 | 510 | 713 | 722 | 0.07 |  | 475 | 501 | 13.79 |  | 525 | 531 | 0.16 |  | | 400 | 418 | 7.44 |  | | 457 | | 523 | 0.61 |  | 430 | 462 | 13.54 |
| P-n50-k7 | 150 | 40 | 554 | 630 | 646 | 0.09 |  | 535 | 548 | 10.13 |  | 588 | 597 | 0.17 |  | | 477 | 495 | 5.66 |  | | 544 | | 604 | 0.77 |  | 519 | 535 | 10.98 |
| P-n50-k8 | 120 | 40 | 631 | 664 | 675 | 0.09 |  | 555 | 574 | 9.40 |  | 593 | 621 | 0.17 |  | | 520 | 566 | 5.37 |  | | 601 | | 660 | 0.83 |  | 561 | 585 | 9.33 |
| P-n50-k10 | 100 | 35 | 696 | 709 | 723 | 0.10 |  | 622 | 642 | 7.06 |  | 671 | 685 | 0.18 |  | | 606 | 618 | 4.83 |  | | 624 | | 706 | 0.84 |  | 588 | 623 | 9.47 |
| P-n55-k7 | 170 | 45 | 568 | 700 | 706 | 0.11 |  | 536 | 557 | 11.96 |  | 576 | 601 | 0.19 |  | | 445 | 479 | 7.41 |  | | 544 | | 603 | 0.91 |  | 507 | 532 | 13.43 |
| P-n55-k10 | 115 | 40 | 694 | 724 | 731 | 0.11 |  | 647 | 665 | 8.24 |  | 661 | 682 | 0.19 |  | | 579 | 611 | 5.65 |  | | 651 | | 714 | 1.02 |  | 609 | 650 | 7.91 |
| P-n55-k15 | 70 | 38 | 989 | 949 | 965 | 0.13 |  | 845 | 868 | 5.02 |  | 847 | 869 | 0.19 |  | | 786 | 798 | 4.25 |  | | 811 | | 876 | 1.01 |  | 768 | 795 | 5.85 |
| P-n60-k10 | 120 | 40 | 744 | 827 | 829 | 0.14 |  | 686 | 704 | 9.42 |  | 745 | 762 | 0.21 |  | | 681 | 711 | 5.45 |  | | 710 | | 784 | 1.22 |  | 669 | 692 | 8.73 |
| P-n60-k15 | 80 | 30 | 968 | 998 | 1015 | 0.15 |  | 919 | 941 | 5.29 |  | 886 | 908 | 0.22 |  | | 845 | 876 | 4.70 |  | | 882 | | 947 | 1.32 |  | 831 | 850 | 6.03 |
| P-n65-k10 | 130 | 40 | 792 | 865 | 884 | 0.16 |  | 764 | 803 | 10.50 |  | 812 | 837 | 0.23 |  | | 737 | 786 | 5.76 |  | | 781 | | 872 | 1.39 |  | 729 | 749 | 9.19 |
| P-n70-k10 | 135 | 40 | 827 | 912 | 928 | 0.19 |  | 816 | 834 | 10.51 |  | 877 | 893 | 0.25 |  | | 780 | 823 | 6.48 |  | | 840 | | 917 | 1.63 |  | 765 | 783 | 9.50 |

# 8. Detailed experimental data in 5.3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Comparison algorithm | | | | | Our algorithm | | | | | | | | | |
| Instance | n | k | Q | q | DTRC | |  | LNS | |  | PORC | | | | HAGM | | | | |
|  |  |  |  |  | Best | Avg Time |  | Best | Avg Time |  | GAP with DTRC | Best | Avg | Avg Time |  | GAP with LNS | Best | Avg | Avg Time |
| A-n32-k5 | 31 | 5 | 100 | 35 | 783 | 0.68 |  | 699 | 68.36 |  | -4.73 | 746 | 752 | 0.15 |  | -1.49 | 689 | 706 | 6.12 |
| A-n33-k5 | 32 | 5 | 100 | 35 | 646 | 0.79 |  | 561 | 68.36 |  | -6.20 | 606 | 621 | 0.13 |  | -2.65 | 546 | 595 | 6.39 |
| A-n33-k6 | 32 | 6 | 100 | 35 | 701 | 0.69 |  | 634 | 63.53 |  | -5.69 | 661 | 676 | 0.13 |  | -0.34 | 632 | 662 | 4.97 |
| A-n34-k5 | 33 | 5 | 100 | 35 | 752 | 0.86 |  | 648 | 66.14 |  | -2.06 | 737 | 755 | 0.15 |  | 0.75 | 653 | 681 | 7.48 |
| A-n36-k5 | 35 | 5 | 100 | 35 | 759 | 1.11 |  | 669 | 68.63 |  | 3.30 | 784 | 794 | 0.15 |  | 13.28 | 758 | 763 | 8.36 |
| A-n37-k5 | 36 | 6 | 100 | 35 | 661 | 1.25 |  | 516 | 68.40 |  | -6.33 | 619 | 635 | 0.14 |  | 6.88 | 552 | 584 | 9.29 |
| A-n37-k6 | 36 | 6 | 100 | 35 | 914 | 1.01 |  | 837 | 66.45 |  | -2.03 | 895 | 903 | 0.14 |  | -5.39 | 792 | 820 | 6.25 |
| A-n38-k5 | 37 | 5 | 100 | 35 | 721 | 1.03 |  | 636 | 70.57 |  | -3.45 | 696 | 714 | 0.14 |  | -0.56 | 632 | 657 | 7.61 |
| A-n39-k5 | 38 | 5 | 100 | 35 | 833 | 2.35 |  | 698 | 66.38 |  | -5.41 | 788 | 808 | 0.15 |  | -2.50 | 681 | 693 | 7.29 |
| A-n39-k6 | 38 | 6 | 100 | 35 | 849 | 1.12 |  | 692 | 76.10 |  | -10.12 | 763 | 783 | 0.15 |  | -0.88 | 686 | 733 | 6.92 |
| A-n44-k6 | 43 | 6 | 100 | 35 | 914 | 1.78 |  | 825 | 72.64 |  | -1.96 | 896 | 909 | 0.16 |  | -2.58 | 804 | 826 | 7.26 |
| A-n45-k6 | 44 | 6 | 100 | 35 | 943 | 0.92 |  | 846 | 85.52 |  | -1.82 | 926 | 936 | 0.16 |  | 1.04 | 855 | 892 | 7.14 |
| A-n46-k7 | 45 | 7 | 100 | 35 | 905 | 1.27 |  | 810 | 90.40 |  | 0.93 | 913 | 920 | 0.16 |  | -3.71 | 780 | 832 | 6.17 |
| A-n48-k7 | 47 | 7 | 100 | 35 | 1075 | 1.34 |  | 973 | 73.54 |  | -0.97 | 1065 | 1090 | 0.17 |  | -6.61 | 909 | 969 | 7.48 |
| A-n53-k7 | 52 | 7 | 100 | 35 | 1000 | 1.02 |  | 952 | 95.63 |  | -0.56 | 994 | 1030 | 0.18 |  | -3.89 | 915 | 942 | 9.33 |
| A-n54-k7 | 53 | 7 | 100 | 35 | 1143 | 1.58 |  | 1057 | 93.10 |  | 1.50 | 1160 | 1188 | 0.19 |  | -3.37 | 1021 | 1057 | 8.12 |
| A-n55-k9 | 54 | 9 | 100 | 35 | 1057 | 1.53 |  | 981 | 94.46 |  | -3.39 | 1021 | 1055 | 0.19 |  | -8.81 | 895 | 949 | 6.48 |
| A-n62-k8 | 61 | 8 | 100 | 35 | 1287 | 3.32 |  | 1241 | 118.51 |  | 3.26 | 1329 | 1350 | 0.21 |  | -11.36 | 1100 | 1155 | 7.55 |
| A-n63-k10 | 62 | 10 | 100 | 35 | 1305 | 2.26 |  | 1267 | 93.83 |  | -4.82 | 1242 | 1314 | 0.22 |  | -9.77 | 1143 | 1171 | 6.74 |
| A-n65-k9 | 64 | 9 | 100 | 35 | 1180 | 2.96 |  | 1080 | 145.90 |  | -1.25 | 1165 | 1199 | 0.22 |  | 1.63 | 1098 | 1132 | 6.71 |
| A-n69-k9 | 68 | 9 | 100 | 35 | 1078 | 2.40 |  | 1079 | 152.80 |  | 11.01 | 1197 | 1219 | 0.24 |  | -3.70 | 1039 | 1080 | 8.92 |
| B-n31-k5 | 30 | 5 | 100 | 35 | 672 | 0.72 |  | 653 | 66.35 |  | -13.32 | 582 | 585 | 0.13 |  | -14.85 | 556 | 572 | 7.84 |
| B-n34-k5 | 33 | 5 | 100 | 35 | 769 | 0.87 |  | 748 | 69.87 |  | -13.65 | 664 | 694 | 0.13 |  | -9.32 | 678 | 698 | 7.13 |
| B-n35-k5 | 34 | 5 | 100 | 35 | 954 | 0.71 |  | 896 | 67.05 |  | -19.60 | 767 | 774 | 0.13 |  | -16.60 | 747 | 750 | 8.84 |
| B-n38-k6 | 37 | 6 | 100 | 35 | 803 | 1.11 |  | 723 | 69.44 |  | -19.75 | 644 | 655 | 0.14 |  | -12.32 | 634 | 665 | 6.72 |
| B-n39-k5 | 38 | 5 | 100 | 35 | 548 | 0.97 |  | 497 | 75.09 |  | -2.54 | 534 | 538 | 0.14 |  | 6.55 | 530 | 534 | 6.70 |
| B-n41-k6 | 40 | 6 | 100 | 35 | 875 | 0.82 |  | 813 | 82.07 |  | -11.07 | 778 | 785 | 0.15 |  | -6.21 | 762 | 770 | 6.89 |
| E-n51-k5 | 50 | 5 | 160 | 50 | 502 | 2.86 |  | 452 | 94.20 |  | 3.95 | 522 | 538 | 0.17 |  | -0.29 | 451 | 467 | 9.00 |
| E-n76-k7 | 75 | 7 | 220 | 55 | 650 | 3.87 |  | 622 | 150.79 |  | 11.86 | 727 | 745 | 0.27 |  | -15.53 | 525 | 573 | 1.06 |
| E-n76-k8 | 75 | 8 | 180 | 45 | 684 | 3.65 |  | 664 | 233.76 |  | 16.41 | 796 | 812 | 0.27 |  | -19.91 | 532 | 583 | 8.80 |
| E-n76-k10 | 75 | 10 | 140 | 40 | 827 | 3.06 |  | 795 | 289.56 |  | 7.18 | 886 | 897 | 0.27 |  | -4.94 | 756 | 808 | 7.04 |
| E-n76-k14 | 75 | 14 | 100 | 35 | 1019 | 1.94 |  | 1008 | 160.27 |  | -0.90 | 1010 | 1027 | 0.28 |  | -11.73 | 890 | 922 | 5.26 |
| P-n16-k8 | 15 | 8 | 35 | 20 | 469 | 0.37 |  | 444 | 60.24 |  | -8.32 | 430 | 447 | 0.11 |  | -9.23 | 403 | 410 | 2.55 |
| P-n19-k2 | 18 | 2 | 160 | 40 | 221 | 0.65 |  | 165 | 60.67 |  | -7.16 | 205 | 205 | 0.11 |  | -11.33 | 146 | 180 | 4.78 |
| P-n20-k2 | 19 | 2 | 160 | 40 | 216 | 0.54 |  | 166 | 60.88 |  | -0.21 | 216 | 216 | 0.11 |  | -16.03 | 139 | 158 | 3.48 |
| P-n21-k2 | 20 | 2 | 160 | 40 | 203 | 0.77 |  | 161 | 61.77 |  | 9.68 | 223 | 223 | 0.11 |  | -6.83 | 150 | 165 | 2.22 |
| P-n22-k2 | 21 | 2 | 160 | 40 | 208 | 0.76 |  | 163 | 61.84 |  | 4.97 | 218 | 218 | 0.11 |  | 14.11 | 186 | 195 | 1.67 |
| P-n23-k8 | 22 | 8 | 40 | 20 | 527 | 0.48 |  | 512 | 61.24 |  | -5.88 | 496 | 503 | 0.12 |  | -4.69 | 488 | 497 | 2.72 |
| P-n40-k5 | 39 | 5 | 140 | 40 | 456 | 1.56 |  | 379 | 81.46 |  | -2.13 | 446 | 458 | 0.15 |  | 4.65 | 397 | 413 | 7.16 |
| P-n45-k5 | 44 | 5 | 150 | 40 | 495 | 1.06 |  | 426 | 80.29 |  | 6.15 | 525 | 531 | 0.16 |  | -6.02 | 400 | 418 | 7.44 |
| P-n50-k7 | 49 | 7 | 150 | 40 | 555 | 0.98 |  | 502 | 91.90 |  | 5.97 | 588 | 597 | 0.17 |  | -4.94 | 477 | 495 | 5.66 |
| P-n50-k8 | 49 | 8 | 120 | 40 | 604 | 1.08 |  | 578 | 73.33 |  | -1.77 | 593 | 621 | 0.17 |  | -9.99 | 520 | 566 | 5.37 |
| P-n50-k10 | 49 | 10 | 100 | 35 | 705 | 1.45 |  | 665 | 81.98 |  | -4.79 | 671 | 685 | 0.18 |  | -8.90 | 606 | 618 | 4.83 |
| P-n55-k7 | 54 | 7 | 170 | 45 | 579 | 1.68 |  | 512 | 96.21 |  | -0.43 | 576 | 601 | 0.19 |  | -13.00 | 445 | 479 | 7.41 |
| P-n55-k10 | 54 | 10 | 115 | 40 | 695 | 1.71 |  | 654 | 92.65 |  | -4.83 | 661 | 682 | 0.19 |  | -11.41 | 579 | 611 | 5.65 |
| P-n55-k15 | 54 | 15 | 70 | 38 | 937 | 1.33 |  | 919 | 77.16 |  | -9.65 | 847 | 869 | 0.19 |  | -14.52 | 786 | 798 | 4.25 |
| P-n60-k10 | 59 | 10 | 120 | 40 | 735 | 1.89 |  | 714 | 99.47 |  | 1.30 | 745 | 762 | 0.21 |  | -6.37 | 669 | 692 | 5.45 |
| P-n60-k15 | 59 | 15 | 80 | 30 | 968 | 1.62 |  | 946 | 83.28 |  | -8.45 | 886 | 908 | 0.22 |  | -12.20 | 831 | 850 | 4.70 |
| P-n65-k10 | 64 | 10 | 130 | 40 | 803 | 2.07 |  | 730 | 128.82 |  | 1.07 | 812 | 837 | 0.23 |  | -0.18 | 729 | 749 | 5.76 |
| P-n70-k10 | 69 | 10 | 135 | 40 | 832 | 2.36 |  | 783 | 138.90 |  | 5.41 | 877 | 893 | 0.25 |  | -2.24 | 765 | 783 | 6.48 |
| **Average** |  |  |  |  |  | **1.48** |  |  | **93.00** |  | **-2.03** |  |  | **0.17** |  | **-5.37** |  |  | **6.31** |