**Appendix: A dataset containing 252 sets of permeability coefficient data for coarse-grained soils with different characteristics.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Serial number | *n* | *d*50 (mm) | *c*s (mm) | *C*u | *k*Meas (cm/s-1) |
| 1 | 0.484801649 | 0.17 | 0.05 | 1.8 | 0.000442 |
| 2 | 0.485596708 | 0.16 | 0.05 | 2.1 | 0.000394 |
| 3 | 0.486125385 | 0.16 | 0.05 | 2.3 | 3.82E-05 |
| 4 | 0.486916367 | 0.15 | 0.05 | 4.6 | 2.42E-05 |
| 5 | 0.487704918 | 0.14 | 0.05 | 5.9 | 1.93E-05 |
| 6 | 0.48796723 | 0.13 | 0.05 | 7.1 | 1.35E-05 |
| 7 | 0.48927477 | 0.11 | 0.05 | 7.7 | 1.27E-05 |
| 8 | 0.133448873 | 4.31 | 0.02 | 20 | 0.00116 |
| 9 | 0.152542373 | 4.31 | 0.02 | 20 | 0.00187 |
| 10 | 0.167360533 | 4.31 | 0.02 | 20 | 0.00231 |
| 11 | 0.133448873 | 4.31 | 0.02 | 30 | 0.00092 |
| 12 | 0.152542373 | 4.31 | 0.02 | 30 | 0.00128 |
| 13 | 0.167360533 | 4.31 | 0.02 | 30 | 0.00183 |
| 14 | 0.133448873 | 4.31 | 0.02 | 40 | 0.00059 |
| 15 | 0.152542373 | 4.31 | 0.02 | 40 | 0.00103 |
| 16 | 0.167360533 | 4.31 | 0.02 | 40 | 0.00171 |
| 17 | 0.133448873 | 5.71 | 0.02 | 20 | 0.00572 |
| 18 | 0.152542373 | 5.71 | 0.02 | 20 | 0.0063 |
| 19 | 0.167360533 | 5.71 | 0.02 | 20 | 0.00778 |
| 20 | 0.133448873 | 5.71 | 0.02 | 30 | 0.00444 |
| 21 | 0.152542373 | 5.71 | 0.02 | 30 | 0.00555 |
| 22 | 0.167360533 | 5.71 | 0.02 | 30 | 0.00703 |
| 23 | 0.133448873 | 5.71 | 0.02 | 40 | 0.0031 |
| 24 | 0.152542373 | 5.71 | 0.02 | 40 | 0.00379 |
| 25 | 0.167360533 | 5.71 | 0.02 | 40 | 0.0042 |
| 26 | 0.133448873 | 7.1 | 0.02 | 20 | 0.00828 |
| 27 | 0.152542373 | 7.1 | 0.02 | 20 | 0.0152 |
| 28 | 0.167360533 | 7.1 | 0.02 | 20 | 0.01801 |
| 29 | 0.133448873 | 7.1 | 0.02 | 30 | 0.00684 |
| 30 | 0.152542373 | 7.1 | 0.02 | 30 | 0.00798 |
| 31 | 0.167360533 | 7.1 | 0.02 | 30 | 0.01005 |
| 32 | 0.133448873 | 7.1 | 0.02 | 40 | 0.00508 |
| 33 | 0.152542373 | 7.1 | 0.02 | 40 | 0.00606 |
| 34 | 0.133448873 | 7.1 | 0.02 | 20 | 0.00851 |
| 35 | 0.307479224 | 5 | 0 | 32.5 | 0.016 |
| 36 | 0.307479224 | 5 | 0 | 33.5 | 0.023 |
| 37 | 0.307479224 | 5 | 0 | 34.5 | 0.037 |
| 38 | 0.307479224 | 5 | 0 | 35.5 | 0.046 |
| 39 | 0.307479224 | 5 | 0 | 36.5 | 0.059 |
| 40 | 0.307479224 | 5 | 0 | 37.5 | 0.08 |
| 41 | 0.307479224 | 5 | 0 | 38 | 0.1 |
| 42 | 0.307479224 | 5 | 0 | 41 | 0.121 |
| 43 | 0.307479224 | 5 | 0 | 47.5 | 0.202 |
| 44 | 0.307479224 | 5 | 0 | 57.5 | 0.266 |
| 45 | 0.307479224 | 5 | 0 | 77.5 | 0.291 |
| 46 | 0.211977935 | 17.84 | 0 | 5.2 | 0.354 |
| 47 | 0.196787149 | 17.84 | 0 | 5.2 | 0.305 |
| 48 | 0.177631579 | 17.84 | 0 | 5.2 | 0.29 |
| 49 | 0.211977935 | 15.58 | 0 | 9.166666667 | 0.101 |
| 50 | 0.196787149 | 15.58 | 0 | 9.166666667 | 0.0903 |
| 51 | 0.211977935 | 11.03 | 0 | 16 | 0.00987 |
| 52 | 0.196787149 | 11.03 | 0 | 16 | 0.00869 |
| 53 | 0.177631579 | 11.03 | 0 | 16 | 0.00809 |
| 54 | 0.211977935 | 7.94 | 0 | 25 | 0.00808 |
| 55 | 0.196787149 | 7.94 | 0 | 25 | 0.00448 |
| 56 | 0.177631579 | 7.94 | 0 | 25 | 0.00264 |
| 57 | 0.178307313 | 13.23 | 0 | 20.18292683 | 0.794 |
| 58 | 0.168744805 | 12.85 | 0 | 27.1 | 0.789 |
| 59 | 0.118165785 | 12.55 | 0 | 38.02380952 | 0.51 |
| 60 | 0.085086917 | 11.98 | 0 | 90.70588235 | 0.0701 |
| 61 | 0.259259259 | 2.54 | 0 | 16.24 | 0.0077 |
| 62 | 0.270605398 | 2.54 | 0 | 16.24 | 0.022 |
| 63 | 0.292786421 | 2.54 | 0 | 16.24 | 0.023 |
| 64 | 0.30362117 | 2.54 | 0 | 16.24 | 0.033 |
| 65 | 0.31459904 | 2.54 | 0 | 16.24 | 0.038 |
| 66 | 0.336870027 | 2.54 | 0 | 16.24 | 0.072 |
| 67 | 0.348109518 | 2.54 | 0 | 16.24 | 0.087 |
| 68 | 0.35938501 | 2.54 | 0 | 16.24 | 0.094 |
| 69 | 0.311294766 | 7.7 | 0 | 41.8 | 0.067 |
| 70 | 0.311294766 | 6.44 | 0 | 36.2 | 0.045 |
| 71 | 0.311294766 | 5.1 | 0 | 29.72 | 0.028 |
| 72 | 0.311294766 | 3.94 | 0 | 23.56 | 0.024 |
| 73 | 0.311294766 | 3.28 | 0 | 17.68 | 0.023 |
| 74 | 0.311294766 | 2.77 | 0 | 13.76 | 0.021 |
| 75 | 0.311294766 | 1.79 | 0 | 9.96 | 0.019 |
| 76 | 0.311294766 | 1.36 | 0 | 6.4 | 0.01 |
| 77 | 0.311294766 | 0.83 | 0 | 3.88 | 0.0096 |
| 78 | 0.311294766 | 0.71 | 0 | 3.08 | 0.0088 |
| 79 | 0.277978339 | 0.76 | 0 | 20 | 0.0031 |
| 80 | 0.277978339 | 2.52 | 0 | 20 | 0.0063 |
| 81 | 0.277978339 | 3.05 | 0 | 20 | 0.0064 |
| 82 | 0.277978339 | 3.44 | 0 | 20 | 0.0067 |
| 83 | 0.277978339 | 3.54 | 0 | 20 | 0.0069 |
| 84 | 0.277978339 | 3.59 | 0 | 20 | 0.013 |
| 85 | 0.277978339 | 3.69 | 0 | 20 | 0.012 |
| 86 | 0.277978339 | 3.76 | 0 | 20 | 0.01 |
| 87 | 0.277978339 | 3.83 | 0 | 20 | 0.016 |
| 88 | 0.277978339 | 3.92 | 0 | 20 | 0.016 |
| 89 | 0.277978339 | 3.99 | 0 | 20 | 0.024 |
| 90 | 0.213217939 | 11.52 | 0 | 12.56923077 | 0.0503 |
| 91 | 0.213217939 | 12.36 | 0 | 12.31724138 | 0.0502 |
| 92 | 0.213217939 | 13.86 | 0 | 9.480952381 | 0.0403 |
| 93 | 0.213217939 | 15.15 | 0 | 7.268707483 | 0.0304 |
| 94 | 0.213217939 | 15.98 | 0 | 7.222929936 | 0.021 |
| 95 | 0.213217939 | 17.47 | 0 | 7.784848485 | 0.0206 |
| 96 | 0.213217939 | 18.76 | 0 | 8.312138728 | 0.0198 |
| 97 | 0.213217939 | 19.91 | 0 | 9.303468208 | 0.0101 |
| 98 | 0.217527387 | 17.68 | 0 | 10.44491525 | 0.011 |
| 99 | 0.211356467 | 17.68 | 0 | 10.44491525 | 0.00993 |
| 100 | 0.200639488 | 17.68 | 0 | 10.44491525 | 0.00902 |
| 101 | 0.192245557 | 17.68 | 0 | 10.44491525 | 0.00781 |
| 102 | 0.177631579 | 17.68 | 0 | 10.44491525 | 0.00683 |
| 103 | 0.354005168 | 0.71 | 0 | 4 | 0.0222 |
| 104 | 0.354005168 | 1 | 0 | 5.68 | 0.0547 |
| 105 | 0.354005168 | 1.28 | 0 | 8 | 0.0564 |
| 106 | 0.354005168 | 1.29 | 0 | 10.12 | 0.0603 |
| 107 | 0.41588785 | 1.29 | 0 | 8 | 0.0141 |
| 108 | 0.41588785 | 1.46 | 0 | 8 | 0.0204 |
| 109 | 0.41588785 | 1.63 | 0 | 8 | 0.034 |
| 110 | 0.41588785 | 1.67 | 0 | 8 | 0.0408 |
| 111 | 0.41588785 | 1.69 | 0 | 8 | 0.0547 |
| 112 | 0.206349206 | 25.07 | 0 | 12.056 | 0.95 |
| 113 | 0.206349206 | 19.97 | 0 | 10.028 | 0.73 |
| 114 | 0.206349206 | 7.89 | 0 | 18.2 | 0.066 |
| 115 | 0.249812453 | 3.67 | 0 | 67 | 0.00704 |
| 116 | 0.190283401 | 3.67 | 0 | 67 | 0.00118 |
| 117 | 0.240121581 | 3.97 | 0 | 37.5 | 0.0122 |
| 118 | 0.190283401 | 3.97 | 0 | 37.5 | 0.0098 |
| 119 | 0.2 | 3.73 | 0 | 67.5 | 0.00044 |
| 120 | 0.2 | 3.73 | 0 | 67.5 | 0.00076 |
| 121 | 0.190283401 | 11.55 | 0 | 75.32142857 | 0.00401 |
| 122 | 0.177631579 | 15.58 | 0 | 9.166666667 | 0.0832 |
| 123 | 0.10793934 | 12.26 | 0 | 58.11111111 | 0.35 |
| 124 | 0.281609195 | 2.54 | 0 | 16.24 | 0.022 |
| 125 | 0.326145553 | 2.54 | 0 | 16.24 | 0.057 |
| 126 | 0.354005168 | 0.43 | 0 | 2 | 0.0142 |
| 127 | 0.2 | 3.67 | 0 | 67 | 0.00313 |
| 128 | 0.344262295 | 0.5 | 0 | 3 | 0.001843 |
| 129 | 0.344262295 | 1 | 0 | 5.6 | 0.00383 |
| 130 | 0.344262295 | 2 | 0 | 11 | 0.003675 |
| 131 | 0.358563182 | 2 | 0 | 5.6 | 0.01226 |
| 132 | 0.358563182 | 0.5 | 0 | 11 | 0.003352 |
| 133 | 0.358563182 | 1 | 0 | 3 | 0.008993 |
| 134 | 0.363867684 | 1 | 0 | 11 | 0.001359 |
| 135 | 0.363867684 | 2 | 0 | 3 | 0.03184 |
| 136 | 0.363867684 | 0.5 | 0 | 5.6 | 0.0009422 |
| 137 | 0.41 | 1.7 | 0 | 8 | 0.12 |
| 138 | 0.41 | 2.5 | 0 | 12.6 | 0.06 |
| 139 | 0.41 | 3 | 0 | 16.7 | 0.07 |
| 140 | 0.41 | 3.5 | 0 | 20 | 0.078 |
| 141 | 0.41 | 5.5 | 0 | 29.1 | 0.32 |
| 142 | 0.275362319 | 2.22 | 0 | 13.32 | 0.00684 |
| 143 | 0.305555556 | 2.22 | 0 | 13.32 | 0.00959 |
| 144 | 0.337748344 | 2.22 | 0 | 13.32 | 0.0268 |
| 145 | 0.367088608 | 2.22 | 0 | 13.32 | 0.0502 |
| 146 | 0.393939394 | 2.22 | 0 | 13.32 | 0.0889 |
| 147 | 0.300699301 | 3.11 | 0 | 9.65 | 0.00727 |
| 148 | 0.32885906 | 3.11 | 0 | 9.65 | 0.0134 |
| 149 | 0.35483871 | 3.11 | 0 | 9.65 | 0.0258 |
| 150 | 0.378881988 | 3.11 | 0 | 9.65 | 0.0478 |
| 151 | 0.401197605 | 3.11 | 0 | 9.65 | 0.0719 |
| 152 | 0.539170507 | 9.15 | 0 | 1.571428571 | 1.6028 |
| 153 | 0.539170507 | 8.65 | 0 | 11.11111111 | 0.2844 |
| 154 | 0.539170507 | 6 | 0 | 11.53846154 | 0.0494 |
| 155 | 0.539170507 | 4 | 0 | 10 | 0.0081 |
| 156 | 0.539170507 | 3 | 0 | 13.33333333 | 0.0014 |
| 157 | 0.539170507 | 9.5 | 0 | 10 | 0.6966 |
| 158 | 0.539170507 | 8 | 0 | 12.85714286 | 0.1114 |
| 159 | 0.539170507 | 5 | 0 | 15.55555556 | 0.0194 |
| 160 | 0.539170507 | 4 | 0 | 16.66666667 | 0.0032 |
| 161 | 0.35191186 | 1.93 | 0 | 13.65 | 0.00442 |
| 162 | 0.360204734 | 4.93 | 0 | 28.89 | 0.00367 |
| 163 | 0.343401182 | 3.48 | 0 | 10 | 0.00438 |
| 164 | 0.379652605 | 1.34 | 0 | 11.43 | 0.0003 |
| 165 | 0.408983452 | 3.26 | 0 | 28.75 | 0.00725 |
| 166 | 0.367888748 | 0.67 | 0 | 24.62 | 0.00317 |
| 167 | 0.343401182 | 2.26 | 0 | 19 | 0.00035 |
| 168 | 0.381953028 | 1.03 | 0 | 10.44 | 0.018 |
| 169 | 0.404761905 | 4.16 | 0 | 14.71 | 0.01329 |
| 170 | 0.399399399 | 3.98 | 0 | 18.33 | 0.00179 |
| 171 | 0.405116002 | 3.72 | 0 | 12.7 | 0.01758 |
| 172 | 0.387501253 | 0.94 | 0 | 3.513513514 | 0.0003553 |
| 173 | 0.386467347 | 0.48 | 0 | 3.555555556 | 0.000169 |
| 174 | 0.370510679 | 0.5 | 0 | 4.25 | 0.0001759 |
| 175 | 0.394798267 | 0.82 | 0 | 3.225806452 | 0.0004502 |
| 176 | 0.400805689 | 0.6 | 0 | 3 | 0.0003148 |
| 177 | 0.395098678 | 0.77 | 0 | 3.214285714 | 0.0002581 |
| 178 | 0.386467347 | 0.48 | 0 | 3.555555556 | 0.0002731 |
| 179 | 0.370510679 | 0.5 | 0 | 4.25 | 0.0001956 |
| 180 | 0.405989703 | 0.38 | 0 | 2.8125 | 0.0002176 |
| 181 | 0.395098678 | 0.73 | 0 | 3.214285714 | 0.00039 |
| 182 | 0.376018727 | 0.9 | 0 | 4 | 0.0003275 |
| 183 | 0.389078644 | 0.53 | 0 | 3.45 | 0.0003692 |
| 184 | 0.429117714 | 0.4 | 0 | 2.047619048 | 0.0002454 |
| 185 | 0.369744536 | 0.7 | 0 | 4.285714286 | 0.0002731 |
| 186 | 0.378963571 | 0.9 | 0 | 3.870967742 | 0.0001782 |
| 187 | 0.355445547 | 1.1 | 0 | 5 | 0.0002905 |
| 188 | 0.437825496 | 0.4 | 0 | 1.785714286 | 0.0003102 |
| 189 | 0.302669771 | 1.14 | 0 | 9 | 0.0001458 |
| 190 | 0.383410474 | 0.65 | 0 | 3.681818182 | 0.0005197 |
| 191 | 0.420090635 | 0.58 | 0 | 2.333333333 | 0.0004028 |
| 192 | 0.343712089 | 1.21 | 0 | 5.666666667 | 0.000485 |
| 193 | 0.485519403 | 0.22 | 0 | 0.541666667 | 0.0001667 |
| 194 | 0.45982844 | 1.04 | 0 | 1.175824176 | 0.011 |
| 195 | 0.449462381 | 0.46 | 0 | 1.454545455 | 0.002 |
| 196 | 0.458324136 | 0.75 | 0 | 1.215384615 | 0.01 |
| 197 | 0.460576853 | 0.36 | 0 | 1.15625 | 0.001 |
| 198 | 0.457016946 | 0.29 | 0 | 1.25 | 0.0007998 |
| 199 | 0.452366091 | 0.21 | 0 | 1.375 | 0.0002002 |
| 200 | 0.356435414 | 0.57 | 0 | 4.947368421 | 0.0002002 |
| 201 | 0.405404705 | 0.45 | 0 | 2.833333333 | 0.0002998 |
| 202 | 0.415042532 | 0.37 | 0 | 2.5 | 0.0002002 |
| 203 | 0.384218594 | 1.75 | 0 | 3.648148148 | 0.009 |
| 204 | 0.305555556 | 0.65 | 0 | 1.6 | 0.0035 |
| 205 | 0.375 | 0.28 | 0 | 1.875 | 9.6E-05 |
| 206 | 0.275362319 | 0.02 | 0 | 3 | 7.2E-07 |
| 207 | 0.324324324 | 0.56 | 0 | 1.619047619 | 0.00056 |
| 208 | 0.342105263 | 0.47 | 0 | 1.666666667 | 0.00038 |
| 209 | 0.358974359 | 0.37 | 0 | 1.791666667 | 0.0002 |
| 210 | 0.300699301 | 0.49 | 0 | 1.605263158 | 0.0005 |
| 211 | 0.319727891 | 0.4 | 0 | 0.620689655 | 0.0002 |
| 212 | 0.337748344 | 0.31 | 0 | 1.714285714 | 0.00015 |
| 213 | 0.35483871 | 0.21 | 0 | 1.916666667 | 0.000038 |
| 214 | 0.290780142 | 0.33 | 0 | 1.576923077 | 0.00012 |
| 215 | 0.310344828 | 0.24 | 0 | 1.705882353 | 6.7E-05 |
| 216 | 0.32885906 | 0.15 | 0 | 1.777777778 | 2.8E-05 |
| 217 | 0.285714286 | 0.18 | 0 | 1.692307692 | 4.6E-05 |
| 218 | 0.305555556 | 0.08 | 0 | 2 | 1.2E-05 |
| 219 | 0.242424242 | 0.18 | 0 | 5 | 0.00002 |
| 220 | 0.28057554 | 0.16 | 0 | 633.3333333 | 1.3E-05 |
| 221 | 0.259259259 | 0.22 | 0 | 3.375 | 1.3E-05 |
| 222 | 0.275362319 | 0.2 | 0 | 3.571428571 | 1.4E-05 |
| 223 | 0.253731343 | 0.19 | 0 | 12.5 | 9.1E-06 |
| 224 | 0.242424242 | 0.02 | 0 | 3 | 7.2E-07 |
| 225 | 0.375 | 0.65 | 0 | 1.6 | 0.0035 |
| 226 | 0.300699301 | 0.28 | 0 | 1.888888889 | 0.0003 |
| 227 | 0.305555556 | 0.23 | 0 | 1.866666667 | 5.6E-05 |
| 228 | 0.090909091 | 0.16 | 0 | 1.428571429 | 0.00077 |
| 229 | 0.479979199 | 0.325 | 0 | 1.975 | 0.000304 |
| 230 | 0.39795304 | 0.325 | 0 | 1.975 | 0.000104 |
| 231 | 0.380037198 | 0.325 | 0 | 1.975 | 7.6E-05 |
| 232 | 0.339933993 | 1.75 | 0 | 18.75 | 0.000292 |
| 233 | 0.265785609 | 1.75 | 0 | 18.75 | 8.5E-05 |
| 234 | 0.255952381 | 1.75 | 0 | 18.75 | 7.1E-05 |
| 235 | 0.332888592 | 12 | 0 | 69.56521739 | 0.000988 |
| 236 | 0.259259259 | 12 | 0 | 69.56521739 | 0.000702 |
| 237 | 0.230769231 | 12 | 0 | 69.56521739 | 0.000384 |
| 238 | 0.436936937 | 0.175 | 0 | 2.769230769 | 2.8E-05 |
| 239 | 0.411071849 | 0.175 | 0 | 2.769230769 | 1.7E-05 |
| 240 | 0.356913183 | 0.175 | 0 | 2.769230769 | 8E-06 |
| 241 | 0.42791762 | 0.49 | 0 | 3.870967742 | 0.000241 |
| 242 | 0.363867684 | 0.49 | 0 | 3.870967742 | 8.2E-05 |
| 243 | 0.339933993 | 0.49 | 0 | 3.870967742 | 7.8E-05 |
| 244 | 0.327956989 | 1.58 | 0 | 13.65853659 | 0.000278 |
| 245 | 0.26199262 | 1.58 | 0 | 13.65853659 | 0.000118 |
| 246 | 0.241274659 | 1.58 | 0 | 13.65853659 | 2.5E-05 |
| 247 | 0.446902655 | 3.25 | 0 | 35.38461538 | 0.00069 |
| 248 | 0.378109453 | 3.25 | 0 | 35.38461538 | 0.000194 |
| 249 | 0.388004896 | 3.25 | 0 | 35.38461538 | 4.3E-05 |
| 250 | 0.378109453 | 0.72 | 0 | 4.680851064 | 0.000315 |
| 251 | 0.291784703 | 0.72 | 0 | 4.680851064 | 5.7E-05 |
| 252 | 0.273783588 | 0.72 | 0 | 4.680851064 | 3.5E-05 |