|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Measurement of roundness by Dial gauge deflections of 6-mm Diameter Copper (Cu) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Mean values of Dial Gauge Deflection Readings before straightening of 6 mm Copper round bar x 0.01 mm | | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Angles in Degrees | | | | | | | | | | | | | | | | | | | | | | | | |  |
| Length in cm | 0o | 15o | 30o | 45o | 60o | 75o | 90o | 105o | 120o | 135o | 150o | 165o | 180o | 195o | 210o | 225o | 240o | 255o | 270o | 285o | 300o | 315o | 330o | 345o | STD  DEV  (mm) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 16.0 | 301.5 | 297.0 | 288.0 | 275.5 | 262.5 | 251.0 | 239.5 | 225.0 | 213.5 | 202.0 | 195.5 | 187.0 | 187.0 | 197.0 | 210.0 | 225.0 | 241.5 | 256.0 | 269.0 | 284.0 | 296.0 | 302.5 | 308.5 | 310.5 | 0.4221 | |
| 18.0 | 311.0 | 306.0 | 296.0 | 285.0 | 268.0 | 253.5 | 241.5 | 230.0 | 217.0 | 203.5 | 195.5 | 187.0 | 187.0 | 198.0 | 211.5 | 228.0 | 244.5 | 259.5 | 272.0 | 285.5 | 297.0 | 302.0 | 307.0 | 312.0 | 0.4339 | |
| 20.0 | 274.0 | 269.0 | 264.5 | 256.5 | 248.0 | 241.0 | 234.0 | 227.0 | 219.0 | 210.0 | 207.0 | 205.0 | 203.0 | 208.0 | 217.5 | 226.0 | 237.0 | 245.5 | 259.0 | 265.5 | 270.0 | 276.5 | 279.5 | 282.0 | 0.2664 | |
| 22.0 | 281.0 | 276.0 | 270.0 | 260.0 | 251.0 | 243.5 | 238.0 | 228.0 | 221.5 | 213.5 | 207.5 | 204.5 | 203.0 | 208.5 | 218.5 | 228.5 | 240.0 | 252.0 | 260.0 | 268.0 | 274.5 | 279.5 | 282.5 | 283.5 | 0.2791 | |
| 25.0 | 239.0 | 238.0 | 238.5 | 237.5 | 238.0 | 237.0 | 236.0 | 236.0 | 232.5 | 232.5 | 235.5 | 239.0 | 241.0 | 241.5 | 244.5 | 245.0 | 245.0 | 242.5 | 241.0 | 240.5 | 239.0 | 247.5 | 237.0 | 245.5 | 0.0398 | |
| 30.0 | 227.5 | 225.0 | 225.5 | 229.0 | 235.5 | 239.0 | 243.5 | 247.0 | 249.5 | 250.5 | 252.0 | 253.5 | 252.0 | 251.0 | 248.0 | 243.5 | 237.0 | 230.0 | 224.5 | 218.0 | 212.0 | 210.0 | 209.5 | 209.0 | 0.1515 | |
| 35.0 | 199.0 | 208.0 | 217.5 | 227.0 | 231.0 | 238.5 | 245.5 | 250.5 | 254.5 | 256.5 | 256.0 | 254.5 | 256.0 | 254.0 | 247.0 | 240.5 | 230.5 | 221.0 | 211.5 | 203.5 | 197.0 | 194.5 | 193.0 | 194.5 | 0.2342 | |
| 40.0 | 181.5 | 195.5 | 211.0 | 227.0 | 239.0 | 250.0 | 260.0 | 268.5 | 273.0 | 276.0 | 274.5 | 273.5 | 267.5 | 262.0 | 252.5 | 243.5 | 231.0 | 217.0 | 205.0 | 194.0 | 185.0 | 181.0 | 178.0 | 178.5 | 0.3588 | |
| 45.0 | 175.5 | 196.0 | 212.0 | 228.5 | 246.0 | 259.0 | 271.0 | 284.5 | 292.0 | 297.0 | 296.5 | 293.0 | 289.5 | 280.0 | 265.5 | 252.5 | 237.5 | 222.0 | 207.5 | 191.5 | 179.0 | 172.0 | 168.5 | 169.5 | 0.4620 | |
| 50.0 | 158.0 | 176.0 | 193.0 | 214.0 | 234.0 | 252.0 | 271.5 | 288.5 | 303.0 | 314.0 | 318.5 | 319.5 | 317.0 | 310.0 | 302.0 | 285.5 | 269.0 | 252.0 | 234.0 | 215.5 | 201.0 | 183.5 | 174.0 | 171.0 | 0.5507 | |
| 55.0 | 165.0 | 177.5 | 192.0 | 210.0 | 233.5 | 254.0 | 270.5 | 284.5 | 301.0 | 315.5 | 329.0 | 335.0 | 339.5 | 329.5 | 322.0 | 309.5 | 292.0 | 272.0 | 254.5 | 232.0 | 208.0 | 190.5 | 176.0 | 168.5 | 0.5959 | |
| 60.0 | 189.0 | 185.0 | 184.5 | 185.0 | 191.0 | 202.5 | 213.0 | 234.0 | 248.0 | 258.0 | 267.0 | 275.0 | 283.0 | 289.5 | 291.5 | 289.0 | 283.0 | 275.0 | 267.0 | 256.0 | 242.5 | 230.0 | 218.0 | 205.0 | 0.3837 | |
| 62.0 | 193.0 | 182.5 | 178.0 | 183.0 | 188.5 | 201.0 | 214.5 | 229.0 | 240.0 | 251.5 | 260.0 | 268.0 | 273.0 | 278.5 | 281.0 | 277.5 | 274.0 | 270.0 | 263.0 | 252.0 | 240.0 | 225.5 | 214.5 | 202.0 | 0.3548 | |
| 65.0 | 164.5 | 158.5 | 155.5 | 156.0 | 169.0 | 188.5 | 205.0 | 225.0 | 241.0 | 253.5 | 270.0 | 287.5 | 302.0 | 304.5 | 310.5 | 305.0 | 311.0 | 290.0 | 275.0 | 255.0 | 239.5 | 210.0 | 201.0 | 181.0 | 0.5544 | |
| 68.0 | 170.0 | 154.5 | 155.0 | 158.0 | 173.5 | 190.5 | 209.0 | 229.0 | 246.5 | 261.5 | 278.0 | 291.0 | 291.5 | 298.0 | 300.0 | 298.0 | 296.5 | 281.0 | 267.5 | 250.5 | 221.0 | 214.0 | 194.5 | 178.5 | 0.5246 | |
| 70.0 | 146.0 | 138.5 | 138.5 | 145.0 | 162.0 | 183.0 | 203.0 | 224.5 | 242.5 | 261.5 | 277.5 | 292.0 | 314.5 | 321.5 | 323.5 | 318.0 | 300.5 | 286.0 | 268.0 | 246.0 | 226.5 | 204.0 | 185.5 | 164.5 | 0.6410 | |
| 75.0 | 146.5 | 145.5 | 148.5 | 164.0 | 181.5 | 200.0 | 219.0 | 238.5 | 256.0 | 273.0 | 289.5 | 303.5 | 311.0 | 312.5 | 305.0 | 295.0 | 280.5 | 264.5 | 246.5 | 224.0 | 205.0 | 187.5 | 168.0 | 155.0 | 0.5868 | |
| 80.0 | 155.0 | 167.0 | 178.0 | 191.5 | 205.0 | 214.5 | 241.5 | 255.5 | 270.5 | 285.0 | 296.5 | 301.0 | 301.5 | 295.5 | 285.0 | 270.0 | 262.5 | 243.0 | 224.5 | 206.0 | 190.0 | 175.5 | 163.5 | 156.5 | 0.5099 | |
| 86.0 | 165.5 | 181.5 | 196.5 | 213.5 | 230.0 | 246.5 | 259.5 | 275.0 | 286.5 | 293.0 | 296.5 | 299.0 | 295.0 | 285.0 | 275.0 | 263.0 | 247.5 | 228.0 | 213.0 | 196.0 | 182.5 | 168.0 | 160.0 | 159.0 | 0.4899 | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Measurement of roundness by Dial gauge deflections of 8-mm Diameter Copper (Cu) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Mean values of Dial Gauge Deflection Readings before straightening of 8 mm Copper round bar x 0.01 mm | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Angles in Degrees | | | | | | | | | | | | | | | | | | | | | | | |  |
| Length in cm | 0o | 15o | 30o | 45o | 60o | 75o | 90o | 105o | 120o | 135o | 150o | 165o | 180o | 195o | 210o | 225o | 240o | 255o | 270o | 285o | 300o | 315o | 330o | 345o | STD  DEV (mm) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11.5 | 174 | 174 | 174 | 174 | 173 | 171 | 171 | 172 | 174 | 174 | 172 | 169 | 164 | 161 | 157 | 156 | 156 | 155 | 157 | 159 | 163 | 165 | 168 | 173 | 0.0715195 |
| 13 | 173 | 171 | 173 | 173 | 172 | 172 | 172 | 173 | 175 | 174 | 171 | 168 | 162 | 159 | 156 | 154 | 153 | 154 | 157 | 159 | 163 | 165 | 167 | 172 | 0.0751011 |
| 15 | 173 | 174 | 174 | 174 | 173 | 172 | 171 | 172 | 172 | 171 | 167 | 163 | 158 | 155 | 152 | 151 | 152 | 155 | 158 | 162 | 164 | 165 | 167 | 170 | 0.0793996 |
| 17 | 179 | 178 | 178 | 177 | 176 | 175 | 174 | 175 | 174 | 169 | 166 | 163 | 158 | 155 | 154 | 158 | 163 | 167 | 170 | 172 | 174 | 174 | 175 | 177 | 0.076413 |
| 19 | 179 | 178 | 177 | 177 | 175 | 173 | 173 | 172 | 169 | 165 | 162 | 157 | 153 | 152 | 155 | 161 | 168 | 171 | 175 | 177 | 176 | 176 | 177 | 180 | 0.0875861 |
| 22 | 181 | 180 | 179 | 179 | 175 | 172 | 172 | 170 | 166 | 163 | 158 | 155 | 151 | 152 | 156 | 164 | 170 | 176 | 179 | 180 | 179 | 178 | 179 | 180 | 0.0994951 |
| 25 | 181 | 181 | 179 | 176 | 173 | 169 | 168 | 166 | 161 | 156 | 153 | 147 | 147 | 152 | 156 | 165 | 170 | 175 | 178 | 178 | 177 | 177 | 179 | 183 | 0.1144598 |
| 28 | 177 | 178 | 175 | 175 | 172 | 171 | 170 | 166 | 162 | 158 | 153 | 149 | 148 | 153 | 156 | 161 | 168 | 173 | 174 | 175 | 176 | 177 | 179 | 181 | 0.102854 |
| 31 | 175 | 175 | 174 | 172 | 172 | 174 | 172 | 168 | 165 | 162 | 156 | 153 | 153 | 152 | 155 | 158 | 160 | 165 | 168 | 171 | 173 | 175 | 176 | 177 | 0.0847492 |
| 34 | 173 | 173 | 174 | 174 | 174 | 176 | 175 | 171 | 169 | 163 | 160 | 157 | 156 | 155 | 154 | 156 | 157 | 161 | 165 | 167 | 172 | 175 | 175 | 175 | 0.0794817 |
| 37 | 172 | 172 | 173 | 174 | 175 | 176 | 175 | 173 | 170 | 167 | 164 | 161 | 160 | 159 | 157 | 155 | 156 | 158 | 160 | 163 | 167 | 171 | 172 | 172 | 0.0697508 |
| 40 | 166 | 166 | 166 | 167 | 170 | 173 | 173 | 171 | 171 | 167 | 165 | 164 | 163 | 164 | 162 | 159 | 157 | 156 | 154 | 156 | 159 | 161 | 163 | 165 | 0.0546066 |
| 43 | 159 | 159 | 159 | 162 | 165 | 165 | 166 | 164 | 163 | 161 | 160 | 159 | 159 | 158 | 157 | 156 | 154 | 152 | 151 | 152 | 155 | 156 | 157 | 158 | 0.0423575 |
| 46 | 155 | 155 | 155 | 158 | 162 | 162 | 162 | 162 | 161 | 159 | 158 | 158 | 160 | 159 | 157 | 155 | 154 | 152 | 151 | 152 | 154 | 155 | 154 | 156 | 0.0337161 |
| 49 | 153 | 154 | 154 | 157 | 160 | 161 | 161 | 161 | 160 | 159 | 158 | 160 | 160 | 160 | 159 | 157 | 156 | 154 | 152 | 152 | 154 | 155 | 155 | 154 | 0.031172 |
| 52 | 150 | 150 | 151 | 155 | 157 | 158 | 159 | 158 | 157 | 157 | 156 | 158 | 161 | 159 | 158 | 156 | 154 | 152 | 151 | 151 | 153 | 152 | 152 | 151 | 0.0336536 |
| 55 | 148 | 149 | 151 | 154 | 156 | 158 | 159 | 160 | 158 | 157 | 158 | 159 | 160 | 160 | 159 | 157 | 154 | 151 | 150 | 150 | 150 | 149 | 149 | 149 | 0.0443226 |
| 57.5 | 178 | 178 | 180 | 179 | 177 | 176 | 174 | 167 | 165 | 163 | 162 | 158 | 156 | 157 | 158 | 157 | 160 | 164 | 169 | 172 | 174 | 175 | 176 | 177 | 0.0845534 |
| 61.2 | 174 | 174 | 175 | 175 | 175 | 174 | 171 | 164 | 163 | 161 | 160 | 158 | 156 | 156 | 158 | 158 | 161 | 165 | 168 | 169 | 171 | 173 | 175 | 176 | 0.0716308 |
| 64.3 | 168 | 169 | 171 | 173 | 171 | 170 | 169 | 163 | 159 | 157 | 157 | 156 | 155 | 155 | 155 | 155 | 157 | 159 | 163 | 164 | 165 | 167 | 168 | 169 | 0.0625833 |
| 67.5 | 169 | 169 | 169 | 171 | 170 | 169 | 168 | 163 | 159 | 158 | 160 | 158 | 159 | 158 | 158 | 156 | 157 | 158 | 162 | 164 | 166 | 168 | 170 | 168 | 0.0521803 |
| 70.5 | 162 | 162 | 162 | 163 | 163 | 162 | 162 | 158 | 155 | 154 | 154 | 154 | 157 | 157 | 159 | 158 | 158 | 158 | 158 | 161 | 164 | 164 | 166 | 164 | 0.0350129 |
| 73.5 | 163 | 161 | 161 | 161 | 161 | 160 | 160 | 156 | 155 | 154 | 156 | 158 | 160 | 160 | 162 | 161 | 160 | 159 | 161 | 161 | 164 | 165 | 166 | 165 | 0.0313003 |
| 77 | 161 | 160 | 159 | 157 | 158 | 157 | 158 | 157 | 155 | 156 | 156 | 159 | 162 | 164 | 164 | 165 | 161 | 161 | 162 | 163 | 164 | 165 | 166 | 165 | 0.0340689 |
| 80.2 | 159 | 158 | 157 | 156 | 156 | 158 | 160 | 159 | 160 | 158 | 160 | 162 | 163 | 163 | 164 | 164 | 162 | 163 | 166 | 166 | 166 | 164 | 166 | 164 | 0.0332256 |
| 83.2 | 160 | 156 | 155 | 157 | 158 | 161 | 164 | 167 | 169 | 169 | 172 | 173 | 174 | 174 | 174 | 172 | 171 | 168 | 169 | 169 | 170 | 169 | 167 | 164 | 0.059673 |
| 86.2 | 151 | 149 | 149 | 147 | 149 | 152 | 156 | 159 | 161 | 162 | 164 | 167 | 167 | 168 | 169 | 167 | 165 | 164 | 165 | 162 | 163 | 162 | 160 | 157 | 0.0690148 |
| 90.2 | 151 | 149 | 148 | 146 | 150 | 154 | 160 | 164 | 165 | 166 | 170 | 173 | 174 | 173 | 172 | 170 | 168 | 168 | 166 | 166 | 165 | 162 | 161 | 156 | 0.0868282 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Measurement of roundness by Dial gauge deflections of 10-mm Diameter Copper (Cu) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **Mean values of Dial Gauge Deflection Readings before straightening of 10 mm Copper round bar x 0.01 mm** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Angles in Degrees | | | | | | | | | | | | | | | | | | | | | | | |  |
| Length in cm | 0o | 15o | 30o | 45o | 60o | 75o | 90o | 105o | 120o | 135o | 150o | 165o | 180o | 195o | 210o | 225o | 240o | 255o | 270o | 285o | 300o | 315o | 330o | 345o | STD  DEV (mm) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12.3 | 79 | 71 | 67 | 64 | 61 | 64 | 64 | 65 | 71 | 77 | 84 | 88 | 95 | 100 | 104 | 107 | 110 | 108 | 105 | 103 | 98 | 93 | 88 | 85 | 0.16352 |
| 16 | 68 | 66 | 67 | 67 | 66 | 68 | 73 | 77 | 81 | 86 | 92 | 96 | 100 | 102 | 105 | 105 | 104 | 102 | 97 | 92 | 87 | 81 | 76 | 71 | 0.14430 |
| 20.5 | 73 | 70 | 65 | 63 | 60 | 60 | 62 | 63 | 67 | 70 | 74 | 78 | 83 | 86 | 91 | 94 | 96 | 97 | 97 | 93 | 90 | 85 | 81 | 76 | 0.12708 |
| 25 | 91 | 84 | 76 | 67 | 59 | 50 | 49 | 52 | 53 | 50 | 51 | 54 | 62 | 68 | 77 | 86 | 95 | 101 | 108 | 110 | 111 | 109 | 104 | 98 | 0.22512 |
| 28 | 101 | 88 | 88 | 65 | 51 | 49 | 52 | 55 | 57 | 59 | 61 | 58 | 55 | 60 | 73 | 85 | 98 | 99 | 117 | 122 | 124 | 123 | 119 | 103 | 0.26424 |
| 31 | 104 | 91 | 73 | 55 | 49 | 52 | 54 | 49 | 53 | 55 | 57 | 59 | 62 | 64 | 69 | 84 | 101 | 115 | 127 | 134 | 137 | 138 | 132 | 128 | 0.33251 |
| 31 | 116 | 97 | 82 | 61 | 50 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 49 | 59 | 75 | 91 | 108 | 121 | 131 | 138 | 140 | 138 | 131 | 121 | 0.35596 |
| 35 | 112 | 94 | 75 | 52 | 49 | 53 | 55 | 56 | 57 | 52 | 54 | 56 | 53 | 55 | 72 | 91 | 109 | 126 | 141 | 149 | 153 | 155 | 150 | 140 | 0.40274 |
| 35 | 128 | 103 | 82 | 59 | 49 | 52 | 53 | 55 | 56 | 57 | 58 | 52 | 53 | 55 | 71 | 89 | 110 | 126 | 141 | 149 | 155 | 155 | 150 | 138 | 0.40341 |
| 40 | 120 | 96 | 71 | 49 | 53 | 52 | 54 | 56 | 58 | 59 | 62 | 65 | 66 | 66 | 85 | 105 | 123 | 140 | 154 | 164 | 168 | 167 | 157 | 143 | 0.43190 |
| 45 | 113 | 94 | 66 | 49 | 50 | 54 | 56 | 58 | 62 | 64 | 65 | 69 | 56 | 72 | 87 | 104 | 124 | 142 | 159 | 169 | 175 | 174 | 167 | 149 | 0.45507 |
| 48 | 59 | 59 | 56 | 53 | 49 | 52 | 56 | 50 | 53 | 52 | 51 | 50 | 53 | 55 | 56 | 62 | 64 | 52 | 53 | 52 | 51 | 49 | 51 | 54 | 0.03918 |
| 51 | 68 | 66 | 64 | 57 | 50 | 49 | 52 | 56 | 58 | 59 | 62 | 64 | 63 | 66 | 60 | 57 | 53 | 50 | 50 | 49 | 50 | 60 | 64 | 67 | 0.06620 |
| 54 | 71 | 69 | 66 | 60 | 49 | 54 | 56 | 52 | 51 | 50 | 54 | 56 | 58 | 62 | 61 | 60 | 54 | 52 | 49 | 55 | 61 | 65 | 71 | 72 | 0.07536 |
| 57 | 70 | 66 | 62 | 53 | 59 | 50 | 49 | 52 | 53 | 50 | 51 | 54 | 62 | 68 | 69 | 72 | 74 | 65 | 62 | 49 | 60 | 66 | 69 | 72 | 0.08510 |
| 60 | 79 | 76 | 72 | 64 | 52 | 50 | 51 | 50 | 52 | 53 | 54 | 56 | 58 | 63 | 64 | 66 | 68 | 63 | 49 | 53 | 64 | 68 | 73 | 76 | 0.09571 |
| 63 | 81 | 78 | 74 | 65 | 52 | 55 | 52 | 51 | 49 | 52 | 53 | 52 | 56 | 58 | 62 | 62 | 58 | 51 | 49 | 60 | 68 | 72 | 78 | 80 | 0.11159 |
| 66 | 82 | 82 | 79 | 67 | 50 | 49 | 55 | 57 | 59 | 60 | 55 | 51 | 58 | 52 | 59 | 63 | 61 | 65 | 66 | 66 | 72 | 76 | 81 | 84 | 0.11453 |
| 69 | 82 | 79 | 74 | 64 | 49 | 52 | 56 | 58 | 62 | 74 | 72 | 65 | 56 | 49 | 56 | 67 | 65 | 49 | 57 | 66 | 72 | 78 | 82 | 84 | 0.11558 |
| 72 | 75 | 73 | 65 | 50 | 49 | 52 | 54 | 56 | 58 | 62 | 65 | 67 | 68 | 72 | 65 | 55 | 55 | 53 | 62 | 69 | 74 | 79 | 81 | 81 | 0.10207 |
| 75 | 72 | 67 | 58 | 49 | 54 | 57 | 59 | 62 | 65 | 67 | 69 | 62 | 56 | 52 | 56 | 52 | 50 | 54 | 55 | 61 | 66 | 71 | 73 | 74 | 0.07856 |
| 78 | 63 | 58 | 49 | 53 | 58 | 59 | 63 | 66 | 67 | 72 | 66 | 62 | 58 | 55 | 52 | 56 | 59 | 55 | 63 | 66 | 72 | 73 | 74 | 72 | 0.07141 |
| 81 | 64 | 61 | 50 | 49 | 53 | 64 | 69 | 56 | 62 | 65 | 59 | 53 | 50 | 49 | 56 | 59 | 62 | 49 | 53 | 58 | 64 | 67 | 68 | 69 | 0.06704 |
| 85.5 | 87 | 84 | 75 | 60 | 49 | 54 | 56 | 59 | 63 | 66 | 69 | 72 | 75 | 69 | 59 | 57 | 65 | 72 | 80 | 86 | 89 | 89 | 91 | 91 | 0.13228 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Measurement of roundness by Dial gauge deflections of 12-mm Diameter Copper (Cu) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **Mean values of Dial Gauge Deflection Readings before straightening of 12 mm Copper (Cu) round bar x 0.01 mm** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **Angles in Degrees** | | | | | | | | | | | | | | | | | | | | | | | |  |
| Length in cm | 0o | 15o | 30o | 45o | 60o | 75o | 90o | 105o | 120o | 135o | 150o | 165o | 180o | 195o | 210o | 225o | 240o | 255o | 270o | 285o | 300o | 315o | 330o | 345o | STD  DEV (mm) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 | 102 | 91 | 81 | 70 | 61 | 52 | 49 | 49 | 49 | 49 | 52 | 59 | 66 | 74 | 82 | 91 | 101 | 110 | 116 | 121 | 124 | 122 | 117 | 112 | 0.27505 |
| 15 | 95 | 88 | 80 | 70 | 64 | 51 | 51 | 49 | 49 | 50 | 53 | 59 | 66 | 72 | 82 | 88 | 96 | 102 | 108 | 110 | 112 | 111 | 110 | 104 | 0.23366 |
| 19 | 92 | 89 | 85 | 83 | 79 | 75 | 71 | 67 | 65 | 64 | 65 | 67 | 70 | 72 | 76 | 79 | 83 | 86 | 89 | 91 | 94 | 94 | 94 | 93 | 0.10598 |
| 24 | 67 | 66 | 67 | 66 | 67 | 69 | 72 | 75 | 77 | 80 | 82 | 85 | 88 | 88 | 88 | 88 | 88 | 86 | 83 | 81 | 79 | 74 | 71 | 69 | 0.08401 |
| 29 | 75 | 75 | 75 | 74 | 73 | 73 | 72 | 71 | 70 | 70 | 69 | 69 | 69 | 68 | 69 | 70 | 70 | 71 | 73 | 73 | 74 | 74 | 73 | 74 | 0.02334 |
| 34 | 102 | 101 | 98 | 95 | 88 | 80 | 72 | 66 | 58 | 50 | 49 | 49 | 49 | 49 | 49 | 52 | 59 | 65 | 72 | 78 | 85 | 91 | 96 | 100 | 0.19895 |
| 39 | 97 | 96 | 97 | 95 | 89 | 85 | 78 | 72 | 65 | 60 | 56 | 55 | 56 | 56 | 58 | 60 | 64 | 69 | 74 | 78 | 83 | 86 | 88 | 92 | 0.15044 |
| 44 | 79 | 78 | 79 | 78 | 77 | 76 | 74 | 72 | 71 | 69 | 68 | 67 | 67 | 66 | 67 | 67 | 69 | 70 | 71 | 73 | 74 | 75 | 75 | 76 | 0.04334 |
| 49 | 62 | 62 | 64 | 66 | 67 | 69 | 70 | 72 | 74 | 75 | 76 | 77 | 77 | 74 | 73 | 72 | 71 | 69 | 67 | 65 | 62 | 61 | 60 | 60 | 0.05682 |
| 56 | 77 | 76 | 76 | 76 | 75 | 73 | 72 | 70 | 67 | 65 | 63 | 61 | 60 | 58 | 59 | 58 | 59 | 62 | 63 | 65 | 67 | 69 | 71 | 74 | 0.0652 |
| 59 | 63 | 63 | 62 | 61 | 59 | 58 | 56 | 55 | 55 | 52 | 51 | 50 | 49 | 49 | 49 | 50 | 52 | 52 | 55 | 56 | 57 | 58 | 60 | 61 | 0.04636 |
| 62 | 50 | 50 | 50 | 51 | 53 | 53 | 55 | 57 | 58 | 60 | 60 | 61 | 61 | 60 | 59 | 59 | 59 | 57 | 56 | 54 | 52 | 50 | 49 | 49 | 0.0429 |
| 67 | 49 | 49 | 49 | 49 | 50 | 53 | 58 | 62 | 66 | 69 | 71 | 71 | 72 | 70 | 68 | 65 | 62 | 58 | 52 | 49 | 49 | 49 | 49 | 49 | 0.08975 |
| 72 | 49 | 49 | 49 | 51 | 55 | 57 | 61 | 64 | 67 | 69 | 70 | 71 | 70 | 68 | 66 | 64 | 60 | 57 | 55 | 51 | 49 | 49 | 49 | 49 | 0.08312 |
| 77 | 53 | 54 | 56 | 59 | 62 | 65 | 67 | 70 | 73 | 74 | 75 | 76 | 75 | 73 | 70 | 68 | 65 | 61 | 57 | 54 | 50 | 50 | 49 | 50 | 0.09309 |
| 82 | 61 | 61 | 62 | 65 | 67 | 69 | 72 | 75 | 77 | 78 | 80 | 82 | 82 | 80 | 79 | 78 | 77 | 74 | 71 | 70 | 65 | 61 | 61 | 61 | 0.07554 |
| 87 | 70 | 69 | 70 | 70 | 71 | 72 | 73 | 74 | 75 | 75 | 79 | 79 | 77 | 76 | 76 | 76 | 75 | 73 | 72 | 71 | 70 | 69 | 68 | 69 | 0.03303 |