|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 6.24**  **Measurement of roundness by Dial gauge deflections of 10-mm Diameter Copper (Cu) Round Bar After Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | **Mean values of Dial Gauge Deflection Readings after straightening of 10 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)** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13 | 143 | 140 | 138 | 137 | 136 | 135 | 135 | 136 | 137 | 138 | 140 | 142 | 145 | 146 | 148 | 150 | 151 | 152 | 152 | 152 | 151 | 149 | 147 | 145 | 0.062 |
| 16 | 142 | 140 | 139 | 137 | 135 | 135 | 135 | 136 | 137 | 138 | 140 | 143 | 145 | 147 | 148 | 150 | 152 | 153 | 154 | 154 | 153 | 151 | 149 | 146 | 0.069 |
| 19 | 144 | 142 | 140 | 139 | 137 | 136 | 136 | 136 | 137 | 139 | 140 | 143 | 145 | 147 | 149 | 150 | 151 | 152 | 153 | 153 | 153 | 151 | 150 | 148 | 0.062 |
| 22 | 145 | 143 | 141 | 139 | 138 | 137 | 137 | 137 | 138 | 140 | 141 | 143 | 145 | 147 | 148 | 150 | 152 | 153 | 154 | 154 | 154 | 152 | 150 | 148 | 0.061 |
| 25 | 149 | 147 | 145 | 143 | 141 | 141 | 141 | 141 | 142 | 143 | 145 | 147 | 148 | 150 | 152 | 153 | 155 | 156 | 157 | 157 | 156 | 155 | 154 | 152 | 0.058 |
| 28 | 153 | 150 | 148 | 145 | 143 | 142 | 141 | 142 | 143 | 144 | 145 | 146 | 148 | 150 | 152 | 153 | 155 | 156 | 158 | 158 | 159 | 155 | 152 | 152 | 0.057 |
| 31 | 154 | 152 | 150 | 148 | 146 | 145 | 144 | 144 | 144 | 144 | 145 | 147 | 149 | 150 | 151 | 152 | 154 | 153 | 152 | 154 | 157 | 157 | 156 | 155 | 0.045 |
| 34 | 152 | 151 | 149 | 148 | 146 | 145 | 144 | 144 | 144 | 144 | 145 | 146 | 147 | 148 | 150 | 151 | 153 | 153 | 154 | 154 | 155 | 155 | 155 | 154 | 0.04 |
| 37 | 155 | 154 | 152 | 151 | 150 | 148 | 147 | 146 | 145 | 145 | 146 | 146 | 146 | 147 | 148 | 149 | 150 | 151 | 153 | 154 | 155 | 155 | 156 | 155 | 0.039 |
| 40 | 170 | 170 | 170 | 169 | 168 | 166 | 165 | 162 | 160 | 159 | 158 | 158 | 158 | 158 | 159 | 160 | 162 | 163 | 165 | 166 | 167 | 169 | 170 | 171 | 0.047 |
| 43 | 173 | 173 | 173 | 172 | 172 | 169 | 167 | 165 | 163 | 161 | 159 | 159 | 159 | 159 | 160 | 160 | 161 | 163 | 165 | 167 | 169 | 170 | 172 | 173 | 0.054 |
| 46 | 177 | 178 | 180 | 180 | 181 | 179 | 177 | 174 | 171 | 167 | 163 | 159 | 156 | 155 | 154 | 154 | 155 | 157 | 159 | 161 | 164 | 168 | 172 | 175 | 0.098 |
| 49 | 180 | 184 | 188 | 191 | 193 | 192 | 191 | 186 | 181 | 175 | 169 | 161 | 154 | 149 | 145 | 145 | 144 | 146 | 149 | 153 | 158 | 165 | 171 | 176 | 0.175 |
| 52 | 180 | 186 | 193 | 195 | 196 | 194 | 191 | 185 | 179 | 171 | 163 | 156 | 150 | 144 | 138 | 137 | 135 | 139 | 142 | 149 | 156 | 163 | 170 | 175 | 0.211 |
| 55 | 183 | 188 | 193 | 194 | 195 | 193 | 191 | 184 | 178 | 172 | 166 | 159 | 152 | 148 | 145 | 144 | 143 | 147 | 151 | 156 | 161 | 168 | 176 | 180 | 0.183 |
| 57 | 163 | 162 | 161 | 160 | 158 | 157 | 155 | 154 | 154 | 154 | 154 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 164 | 163 | 163 | 163 | 0.035 |
| 60 | 163 | 162 | 161 | 161 | 160 | 158 | 156 | 155 | 153 | 153 | 153 | 153 | 153 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 161 | 162 | 0.036 |
| 63 | 165 | 165 | 165 | 164 | 163 | 162 | 160 | 159 | 158 | 156 | 155 | 154 | 154 | 153 | 153 | 153 | 154 | 156 | 158 | 159 | 160 | 161 | 162 | 163 | 0.041 |
| 66 | 165 | 166 | 167 | 166 | 165 | 164 | 163 | 161 | 160 | 157 | 155 | 154 | 152 | 152 | 151 | 151 | 151 | 153 | 155 | 156 | 158 | 160 | 163 | 163 | 0.055 |
| 69 | 166 | 166 | 167 | 168 | 169 | 169 | 168 | 165 | 163 | 160 | 158 | 155 | 152 | 150 | 149 | 148 | 148 | 149 | 150 | 151 | 152 | 155 | 158 | 161 | 0.077 |
| 72 | 165 | 167 | 170 | 172 | 173 | 173 | 173 | 170 | 168 | 164 | 161 | 156 | 152 | 150 | 148 | 146 | 145 | 145 | 146 | 148 | 150 | 154 | 158 | 162 | 0.102 |
| 75 | 165 | 168 | 172 | 174 | 176 | 176 | 176 | 174 | 172 | 167 | 162 | 158 | 153 | 149 | 145 | 144 | 142 | 142 | 142 | 145 | 147 | 151 | 155 | 160 | 0.126 |
| 78 | 165 | 169 | 173 | 176 | 180 | 179 | 179 | 176 | 173 | 168 | 163 | 157 | 151 | 147 | 143 | 140 | 138 | 138 | 139 | 141 | 144 | 148 | 152 | 158 | 0.152 |
| 81 | 165 | 170 | 176 | 179 | 183 | 183 | 184 | 181 | 179 | 173 | 168 | 161 | 154 | 150 | 145 | 142 | 139 | 138 | 138 | 140 | 142 | 146 | 151 | 158 | 0.169 |
| 84 | 164 | 169 | 174 | 179 | 184 | 185 | 186 | 184 | 182 | 176 | 171 | 164 | 157 | 151 | 146 | 142 | 138 | 136 | 135 | 137 | 139 | 144 | 149 | 156 | 0.182 |
| 87 | 161 | 168 | 175 | 181 | 187 | 189 | 190 | 188 | 186 | 180 | 174 | 166 | 158 | 152 | 145 | 140 | 134 | 133 | 131 | 133 | 135 | 141 | 147 | 154 | 0.21 |



**Figure 6.29(a): Box Plot of dial gauge readings dataset of mean values of 10-mm diameter Copper (Cu) round bar before straightening**

**Figure 6.29(b): Error Plot of dial gauge readings on 10 mm Copper Round Bar after straightening**