|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 6.12**  **Measurement of roundness by Dial gauge deflections of 10-mm Diameter Mild Steel (MS) Round Bar After Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Mean values of Dial Gauge Deflection Readings after straightening of 10 mm Mild Steel (MS) 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)** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14.5 | 153.0 | 152.5 | 152.0 | 152.0 | 152.0 | 151.8 | 151.5 | 151.3 | 151.0 | 151.3 | 151.5 | 151.8 | 152.0 | 152.3 | 152.5 | 152.8 | 153.0 | 153.0 | 153.0 | 153.3 | 153.5 | 153.3 | 153.0 | 153.0 | 0.0074 |
| 17 | 146.0 | 146.0 | 146.0 | 146.0 | 146.0 | 146.0 | 146.0 | 145.8 | 145.5 | 145.8 | 146.0 | 145.8 | 145.5 | 146.0 | 146.5 | 146.5 | 146.5 | 146.8 | 147.0 | 146.8 | 146.5 | 146.8 | 147.0 | 146.5 | 0.0045 |
| 20 | 144.0 | 144.8 | 145.5 | 145.5 | 145.5 | 145.5 | 145.5 | 145.5 | 145.5 | 146.0 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 146.3 | 146.0 | 146.0 | 146.0 | 146.3 | 0.0064 |
| 23.5 | 147.5 | 147.3 | 147.0 | 147.3 | 147.5 | 147.5 | 147.5 | 147.8 | 148.0 | 148.0 | 148.0 | 148.3 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.5 | 148.3 | 0.0051 |
| 26 | 146.5 | 147.0 | 147.5 | 147.3 | 147.0 | 147.3 | 147.5 | 147.3 | 147.0 | 146.8 | 146.5 | 146.8 | 147.0 | 147.5 | 148.0 | 148.0 | 148.0 | 147.5 | 147.0 | 147.0 | 147.0 | 147.0 | 147.0 | 147.0 | 0.0042 |
| 29 | 145.0 | 145.0 | 145.0 | 145.3 | 145.5 | 145.5 | 145.5 | 145.3 | 145.0 | 145.0 | 145.0 | 145.3 | 145.5 | 145.3 | 145.0 | 145.3 | 145.5 | 145.0 | 144.5 | 145.5 | 146.5 | 146.3 | 146.0 | 146.0 | 0.0046 |
| 31.5 | 145.0 | 145.0 | 145.0 | 145.3 | 145.5 | 145.5 | 145.5 | 144.8 | 144.0 | 144.3 | 144.5 | 144.0 | 143.5 | 144.3 | 145.0 | 145.0 | 145.0 | 145.3 | 145.5 | 145.8 | 146.0 | 146.0 | 146.0 | 146.0 | 0.007 |
| 34 | 144.0 | 145.0 | 146.0 | 145.5 | 145.0 | 144.8 | 144.5 | 144.8 | 145.0 | 144.5 | 144.0 | 144.0 | 144.0 | 144.5 | 145.0 | 145.0 | 145.0 | 145.3 | 145.5 | 145.8 | 146.0 | 146.3 | 146.5 | 146.5 | 0.0078 |
| 37 | 145.0 | 145.3 | 145.5 | 145.8 | 146.0 | 145.5 | 145.0 | 145.5 | 146.0 | 145.5 | 145.0 | 145.0 | 145.0 | 145.0 | 145.0 | 144.8 | 144.5 | 145.0 | 145.5 | 145.5 | 145.5 | 146.0 | 146.5 | 146.3 | 0.005 |
| 40 | 143.5 | 143.5 | 143.5 | 143.5 | 143.5 | 143.3 | 143.0 | 143.8 | 144.5 | 144.3 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.3 | 144.5 | 144.3 | 144.0 | 144.3 | 144.5 | 144.3 | 144.0 | 144.0 | 0.0041 |
| 43 | 142.0 | 142.0 | 142.0 | 142.3 | 142.5 | 142.0 | 141.5 | 141.8 | 142.0 | 141.8 | 141.5 | 141.0 | 140.5 | 141.3 | 142.0 | 142.0 | 142.0 | 142.0 | 142.0 | 141.8 | 141.5 | 141.8 | 142.0 | 142.3 | 0.0043 |
| 46 | 147.0 | 147.3 | 147.5 | 147.3 | 147.0 | 147.3 | 147.5 | 147.5 | 147.5 | 147.3 | 147.0 | 146.8 | 146.5 | 146.5 | 146.5 | 146.5 | 146.5 | 147.0 | 147.5 | 147.3 | 147.0 | 147.0 | 147.0 | 147.0 | 0.0035 |
| 49 | 143.0 | 143.0 | 143.0 | 142.8 | 142.5 | 143.5 | 144.5 | 143.3 | 142.0 | 142.5 | 143.0 | 142.8 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.8 | 143.0 | 143.3 | 143.5 | 143.5 | 143.5 | 143.5 | 0.0053 |
| 52 | 144.0 | 144.3 | 144.5 | 144.3 | 144.0 | 144.0 | 144.0 | 143.8 | 143.5 | 143.3 | 143.0 | 143.0 | 143.0 | 143.0 | 143.0 | 143.3 | 143.5 | 143.8 | 144.0 | 144.3 | 144.5 | 144.5 | 144.5 | 144.3 | 0.0055 |
| 55 | 144 | 144.3 | 144.5 | 144.3 | 144 | 144.0 | 144 | 144.0 | 144 | 143.8 | 143.5 | 143.5 | 143.5 | 143.5 | 143.5 | 143.8 | 144 | 144.3 | 144.5 | 144.3 | 144 | 144.3 | 144.5 | 144.5 | 0.0034 |
| 58 | 143 | 143.0 | 143 | 142.5 | 142 | 143.0 | 143.5 | 143.0 | 143 | 143.0 | 142.5 | 142.0 | 143 | 143.0 | 142.5 | 142.5 | 142.5 | 143.0 | 143 | 143.0 | 143.5 | 143.5 | 144 | 144.8 | 0.0059 |
| 61 | 142 | 142.3 | 142.5 | 142.3 | 142 | 142.3 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.5 | 142.8 | 143 | 142.8 | 142.5 | 142.8 | 143 | 143.0 | 143 | 143.0 | 0.003 |
| 64 | 142.5 | 143.0 | 143.5 | 143.0 | 142.5 | 142.5 | 142.5 | 142.3 | 142 | 142.0 | 142 | 141.5 | 141 | 141.3 | 141.5 | 141.5 | 141.5 | 141.3 | 141 | 141.3 | 141.5 | 141.8 | 142 | 142.0 | 0.0067 |
| 67 | 141.5 | 142.0 | 142.5 | 141.8 | 141 | 141.8 | 142.5 | 142.3 | 142 | 142.0 | 142 | 141.8 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.0 | 140.5 | 141.0 | 0.0047 |
| 70 | 140.5 | 140.3 | 140 | 140.0 | 140 | 140.3 | 140.5 | 140.3 | 140 | 140.0 | 140 | 140.0 | 140 | 140.0 | 140 | 140.3 | 140.5 | 140.0 | 139.5 | 140.0 | 140.5 | 140.5 | 140.5 | 140.8 | 0.0028 |
| 73 | 138.5 | 139.8 | 141 | 141.0 | 141 | 140.5 | 140 | 140.3 | 140.5 | 141.0 | 141.5 | 141.0 | 140.5 | 140.5 | 140.5 | 140.3 | 140 | 140.3 | 140.5 | 140.8 | 141 | 140.8 | 140.5 | 140.5 | 0.0059 |
| 76 | 141.5 | 141.0 | 140.5 | 141.3 | 142 | 142.0 | 142 | 141.8 | 141.5 | 141.5 | 141.5 | 141.3 | 141 | 141.0 | 141 | 141.3 | 141.5 | 141.0 | 140.5 | 141.3 | 142 | 141.8 | 141.5 | 141.5 | 0.0043 |
| 79 | 141 | 140.3 | 139.5 | 140.0 | 140.5 | 140.8 | 141 | 141.3 | 141.5 | 141.0 | 140.5 | 140.8 | 141 | 140.8 | 140.5 | 140.5 | 140.5 | 140.8 | 141 | 140.8 | 140.5 | 140.8 | 141 | 141.0 | 0.0041 |
| 82 | 138 | 137.3 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 136.5 | 0.0034 |
| 85 | 137.5 | 137.8 | 138 | 137.5 | 137 | 137.3 | 137.5 | 138.0 | 138.5 | 138.0 | 137.5 | 137.5 | 137.5 | 137.3 | 137 | 137.3 | 137.5 | 138.3 | 139 | 139.3 | 139.5 | 138.8 | 138 | 138.0 | 0.0069 |
| 88 | 137.5 | 137.8 | 138 | 138.3 | 138.5 | 138.5 | 138.5 | 138.3 | 138 | 138.3 | 138.5 | 138.5 | 138.5 | 138.5 | 138.5 | 138.5 | 138.5 | 138.5 | 138.5 | 138.3 | 138 | 138.0 | 138 | 138.0 | 0.0029 |
| 91 | 137 | 136.8 | 136.5 | 136.8 | 137 | 137.0 | 137 | 137.3 | 137.5 | 137.5 | 137.5 | 137.8 | 138 | 138.0 | 138 | 138.3 | 138.5 | 138.3 | 138 | 138.3 | 138.5 | 138.3 | 138 | 137.8 | 0.006 |
| 94 | 135.5 | 135.8 | 136 | 136.3 | 136.5 | 136.5 | 136.5 | 136.8 | 137 | 136.8 | 136.5 | 136.8 | 137 | 137.0 | 137 | 137.0 | 137 | 137.0 | 137 | 137.5 | 138 | 137.5 | 137 | 136.8 | 0.0055 |
| 97 | 136 | 136.0 | 136 | 136.0 | 136 | 136.0 | 136 | 136.3 | 136.5 | 136.5 | 136.5 | 136.8 | 137 | 137.0 | 137 | 137.3 | 137.5 | 137.5 | 137.5 | 137.3 | 137 | 136.8 | 136.5 | 136.3 | 0.0054 |
| 100 | 135.5 | 135.3 | 135 | 135.3 | 135.5 | 135.5 | 135.5 | 135.5 | 135.5 | 135.5 | 135.5 | 135.3 | 135 | 135.5 | 136 | 136.0 | 136 | 136.0 | 136 | 136.0 | 136 | 136.0 | 136 | 136.0 | 0.0035 |
| 104.5 | 134.5 | 134.5 | 134.5 | 134.5 | 134.5 | 134.8 | 135 | 135.0 | 135 | 135.0 | 135 | 135.0 | 135 | 135.0 | 135 | 134.8 | 134.5 | 134.8 | 135 | 135.0 | 135 | 135.0 | 135 | 135.0 | 0.0022 |
| 107.5 | 137.5 | 137.8 | 138 | 138.3 | 138.5 | 138.5 | 138.5 | 138.3 | 138 | 138.0 | 138 | 138.0 | 138 | 138.0 | 138 | 138.0 | 138 | 138.0 | 138 | 138.3 | 138.5 | 138.3 | 138 | 138.0 | 0.0024 |
| 110.5 | 140.5 | 141.0 | 141.5 | 141.5 | 141.5 | 141.5 | 141.5 | 141.3 | 141 | 141.0 | 141 | 141.0 | 141 | 140.5 | 140 | 140.3 | 140.5 | 140.3 | 140 | 140.5 | 141 | 140.8 | 140.5 | 140.8 | 0.0048 |
| 113.5 | 141.5 | 141.8 | 142 | 142.3 | 142.5 | 142.5 | 142.5 | 142.8 | 143 | 142.8 | 142.5 | 142.0 | 141.5 | 141.5 | 141.5 | 141.3 | 141 | 141.0 | 141 | 141.0 | 141 | 141.0 | 141 | 141.3 | 0.0069 |
| 116.5 | 142 | 142.5 | 143 | 143.0 | 143 | 143.0 | 143 | 143.0 | 143 | 143.0 | 143 | 142.3 | 141.5 | 141.3 | 141 | 141.0 | 141 | 141.3 | 141.5 | 141.5 | 141.5 | 141.8 | 142 | 142.0 | 0.0078 |
| 119.5 | 142.5 | 142.8 | 143 | 143.0 | 143 | 143.0 | 143 | 142.5 | 142 | 142.0 | 142 | 141.8 | 141.5 | 141.3 | 141 | 141.3 | 141.5 | 141.5 | 141.5 | 141.3 | 141 | 141.3 | 141.5 | 142.0 | 0.0071 |



**Figure 6.17(a): Box Plot of dial gauge readings dataset of mean values of 10-mm diameter Mild Steel (MS) round bar before straightening**

**Figure 6.17(b): Error Plot of dial gauge readings on 10 mm Mild Steel Round Bar after straightening**