|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 5.12**  **Measurement of roundness by Dial gauge deflections of 6-mm Diameter Aluminium (Al) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | |  |
|  | Mean values of Dial Gauge Deflection Readings before straightening of 6 mm Aluminium(Al) 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) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16.5 | 241.0 | 244.0 | 244.5 | 243.0 | 242.5 | 239.5 | 233.5 | 233.0 | 231.0 | 228.0 | 226.0 | 222.0 | 221.5 | 221.5 | 221.0 | 220.0 | 221.0 | 223.5 | 223.0 | 229.0 | 229.0 | 233.0 | 237.0 | 237.5 | 0.0844 |
| 20.0 | 231.0 | 233.5 | 233.5 | 231.5 | 230.0 | 229.0 | 222.5 | 224.5 | 221.0 | 219.5 | 220.0 | 218.0 | 217.0 | 216.5 | 215.5 | 217.0 | 217.5 | 217.5 | 220.0 | 225.0 | 223.5 | 225.5 | 229.5 | 235.0 | 0.0630 |
| 25.0 | 231.5 | 235.5 | 237.5 | 236.5 | 233.5 | 231.0 | 225.5 | 226.0 | 224.0 | 221.0 | 219.5 | 216.0 | 217.0 | 217.5 | 215.5 | 215.0 | 216.5 | 218.5 | 219.0 | 222.0 | 226.5 | 225.0 | 227.5 | 230.0 | 0.0715 |
| 30.0 | 233.5 | 236.5 | 237.0 | 236.0 | 235.0 | 233.0 | 229.0 | 228.0 | 229.0 | 225.0 | 225.0 | 222.5 | 221.5 | 221.5 | 222.0 | 222.0 | 223.0 | 224.0 | 226.5 | 229.5 | 233.5 | 232.5 | 235.5 | 238.5 | 0.0575 |
| 35.0 | 249.0 | 253.0 | 254.0 | 253.5 | 253.5 | 251.0 | 245.5 | 243.5 | 240.0 | 239.0 | 236.5 | 235.0 | 234.5 | 234.0 | 234.5 | 233.5 | 236.0 | 237.0 | 237.5 | 240.5 | 243.0 | 243.5 | 245.5 | 248.5 | 0.0707 |
| 40.0 | 239.0 | 240.0 | 239.0 | 238.0 | 233.0 | 231.5 | 225.0 | 221.0 | 224.0 | 219.5 | 221.0 | 219.0 | 221.0 | 220.0 | 222.5 | 226.0 | 228.0 | 229.5 | 233.5 | 238.5 | 239.5 | 239.0 | 240.0 | 238.0 | 0.0799 |
| 45.0 | 244.5 | 245.0 | 244.5 | 241.0 | 239.0 | 236.0 | 233.0 | 229.0 | 226.5 | 223.0 | 219.5 | 219.0 | 217.5 | 220.5 | 219.0 | 222.5 | 225.0 | 228.0 | 230.0 | 234.0 | 236.5 | 238.0 | 238.5 | 240.5 | 0.0910 |
| 50.0 | 234.0 | 236.5 | 238.0 | 238.0 | 238.0 | 239.0 | 234.0 | 234.0 | 233.5 | 231.0 | 229.0 | 228.5 | 225.0 | 224.0 | 222.0 | 223.5 | 224.0 | 226.0 | 231.0 | 233.5 | 237.0 | 238.0 | 239.0 | 237.0 | 0.0566 |
| 55.0 | 240.0 | 241.5 | 245.0 | 245.5 | 243.5 | 242.0 | 239.0 | 237.0 | 235.5 | 234.0 | 233.5 | 230.0 | 229.5 | 228.5 | 228.5 | 229.5 | 230.0 | 233.5 | 236.5 | 235.0 | 240.0 | 238.0 | 239.0 | 241.0 | 0.0534 |
| 60.0 | 247.5 | 252.0 | 254.5 | 255.5 | 254.5 | 256.0 | 252.5 | 251.5 | 247.5 | 248.0 | 244.5 | 244.0 | 241.0 | 239.5 | 238.0 | 238.5 | 238.5 | 239.0 | 239.0 | 238.5 | 243.5 | 240.0 | 244.5 | 246.5 | 0.0624 |
| 65.0 | 246.5 | 251.0 | 253.0 | 253.0 | 253.5 | 253.5 | 250.0 | 247.5 | 246.5 | 244.0 | 241.5 | 239.5 | 235.5 | 232.5 | 233.0 | 229.5 | 229.5 | 230.0 | 229.5 | 230.5 | 238.0 | 240.0 | 239.0 | 241.0 | 0.0861 |
| 70.0 | 238.5 | 242.5 | 243.0 | 246.5 | 248.0 | 249.5 | 247.0 | 248.5 | 245.0 | 245.5 | 245.0 | 242.0 | 239.0 | 239.0 | 237.0 | 235.0 | 235.0 | 235.0 | 234.0 | 232.0 | 233.5 | 235.0 | 236.5 | 239.0 | 0.0544 |
| 75.0 | 237.0 | 238.0 | 239.0 | 241.0 | 241.0 | 240.0 | 238.0 | 237.5 | 237.0 | 236.0 | 232.5 | 230.5 | 228.5 | 226.5 | 227.0 | 224.5 | 224.5 | 224.5 | 227.0 | 225.0 | 233.5 | 233.0 | 234.0 | 236.5 | 0.0575 |
| 80.0 | 235.5 | 235.5 | 233.5 | 232.0 | 230.0 | 224.5 | 225.5 | 221.0 | 220.5 | 220.0 | 218.5 | 217.5 | 220.0 | 219.5 | 221.5 | 225.5 | 230.0 | 230.0 | 234.5 | 237.0 | 238.0 | 240.0 | 240.0 | 239.5 | 0.0773 |
| 85.0 | 257.0 | 256.0 | 252.0 | 250.0 | 247.5 | 244.0 | 240.5 | 239.0 | 239.0 | 238.0 | 239.0 | 239.5 | 241.5 | 245.0 | 246.0 | 249.0 | 253.0 | 252.0 | 256.5 | 257.5 | 259.0 | 260.0 | 262.0 | 260.0 | 0.0801 |
| 90.0 | 245.0 | 246.5 | 242.5 | 242.0 | 243.0 | 238.0 | 235.5 | 236.5 | 234.5 | 233.0 | 231.0 | 229.5 | 235.0 | 236.0 | 238.0 | 236.5 | 239.0 | 243.5 | 245.0 | 245.5 | 248.0 | 249.0 | 253.5 | 249.0 | 0.0632 |
| 95.0 | 253.5 | 252.0 | 250.0 | 248.0 | 244.0 | 243.0 | 241.5 | 237.5 | 238.5 | 238.0 | 234.0 | 236.5 | 235.0 | 240.0 | 240.0 | 242.5 | 245.5 | 243.5 | 247.5 | 248.0 | 250.5 | 254.5 | 254.5 | 251.0 | 0.0636 |
| 100.0 | 246.5 | 241.5 | 240.5 | 238.0 | 236.0 | 235.0 | 233.0 | 229.5 | 225.0 | 226.5 | 224.0 | 225.5 | 225.5 | 229.5 | 229.0 | 236.0 | 237.5 | 238.5 | 240.5 | 244.0 | 241.5 | 245.5 | 244.5 | 245.0 | 0.0737 |
| 105.0 | 239.0 | 240.0 | 238.5 | 240.0 | 239.0 | 238.0 | 239.5 | 237.5 | 235.5 | 232.0 | 234.0 | 233.5 | 233.0 | 236.0 | 237.0 | 238.0 | 239.0 | 238.5 | 238.0 | 239.0 | 239.5 | 241.5 | 240.5 | 242.5 | 0.0267 |
| 109.0 | 242.5 | 244.0 | 245.0 | 244.0 | 244.0 | 243.5 | 247.0 | 244.5 | 246.5 | 244.5 | 242.5 | 244.5 | 243.5 | 244.5 | 241.5 | 243.0 | 242.5 | 244.0 | 240.5 | 244.5 | 243.0 | 244.0 | 244.0 | 242.5 | 0.0141 |



**Figure 5.10(a): Box Plot of dial gauge readings dataset of mean values of 6-mm diameter Aluminium (Al) round bar before straightening**

**Figure 5.10(b): Error Plot of 6 mm Aluminium Round Bar Before Straightening**