|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 5.5**  **Measurement of roundness by Dial gauge deflections of 8-mm Diameter Mild Steel (MS) Round Bar** **Before Straightening** | | | | | | | | | | | | | | | | | | | | | | | | |  | |
|  | Mean values of Dial Gauge Deflection Readings before straightening of 8 mm 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) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 12 | 173 | 166 | 162 | 158 | 155 | 153 | 150 | 148 | 146 | 147 | 149 | 155 | 159 | 167 | 149 | 149 | 153 | 158 | 159 | 160 | 159 | 158 | 155 | 152 | 0.068437 | |
| 17 | 152 | 150 | 149 | 145 | 141 | 142 | 138 | 135 | 131 | 128 | 126 | 126 | 128 | 130 | 135 | 140 | 145 | 150 | 155 | 157 | 157 | 158 | 157 | 154 | 0.109782 | |
| 22 | 153 | 153 | 150 | 148 | 146 | 146 | 142 | 139 | 137 | 135 | 130 | 128 | 127 | 126 | 127 | 131 | 136 | 141 | 145 | 151 | 154 | 156 | 156 | 154 | 0.102921 | |
| 27 | 149 | 149 | 148 | 146 | 144 | 143 | 140 | 140 | 138 | 134 | 131 | 129 | 126 | 124 | 123 | 122 | 125 | 129 | 134 | 138 | 142 | 145 | 148 | 149 | 0.093599 | |
| 32 | 142 | 143 | 143 | 143 | 142 | 142 | 139 | 136 | 137 | 135 | 135 | 132 | 131 | 127 | 124 | 122 | 121 | 122 | 125 | 127 | 131 | 134 | 137 | 140 | 0.074103 | |
| 36 | 126 | 128 | 130 | 133 | 133 | 134 | 132 | 130 | 131 | 132 | 132 | 131 | 129 | 128 | 124 | 120 | 119 | 118 | 117 | 117 | 117 | 119 | 122 | 125 | 0.059805 | |
| 40 | 120 | 125 | 126 | 129 | 131 | 133 | 134 | 135 | 134 | 133 | 132 | 131 | 131 | 130 | 128 | 126 | 124 | 121 | 119 | 116 | 116 | 117 | 120 | 121 | 0.06303 | |
| 45 | 115 | 119 | 122 | 125 | 129 | 131 | 133 | 133 | 132 | 132 | 132 | 132 | 132 | 132 | 131 | 130 | 126 | 119 | 121 | 118 | 116 | 116 | 115 | 115 | 0.069933 | |
| 50 | 116 | 115 | 118 | 119 | 126 | 129 | 133 | 136 | 136 | 137 | 134 | 135 | 135 | 134 | 133 | 134 | 133 | 129 | 126 | 121 | 120 | 115 | 114 | 113 | 0.084929 | |
| 55 | 113 | 112 | 111 | 108 | 107 | 113 | 118 | 121 | 125 | 127 | 129 | 127 | 122 | 123 | 129 | 127 | 128 | 129 | 130 | 126 | 119 | 116 | 115 | 113 | 0.074717 | |
| 60 | 120 | 117 | 116 | 117 | 120 | 124 | 127 | 132 | 138 | 141 | 142 | 143 | 143 | 141 | 137 | 137 | 137 | 137 | 137 | 135 | 135 | 131 | 124 | 122 | 0.090289 | |
| 65 | 122 | 121 | 116 | 116 | 116 | 118 | 122 | 124 | 126 | 133 | 138 | 139 | 140 | 140 | 138 | 136 | 135 | 133 | 133 | 133 | 132 | 131 | 128 | 126 | 0.081594 | |
| 70 | 121 | 115 | 113 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 120 | 122 | 125 | 127 | 129 | 130 | 131 | 131 | 129 | 129 | 129 | 129 | 125 | 123 | 0.066821 | |
| 75 | 125 | 124 | 120 | 116 | 114 | 113 | 113 | 113 | 115 | 117 | 117 | 120 | 125 | 126 | 127 | 128 | 129 | 130 | 128 | 125 | 125 | 126 | 127 | 126 | 0.058347 | |
| 80 | 123 | 122 | 121 | 119 | 118 | 115 | 115 | 113 | 113 | 113 | 114 | 115 | 119 | 121 | 125 | 127 | 128 | 128 | 128 | 128 | 127 | 126 | 125 | 124 | 0.056169 | |
| 85 | 119 | 118 | 118 | 118 | 116 | 113 | 111 | 110 | 109 | 107 | 107 | 107 | 108 | 109 | 110 | 113 | 115 | 117 | 119 | 120 | 120 | 121 | 120 | 119 | 0.050076 | |
| 90 | 117 | 116 | 118 | 118 | 119 | 119 | 116 | 114 | 111 | 110 | 109 | 106 | 105 | 103 | 103 | 105 | 108 | 110 | 112 | 115 | 116 | 117 | 115 | 117 | 0.052789 | |
| 95 | 120 | 120 | 120 | 120 | 121 | 120 | 121 | 117 | 116 | 114 | 112 | 109 | 107 | 105 | 105 | 104 | 106 | 108 | 112 | 114 | 116 | 118 | 119 | 119 | 0.059110 | |
| 101.3 | 121 | 122 | 120 | 120 | 120 | 121 | 120 | 120 | 119 | 117 | 117 | 113 | 112 | 109 | 107 | 107 | 107 | 108 | 110 | 113 | 116 | 117 | 118 | 119 | 0.051086 | |
| 106.3 | 121 | 123 | 122 | 122 | 121 | 121 | 120 | 117 | 116 | 116 | 112 | 110 | 109 | 109 | 113 | 116 | 119 | 123 | 120 | 124 | 125 | 125 | 124 | 122 | 0.051009 | |
| 111.3 | 127 | 125 | 125 | 123 | 123 | 120 | 118 | 174 | 139 | 125 | 118 | 119 | 123 | 126 | 128 | 131 | 130 | 130 | 131 | 129 | 130 | 129 | 126 | 126 | 0.108365 | |
| 116.3 | 129 | 126 | 124 | 121 | 118 | 116 | 115 | 114 | 115 | 117 | 119 | 123 | 124 | 124 | 126 | 125 | 126 | 126 | 127 | 127 | 127 | 127 | 127 | 127 | 0.046830 | |
| 121.3 | 126 | 122 | 122 | 122 | 122 | 125 | 130 | 135 | 135 | 136 | 140 | 135 | 134 | 136 | 136 | 135 | 133 | 132 | 132 | 132 | 132 | 131 | 128 | 128 | 0.052523 | |
| 126.3 | 122 | 120 | 118 | 115 | 117 | 119 | 122 | 124 | 122 | 125 | 126 | 127 | 125 | 127 | 131 | 132 | 133 | 133 | 135 | 134 | 130 | 130 | 129 | 128 | 0.056357 | |
| 131.3 | 120 | 119 | 119 | 123 | 127 | 130 | 132 | 134 | 134 | 135 | 135 | 134 | 134 | 135 | 134 | 133 | 133 | 131 | 132 | 131 | 129 | 128 | 126 | 122 | 0.053588 | |
| 136.3 | 119 | 116 | 117 | 117 | 116 | 116 | 117 | 118 | 118 | 121 | 125 | 127 | 129 | 129 | 128 | 130 | 129 | 127 | 128 | 126 | 125 | 122 | 120 | 117 | 0.051483 | |
| 141.3 | 117 | 116 | 116 | 115 | 118 | 120 | 119 | 120 | 127 | 128 | 129 | 129 | 130 | 130 | 129 | 128 | 129 | 128 | 125 | 122 | 120 | 117 | 118 | 113 | 0.057129 | |



Figure 5.3(a): Box Plot of dial gauge readings dataset of mean values of 8-mm diameter Mild Steel (MS) round bar before straightening

Figure 5.3(b): Error Plot of 8 mm MS Round Bar Before Straightening