

# ISO 5393:2017-11 (E)

## Rotary tools for threaded fasteners - Performance test method

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
Introduction .....		vi
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>1</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>1</b>
<b>4</b>	<b>Symbols .....</b>	<b>4</b>
<b>5</b>	<b>Determination of torque scatter .....</b>	<b>5</b>
<b>5.1</b>	<b>General rules for performance tests .....</b>	<b>5</b>
<b>5.1.1</b>	<b>Measurements .....</b>	<b>5</b>
<b>5.1.2</b>	<b>Ambient conditions .....</b>	<b>5</b>
<b>5.1.3</b>	<b>Test installation .....</b>	<b>5</b>
<b>5.1.4</b>	<b>Test tool .....</b>	<b>8</b>
<b>5.1.5</b>	<b>Test tool condition .....</b>	<b>9</b>
<b>5.1.6</b>	<b>Power media .....</b>	<b>9</b>
<b>5.2</b>	<b>Test fixtures .....</b>	<b>10</b>
<b>5.2.1</b>	<b>General .....</b>	<b>10</b>
<b>5.2.2</b>	<b>Test joint .....</b>	<b>10</b>
<b>5.2.3</b>	<b>Measuring instrument .....</b>	<b>12</b>
<b>5.2.4</b>	<b>Test requirements .....</b>	<b>12</b>
<b>5.3</b>	<b>Test method .....</b>	<b>14</b>
<b>5.3.1</b>	<b>Test cycles .....</b>	<b>14</b>
<b>5.3.2</b>	<b>Run-down phase of the test cycle .....</b>	<b>14</b>
<b>5.3.3</b>	<b>Alignment .....</b>	<b>14</b>
<b>5.3.4</b>	<b>Torque measurement .....</b>	<b>15</b>
<b>5.3.5</b>	<b>Tightening time .....</b>	<b>15</b>
<b>5.3.6</b>	<b>Graphical presentation .....</b>	<b>15</b>
<b>5.3.7</b>	<b>Electronically controlled tools .....</b>	<b>15</b>
<b>5.4</b>	<b>Measurement uncertainty .....</b>	<b>15</b>
<b>6</b>	<b>Tool performance over a defined range of torque adjustment .....</b>	<b>15</b>
<b>7</b>	<b>Tool performance over a defined number of operating cycles .....</b>	<b>15</b>
<b>7.1</b>	<b>General .....</b>	<b>15</b>
<b>7.2</b>	<b>Operating cycle requirements .....</b>	<b>16</b>
<b>7.2.1</b>	<b>Tool operation .....</b>	<b>16</b>
<b>7.2.2</b>	<b>Torque level .....</b>	<b>16</b>
<b>7.2.3</b>	<b>Operating cycle test joint .....</b>	<b>16</b>
<b>7.2.4</b>	<b>Ambient conditions .....</b>	<b>17</b>
<b>7.2.5</b>	<b>Maintenance .....</b>	<b>17</b>
<b>7.2.6</b>	<b>Method .....</b>	<b>18</b>
<b>7.2.7</b>	<b>Graphical presentation .....</b>	<b>18</b>
<b>7.3</b>	<b>Performance test .....</b>	<b>18</b>
<b>8</b>	<b>Determination of the combined precision of built-in torque measurement systems .....</b>	<b>18</b>
<b>8.1</b>	<b>General .....</b>	<b>18</b>

<b>9</b>	<b>Evaluation of test results .....</b>	<b>19</b>
<b>9.1</b>	<b>Torque scatter .....</b>	<b>19</b>
<b>9.2</b>	<b>Combined torque scatter .....</b>	<b>19</b>
<b>9.3</b>	<b>Torque scatter over a defined range of torque adjustment .....</b>	<b>20</b>
<b>9.4</b>	<b>Torque scatter over a defined number of operating cycles .....</b>	<b>20</b>
<b>10</b>	<b>Presentation of test results .....</b>	<b>20</b>
<b>10.1</b>	<b>Test report .....</b>	<b>20</b>
<b>10.2</b>	<b>Tool performance rating .....</b>	<b>22</b>
<b>Annex A (informative) Preferred test torque levels .....</b>		<b>23</b>
<b>Annex B (informative) Example test fixtures for rotary tools for threaded fasteners .....</b>		<b>24</b>
<b>Annex C (informative) Test joint (additional information) .....</b>		<b>29</b>
<b>Annex D (informative) Determination of uncertainty of test joint measurements .....</b>		<b>31</b>
<b>Annex E (informative) Determination of the combined precision of built-in torque measurement systems .....</b>		<b>35</b>
<b>Annex F (informative) Example of performance test report .....</b>		<b>38</b>
<b>Annex G (informative) Tool performance rating .....</b>		<b>41</b>
<b>Bibliography .....</b>		<b>43</b>