

# ISO 10406-1:2025-09 (E)

## Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars

---

<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, definition, and symbols .....</b>	<b>1</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>1</b>
<b>3.2</b>	<b>Symbols .....</b>	<b>4</b>
<b>4</b>	<b>General provision concerning test pieces .....</b>	<b>5</b>
<b>5</b>	<b>Test method for physical properties .....</b>	<b>6</b>
<b>5.1</b>	<b>Cross-sectional area .....</b>	<b>6</b>
<b>5.1.1</b>	<b>Test pieces .....</b>	<b>6</b>
<b>5.1.2</b>	<b>Test procedure .....</b>	<b>6</b>
<b>5.1.3</b>	<b>Calculations .....</b>	<b>7</b>
<b>5.1.4</b>	<b>Test report .....</b>	<b>7</b>
<b>5.2</b>	<b>Fibre volume fraction .....</b>	<b>8</b>
<b>5.2.1</b>	<b>Test pieces .....</b>	<b>8</b>
<b>5.2.2</b>	<b>Test procedure .....</b>	<b>8</b>
<b>5.2.3</b>	<b>Calculations .....</b>	<b>8</b>
<b>5.2.4</b>	<b>General .....</b>	<b>8</b>
<b>5.2.5</b>	<b>Fibre content .....</b>	<b>9</b>
<b>5.2.6</b>	<b>Fibre volume fraction .....</b>	<b>9</b>
<b>5.2.7</b>	<b>Test report .....</b>	<b>9</b>
<b>5.3</b>	<b>Coefficient of thermal expansion .....</b>	<b>10</b>
<b>5.3.1</b>	<b>Test pieces .....</b>	<b>10</b>
<b>5.3.2</b>	<b>Testing device .....</b>	<b>10</b>
<b>5.3.3</b>	<b>Test method .....</b>	<b>10</b>
<b>5.3.4</b>	<b>Calculations .....</b>	<b>11</b>
<b>5.3.5</b>	<b>Test report .....</b>	<b>11</b>
<b>6</b>	<b>Test method for short-term mechanical properties .....</b>	<b>12</b>
<b>6.1</b>	<b>Tensile properties .....</b>	<b>12</b>
<b>6.1.1</b>	<b>Test pieces .....</b>	<b>12</b>
<b>6.1.2</b>	<b>Test equipment .....</b>	<b>12</b>
<b>6.1.3</b>	<b>Test procedure .....</b>	<b>13</b>
<b>6.1.4</b>	<b>Test temperature .....</b>	<b>13</b>
<b>6.1.5</b>	<b>Calculations .....</b>	<b>13</b>
<b>6.1.6</b>	<b>Test report .....</b>	<b>15</b>
<b>6.2</b>	<b>Bond strength .....</b>	<b>16</b>
<b>6.2.1</b>	<b>Test pieces .....</b>	<b>16</b>
<b>6.2.2</b>	<b>Testing machine and devices .....</b>	<b>18</b>
<b>6.2.3</b>	<b>Test method .....</b>	<b>18</b>
<b>6.2.4</b>	<b>Calculations .....</b>	<b>19</b>
<b>6.2.5</b>	<b>Test report .....</b>	<b>19</b>
<b>6.3</b>	<b>Anchorage and couplers .....</b>	<b>21</b>
<b>6.3.1</b>	<b>Test pieces .....</b>	<b>21</b>

6.3.2	Test temperature .....	22
6.3.3	Test method .....	22
6.3.4	Calculations .....	22
6.3.5	Test report .....	22
6.4	Transverse shear strength .....	23
6.4.1	Test pieces .....	23
6.4.2	Testing machine and devices .....	24
6.4.3	Test temperature .....	24
6.4.4	Test method .....	24
6.4.5	Calculations .....	25
6.4.6	Test report .....	25
6.5	Flexural tensile properties .....	26
6.5.1	Test pieces .....	26
6.5.2	Testing unit and devices .....	26
6.5.3	Test method .....	27
6.5.4	Calculations .....	27
6.5.5	Test report .....	28
7	Test method for durability .....	29
7.1	Alkali resistance .....	29
7.1.1	Test pieces .....	29
7.1.2	Immersion in alkaline solution .....	30
7.1.3	External appearance and mass change .....	30
7.1.4	Tensile method .....	31
7.1.5	Calculations .....	31
7.1.6	Test report .....	31
8	Test method for long-term mechanical properties .....	32
8.1	Long-term relaxation .....	32
8.1.1	Test pieces .....	32
8.1.2	Testing frame and devices .....	32
8.1.3	Test temperature .....	33
8.1.4	Test method .....	33
8.1.5	Calculations .....	34
8.1.6	Test report .....	34
8.2	Tensile fatigue strength .....	35
8.2.1	Test pieces .....	35
8.2.2	Testing machine and devices .....	35
8.2.3	Test temperature .....	35
8.2.4	Test method .....	36
8.2.5	Calculations .....	36
8.2.6	Test report .....	37
8.3	Creep rupture strength .....	37
8.3.1	Test pieces .....	37
8.3.2	Testing frame and devices .....	37
8.3.3	Test temperature .....	38
8.3.4	Tensile capacity .....	38
8.3.5	Test method .....	38
8.3.6	Calculations .....	39
8.3.7	Test report .....	40