

# ISO 16828:2012-04 (E)

## Non-destructive testing - Ultrasonic testing - Time-of-flight diffraction technique as a method for detection and sizing of discontinuities

---

Contents	Page
<b>Introduction .....</b>	<b>vi</b>
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms, definitions, symbols and abbreviations .....</b>	<b>2</b>
<b>3.1 Terms and definitions .....</b>	<b>2</b>
<b>3.2 Abbreviations .....</b>	<b>2</b>
<b>3.3 Symbols .....</b>	<b>2</b>
<b>4 General .....</b>	<b>3</b>
<b>4.1 Principle of the technique .....</b>	<b>3</b>
<b>4.2 Requirements for surface condition and couplant .....</b>	<b>5</b>
<b>4.3 Materials and process type .....</b>	<b>5</b>
<b>5 Qualification of personnel .....</b>	<b>5</b>
<b>6 Equipment requirements .....</b>	<b>5</b>
<b>6.1 Ultrasonic equipment and display .....</b>	<b>5</b>
<b>6.2 Ultrasonic probes .....</b>	<b>6</b>
<b>6.3 Scanning mechanisms .....</b>	<b>7</b>
<b>7 Equipment set-up procedures .....</b>	<b>7</b>
<b>7.1 General .....</b>	<b>7</b>
<b>7.2 Probe choice and probe separation .....</b>	<b>8</b>
<b>7.2.1 Probe selection .....</b>	<b>8</b>
<b>7.2.2 Probe separation .....</b>	<b>9</b>
<b>7.3 Time window setting .....</b>	<b>9</b>
<b>7.4 Sensitivity setting .....</b>	<b>9</b>
<b>7.5 Scan resolution setting .....</b>	<b>10</b>
<b>7.6 Setting of scanning speed .....</b>	<b>10</b>
<b>7.7 Checking system performance .....</b>	<b>10</b>
<b>8 Interpretation and analysis of data .....</b>	<b>10</b>
<b>8.1 Basic analysis of discontinuities .....</b>	<b>10</b>
<b>8.1.1 General .....</b>	<b>10</b>
<b>8.1.2 Characterisation of discontinuities .....</b>	<b>10</b>
<b>8.1.3 Estimation of discontinuity position .....</b>	<b>11</b>
<b>8.1.4 Estimation of discontinuity length .....</b>	<b>11</b>
<b>8.1.5 Estimation of discontinuity depth and height .....</b>	<b>12</b>
<b>8.2 Detailed analysis of discontinuities .....</b>	<b>12</b>
<b>8.2.1 General .....</b>	<b>12</b>
<b>8.2.2 Additional scans .....</b>	<b>13</b>
<b>8.2.3 Additional algorithms .....</b>	<b>14</b>
<b>9 Detection and sizing in complex geometries .....</b>	<b>14</b>
<b>10 Limitations of the technique .....</b>	<b>14</b>
<b>10.1 General .....</b>	<b>14</b>
<b>10.2 Accuracy and resolution .....</b>	<b>15</b>

10.2.1	General .....	15
10.2.2	Errors in the lateral position .....	15
10.2.3	Timing errors .....	15
10.2.4	Errors in sound velocity .....	15
10.2.5	Errors in probe centre separation .....	15
10.2.6	Spatial resolution .....	16
10.3	Dead zones .....	16
	<b>Foreword .....</b>	<b>v</b>
11	<b>TOFD examination without data recording .....</b>	<b>16</b>
12	<b>Test procedure .....</b>	<b>17</b>
13	<b>Test report .....</b>	<b>17</b>
	<b>Annex A (normative) Reference blocks .....</b>	<b>18</b>
	<b>Bibliography .....</b>	<b>19</b>