

# DIN EN ISO 4255:2025-12 (E)

## Fine ceramics (advanced ceramics, advanced technical ceramics) - Mechanical properties of ceramic composites at high temperature - Determination of axial tensile properties of tubes (ISO 4255:2025)

---

<b>Contents</b>		<b>Page</b>
<b>Foreword</b> .....		<b>v</b>
<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>2</b>
<b>4</b>	<b>Principle</b> .....	<b>4</b>
<b>5</b>	<b>Apparatus</b> .....	<b>5</b>
5.1	Testing machine.....	5
5.2	Gripping system.....	5
5.2.1	Test specimen gripping.....	5
5.2.2	Location and temperature of grips.....	5
5.2.3	Load train couplers.....	6
5.3	Test chamber and heating set-up.....	6
5.4	Heating apparatus.....	7
5.5	Strain measurement.....	7
5.5.1	General.....	7
5.5.2	Extensometers.....	7
5.5.3	Digital image correlation.....	8
5.6	Temperature measurement devices.....	8
5.7	Data recording system.....	8
5.8	Dimension-measuring devices.....	9
<b>6</b>	<b>Tubular test specimen</b> .....	<b>9</b>
6.1	Specimen specifications.....	9
6.1.1	General.....	9
6.1.2	Dimension.....	9
6.1.3	Geometry commonly used.....	9
6.1.4	Tolerances and variability.....	11
6.2	Specimen preparation.....	11
6.2.1	General.....	11
6.2.2	As-fabricated.....	11
6.2.3	Application-matched machining.....	11
6.2.4	Customary practices.....	12
6.2.5	Standard procedure.....	12
6.3	End collars and alignment issue.....	12
6.4	Test count and test specimens sampling.....	14
<b>7</b>	<b>Test procedure</b> .....	<b>14</b>
7.1	Temperature considerations.....	14
7.1.1	General.....	14
7.1.2	Controlled temperature zone.....	14
7.1.3	Temperature measurement.....	14
7.2	Test set-up: other considerations.....	14
7.3	Testing technique.....	15
7.3.1	Measurement of test specimen dimensions.....	15
7.3.2	Instrumentation of the test specimen.....	15
7.3.3	Specimen mounting.....	15
7.3.4	Setting-up of strain measurement means.....	15
7.3.5	Setting-up of inert atmosphere.....	16
7.3.6	Heating of test specimen and temperature control.....	16

	7.3.7	Measurements .....	16
	7.3.8	Post-test analyses .....	17
	7.4	Test validity .....	17
<b>8</b>		<b>Calculation of results .....</b>	<b>17</b>
	8.1	Test specimen origin .....	17
	8.2	Engineering axial tensile stress and strain .....	18
	8.3	Tensile strength .....	18
	8.4	Strain at maximum tensile force .....	19
	8.5	Tensile modulus .....	19
	8.5.1	Calculation of tensile modulus .....	19
	8.5.2	Calculation of tensile elastic modulus with linear region .....	20
	8.5.3	Stress for materials with non-linear stress-strain curve .....	20
	8.6	Poisson's ratio (optional) .....	20
	8.7	Statistics .....	20
<b>9</b>		<b>Test report .....</b>	<b>21</b>
	9.1	General .....	21
	9.2	Testing information .....	21
	9.3	Test specimen and material .....	21
	9.3.1	Tubular test specimen drawing or reference .....	21
	9.3.2	Description of the test material .....	21
	9.4	Equipment and test parameters .....	21
	9.4.1	Testing machine type and configuration .....	21
	9.4.2	Temperature and force measurement description .....	21
	9.4.3	Test mode and test rate .....	22
	9.4.4	Strain measurement description .....	22
	9.5	Test results .....	22
<b>10</b>		<b>Uncertainties .....</b>	<b>22</b>
		<b>Annex A (informative) Illustration of tensile modulus .....</b>	<b>23</b>
		<b>Bibliography .....</b>	<b>26</b>