

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)

Contents		Page
Foreword		v
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Principle	4
5	Apparatus	5
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
6	Tubular test specimen	9
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
7	Test procedure	14
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
8		Calculation of results	17
	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
9		Test report	21
	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
10		Uncertainties	22
		Annex A (informative) Illustration of tensile modulus	23
		Bibliography	26