

ISO 18610:2016-09 (E)

Fine ceramics (advanced ceramics, advanced technical ceramics) - Mechanical properties of ceramic composites at ambient temperature in air atmospheric pressure - Determination of elastic properties by ultrasonic technique

Contents		Page
Foreword		iv
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Principle	5
5	Significance and use	6
6	Test equipment	7
6.1	Immersion tank with temperature measurement device	7
6.2	Holder of the probes and test object	7
6.3	Probes	7
6.4	Pulse generator	7
6.5	Signal display and recording system	7
7	Test object	7
8	Test object preparation	8
9	Test procedure	8
9.1	Choice of frequency	8
9.2	Establishment of the test temperature	9
9.3	Reference test without test object	9
9.4	Measurement with the test object	9
9.4.1	Determination of the bulk density and thickness	9
9.4.2	Mounting of the test object	9
9.4.3	Acquisition of different angles of incidence	9
10	Calculation	10
10.1	Delay	10
10.2	Calculation of the propagation velocities	10
10.3	Calculation of the refracted angle, r	10
10.4	Identification of the elastic constants, C_{ij}	10
10.4.1	Basic considerations	10
10.4.2	Calculation of C_{33}	12
10.4.3	Calculation of C_{22} , C_{23} and C_{44}	12
10.4.4	Calculation of C_{11} , C_{13} and C_{55}	12
10.4.5	Calculation of C_{12} and C_{66}	12
10.5	Polar plots of the velocity curves	13
10.6	Calculation of the quadratic deviation and the confidence interval	14
10.7	Calculation of the engineering constants	14
11	Test validity	15
11.1	Measurements	15
11.2	Criterion of validity for the reliability of the C_{ij} components	15

12	Test report	15
Annex A (informative)	Example of a presentation of the results for a material with orthotropic symmetry	17
Bibliography		19