DIN EN ISO 18610:2021-04 (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 (ISO 18610:2016)

Contents

Page

European foreword ... **3**

Foreword ... **4**

1 Scope ... **5**

2 Normative references ... **5**

3 Terms and definitions ... **5**

4 Principle ... **8**

5 Significance and use ... **10**

6 Test equipment ... **11**
6.1 Immersion tank with temperature measurement device ... 11
6.2 Holder of the probes and test object ... 11
6.3 Probes ... 11
6.4 Pulse generator ... 11
6.5 Signal display and recording system ... 11

7 Test object ... **11**

8 Test object preparation ... **12**

9 Test procedure ... **12**
9.1 Choice of frequency ... 12
9.2 Establishment of the test temperature ... 12
9.3 Reference test without test object ... 13
9.4 Measurement with the test object ... 13
9.4.1 Determination of the bulk density and thickness ... 13
9.4.2 Mounting of the test object ... 13
9.4.3 Acquisition of different angles of incidence ... 13

10 Calculation ... **14**
10.1 Delay ... 14
10.2 Calculation of the propagation velocities ... 14
10.3 Calculation of the refracted angle, θ_r ... 14
10.4 Identification of the elastic constants, C_{ij} ... 14
10.4.1 Basic considerations ... 14
10.4.2 Calculation of C_{33} ... 16
10.4.3 Calculation of C_{22}, C_{23} and C_{44} ... 16
10.4.4 Calculation of C_{11}, C_{13} and C_{55} ... 16
10.4.5 Calculation of C_{12} and C_{66} ... 16
10.5 Polar plots of the velocity curves ... 17
10.6 Calculation of the quadratic deviation and the confidence interval ... 18
10.7 Calculation of the engineering constants ... 18

11 Test validity ... **19**
11.1 Measurements ... 19
11.2 Criterion of validity for the reliability of the C_{ij} components ... 19

12 Test report ... **19**

Annex A (informative) **Example of a presentation of the results for a material with orthotropic symmetry** ... **21**

Bibliography ... **23**