

ISO 22459:2024-08 (E)

Fine ceramics (advanced ceramics, advanced technical ceramics) - Reinforcement of ceramic composites - Determination of distribution of tensile strength and tensile strain to failure of filaments within a multifilament tow at ambient temperature

| Contents | | Page |
|-----------------|--|-------------|
| Foreword | | iv |
| 1 | Scope | 1 |
| 2 | Normative references | 1 |
| 3 | Terms and definitions | 1 |
| 4 | Principle | 2 |
| 5 | Significance and use | 2 |
| 6 | Apparatus | 3 |
| 6.1 | Tensile testing equipment | 3 |
| 6.2 | Data recording | 4 |
| 7 | Test specimen | 4 |
| 7.1 | General | 4 |
| 7.2 | Window type specimen | 4 |
| 7.3 | Cylindrical end type specimen | 4 |
| 8 | Test specimen preparation | 5 |
| 8.1 | General | 5 |
| 8.2 | Window type specimen | 5 |
| 8.3 | Cylindrical end type specimen | 6 |
| 8.4 | Number of test specimens | 6 |
| 9 | Test procedure | 6 |
| 9.1 | Determination of the initial cross-section area | 6 |
| 9.2 | Determination of the gauge length | 6 |
| 9.3 | Gripping | 6 |
| 9.4 | Selection of strain rate | 7 |
| 9.5 | Test procedure | 7 |
| 9.6 | Determination of load train compliance | 7 |
| 9.7 | Test validity | 8 |
| 10 | Calculation of results | 8 |
| 10.1 | Calculation of the load train compliance Cl | 8 |
| 10.2 | Calculation of probability of filament rupture P_j from the tests on specimens with a gauge length of 200 mm | 10 |
| 10.2.1 | Determination of the true origin | 10 |
| 10.2.2 | Construction of envelope curve and determination of instantaneous compliance $C_{t,j}$ | 10 |
| 10.2.3 | Probability of filament rupture | 11 |
| 10.3 | Distribution of filament rupture strain | 11 |
| 10.3.1 | Calculation of filament rupture strain | 11 |
| 10.3.2 | Filament rupture strain distribution | 11 |
| 10.4 | Distribution of filament strength | 12 |
| 10.4.1 | Initial cross-section area | 12 |
| 10.4.2 | Calculation of filament strength | 12 |

| | | |
|--|--------------------------------------|----|
| 10.4.3 | Filament strength distribution | 13 |
| 10.4.4 | Average filament strengths | 13 |
| 10.4.5 | Mean filament strength | 14 |
| 11 | Test report | 14 |
| Annex A (informative) Abstract of the handbook of mathematical functions | | 15 |
| Bibliography | | 16 |