

ISO 17841:2015-08 (E)

Fine ceramics (advanced ceramics, advanced technical ceramics) - Test method for thermal fatigue of fine ceramics substrate

Contents		Page
Foreword		iv
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Testing machine and equipment	2
4.1	Thermal cycling testing equipment	2
4.2	Four-point bending strength testing equipment	2
4.3	Supports for four-point bending strength testing	2
4.4	Micrometre callipers	2
4.5	Vernier callipers	2
5	Test specimens	2
5.1	Test specimen form and dimensions	2
5.1.1	General	2
5.1.2	Fine ceramics plate thickness t and metal plate thickness t_m	2
5.2	Number of test specimens	3
6	Testing methods	3
6.1	Test specimen dimension measurements	3
6.2	Thermal fatigue (thermal cycling) testing methods	3
6.2.1	Thermal fatigue (thermal cycling) conditions	4
6.2.2	Low-temperature tank inside TA and high-temperature tank inside TB	4
6.2.3	Number of cycles in thermal fatigue N	4
6.2.4	Each exposure time t_1 to low temperature and high temperature	4
6.2.5	Transfer time t_2	4
6.2.6	Temperature recovery time t_s	4
6.2.7	Single cycle	5
6.3	Testing methods of four-point bending strength	5
6.3.1	Distance between inner fulcrums (inner span) and distance between outer fulcrums (outer span)	5
6.3.2	Crosshead speed and fracture load	6
6.3.3	Measurement of load-displacement	6
6.4	Four-point bending strength testing for virgin specimens not exposed to thermal cycling	
6.7	Calculation of test results	7
7.1	Calculation of four-point bending strength	7
7.2	Calculation of mean values and standard deviations	7
7.3	Residual strength ratio	7
7.3.1	Calculation of residual strength ratio	7
7.3.2	Residual strength ratio - Thermal cycle number plots	8
8	Test report	9
8.1	Items to be reported	9
8.2	Additional items to be reported	9
Annex A (informative) Calculation of stress intensity factor at fracture		10
Bibliography		15