

DIN EN 16602-70-45:2015-05 (E)

Space product assurance - Mechanical testing of metallic materials; English version
EN 16602-70-45:2014

Foreword	5
1 Scope	6
2 Normative references	7
3 Terms, definitions and abbreviated terms	9
3.1 Terms defined in other standards	9
3.2 Terms specific to the present standard	9
3.3 Abbreviated terms.....	10
3.4 Symbols.....	11
4 Principles	12
4.1 Overview	12
4.2 Tensile test	12
4.3 Fracture toughness test	12
4.3.1 Overview	12
4.3.2 Determination of fracture toughness using the K_{Ic} test method.....	12
4.3.3 Determination of fracture toughness using the J_{Ic} test method	13
4.3.4 Characterization of fracture toughness using the R-curve test method.....	13
4.3.5 Characterization of fracture toughness using the CTOD test method	13
4.4 Fatigue test.....	14
4.4.1 General	14
4.4.2 Force controlled constant amplitude axial fatigue test	14
4.4.3 Strain-controlled fatigue test.....	14
4.5 Fatigue crack propagation test.....	14
4.5.1 Stable crack growth rate.....	14
4.5.2 Crack propagation threshold	15
4.6 Fracture and fatigue test in special environment.....	15
4.7 Stress corrosion cracking test.....	15
4.7.1 Overview	15
4.7.2 Stress corrosion cracking test using smooth specimens	15
4.7.3 Stress corrosion cracking test using pre-cracked specimens	16

4.8	Creep test.....	16
4.9	Test results presentation.....	16
5	Requirements.....	17
5.1	Customer agreement.....	17
5.2	Tensile testing.....	17
5.2.1	General.....	17
5.2.2	Tensile testing of weldments.....	17
5.3	Fracture toughness test.....	18
5.3.1	K_{Ic} test method.....	18
5.3.2	J_{Ic} test method.....	18
5.3.3	R-curve test method.....	18
5.3.4	CTOD test method.....	18
5.4	Fatigue test.....	19
5.4.1	Force controlled constant amplitude axial fatigue test.....	19
5.4.2	Strain-controlled fatigue test.....	19
5.5	Fatigue crack propagation test.....	20
5.5.1	Determination of fatigue crack growth rate.....	20
5.5.2	Determination of a fatigue crack propagation threshold.....	20
5.6	Fracture and fatigue tests in special environments.....	21
5.7	Stress corrosion cracking test.....	21
5.7.1	Stress corrosion cracking test using smooth specimens.....	21
5.7.2	Stress corrosion cracking test using pre-cracked specimens.....	21
5.8	Creep test.....	21
5.9	Evaluation of test results.....	21
5.10	Storage.....	22
5.11	Reporting.....	22
5.12	Quality assurance.....	22
5.12.1	General.....	22
5.12.2	Calibration.....	22
5.12.3	Quality control of raw materials.....	23
5.12.4	Nonconformance.....	23
5.12.5	Traceability and records.....	23
	Annex A (normative) Request for mechanical testing of materials – DRD.....	24
	Annex B (normative) Proposal for mechanical testing of materials – DRD.....	26
	Annex C (normative) Report of mechanical testing of materials – DRD.....	28

Annex D (informative) References	31
Bibliography.....	32