ISO 12108:2018 (E)

Metallic materials — Fatigue testing — Fatigue crack growth method

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols and abbreviated terms

4.1 Symbols
4.2 Abbreviated terms for specimen identification

5 Apparatus

6 Specimens

6.1 General
6.2 Crack plane orientation
6.3 Starter notch precracking details
6.4 Stress-intensity factor
6.5 Specimen size
6.6 Specimen thickness
6.7 Residual stress

7 Procedure

7.1 Fatigue precracking
7.2 Crack length measurement
7.3 Constant-force-amplitude, K-increasing, test procedure for da/dN > 10−5 mm/cycle
7.4 K-decreasing procedure for da/dN < 10−5 mm/cycle

8 Crack length measurement

8.1 Resolution
8.2 Interruption
8.3 Static force
8.4 Measurement interval
8.5 Symmetry
8.6 Out-of-plane cracking
8.7 Crack tip bifurcation
8.8 Non-visual crack length measurement
8.9 Visual crack length measurement

9 Calculations

9.1 Crack-front curvature
9.2 Determining the fatigue crack growth rate
9.2.1 General
9.2.2 Secant method
9.2.3 Incremental polynomial method
9.3 Determination of the fatigue crack growth threshold

10 Test report

10.1 General
10.2 Material
10.3 Test specimen

10.4 Precracking terminal values
10.5 Test conditions
10.6 Test analysis
10.7 Presentation of results

Annex A (normative) Compact tension (CT) specimen

A.1 General
A.2 Specimen size
A.2.1 Specimen thickness
A.2.2 Minimum uncracked ligament
A.3 Grips and fixtures
A.4 Crack length measurement interval
A.5 Stress-intensity factor

Annex B (normative) Centre crack tension (CCT) specimen

B.1 General
B.2 Specimen size
B.2.1 Specimen thickness
B.2.2 Minimum uncracked ligament
B.3 Grips and fixtures
B.3.1 General
B.3.2 Tension-tension testing
B.3.3 Tension-compression testing
B.3.4 Alignment of CCT specimen grips
B.4 Crack length measurement interval
B.5 Stress intensity factor

Annex C (normative) Single edge notch tension (SENT) specimen

C.1 General
C.2 Specimen size
C.2.1 Specimen thickness
C.2.2 Minimum uncracked ligament
C.3 Grips and fixtures
C.4 Crack length measurement interval
C.5 Stress-intensity factor

Annex D (normative) Single edge notch bend (SENB) specimens

D.1 General
D.2 Specimen size
D.2.1 Specimen thickness
D.2.2 Minimum uncracked ligament
D.3 Grips and fixtures
D.3.1 Tension-tension testing of SENB specimens
D.3.2 Tension-compression grips for the SEN B8 specimen
D.4 Crack length measurement interval
D.5 Stress-intensity factor
D.5.1 General
D.5.2 Single edge notch three-point bend, SEN B3, specimen
D.5.3 Single edge notch four-point bend, SEN B4, specimen
D.5.4 Single edge notch eight-point bend, SEN B8, specimen

Annex E (informative) Non-visual crack length measurement methodology — Electric potential difference[9][12][36]

E.1 General principles
E.2 Basic methods
E.2.1 General
E.2.2 Direct current method
E.2.3 Alternating current method
E.2.3.1 General
E.2.3.2 Low frequency systems
E.2.3.3 High frequency systems

Page count: 53