DIN EN 15857:2010-05 (E)

Non-destructive testing - Acoustic emission - Testing of fibre-reinforced polymers - Specific methodology and gene ral evaluation criteria

Contents

Page

Foreword 3

Introduction 4

1 Scope 5

2 Normative references 5

3 Terms and definitions 6

4 Personnel qualification 7

5 AE sources and acoustic behaviour of FRP 7
5.1 AE source mechanisms 7
5.2 Wave propagation and attenuation characterisation 8
5.3 Test temperature 8
5.4 Source location procedures 8
5.5 Analysis of AE from FRP 9

6 Instrumentation and monitoring guidelines 10
6.1 General 10
6.2 Sensors 10
6.3 Sensor location and spacing 10
6.4 Sensor coupling and mounting 10
6.5 Detection and evaluation threshold 11
6.6 Application of load 11
6.7 Graphs for real-time monitoring 11

7 Specific methodology 12
7.1 General 12
7.2 Testing of specimens 13
7.3 Testing of components and structures 13
7.3.1 Preliminary information 13
7.3.2 Test preparation 14
7.3.3 Load profiles 14
7.3.4 Written test instruction 16
7.3.5 Evaluation criteria 17
7.3.6 Stop criteria 20
7.4 Health monitoring 20

8 Interpretation of AE results / source mechanisms 20

9 Documentation 21

Annex A (informative) Recommended standard formats for presentation of AE data (examples) 22

A.1 AE testing of specimens 22
A.1.1 Example 1: AE data from static tensile testing of UD Carbon-fibre/Epoxy composite 22
A.1.2 Example 2: AE data from mode I DCB delamination test of UD Glass-fibre/Epoxy composite 27
A.2 AE testing of components and structures, example 3: AE data from pressure testing 34

A.3 Advanced analysis methods 41
A.3.1 General 41
A.3.2 Waveform/wave mode analysis 41
A.3.3 Frequency spectrum (FFT) analysis 41
A.3.4 Pattern recognition of AE sources 41
A.3.5 Modelling of AE sources 42

Bibliography 43