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Recycled carbon fibre — Determination of tensile strength distribution and interfacial shear strength of single filament embedded in matrix polymer

Fibre de carbone recyclée — Détermination de la distribution de la résistance à la traction et de la résistance au cisaillement interfacial d'un filament unique noyé dans une matrice polymère

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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms, definitions and symbols **1**
3.1 Terms and definitions 1
3.2 Symbols 1
4 Principle **2**
5 Tensile test machine and specimen **2**
5.1 Tensile test machine 2
5.2 Grip 2
5.3 Microscope 2
5.4 Test specimens 2
5.5 Number of tests 4
6 Testing technique **4**
6.1 Test procedure 4
6.2 Validity of the test 6
7 Calculation of results **6**
7.1 Summary of measurement data 6
7.2 Calculation of tensile strength distribution 7
7.3 Calculation of interfacial shear strength 8
7.4 Validity of the test result 8
8 Reporting of test results **9**
Bibliography **10**

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Foreword

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This document was prepared by Technical Committee ISO/TC 61, *Plastic*, Subcommittee SC 13, *Composite and reinforced fibre*.

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Introduction

The properties of recycled carbon fibres are potentially different from those of the original virgin carbon fibres. Therefore, it is very important to evaluate the properties of recycled carbon fibres in order to reuse them as reinforcing fibres. The tensile strength distribution and interfacial shear strength of recycled carbon fibres are essential for the production of composite materials using recycled carbon fibres. This document describes how to measure the tensile strength distribution and interfacial shear strength of recycled carbon fibres.

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Recycled carbon fibre — Determination of tensile strength distribution and interfacial shear strength of single filament embedded in matrix polymer

1 Scope

This document specifies methods for the simultaneous measurement of the fibre tensile strength distribution, and the fibre resin interfacial shear strength of recycled carbon fibres using the modified fragmentation test[1].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10618, *Carbon fibre — Determination of tensile properties of resin-impregnated yarn*

ISO 11566, *Carbon fibre — Determination of the tensile properties of single-filament specimens*

ISO 11567, *Carbon fibre — Determination of filament diameter and cross-sectional area*

3 Terms, definitions and symbols

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.2 Symbols

Symbol		Definition
E	fibre tensile modulus, GPa	Tensile modulus of the recycled carbon fibres
D	average fibre diameter, µm	Average fibre diameter of the recycled carbon fibres
L	Gauge length, mm	Initial distance between grips
l	Total fibre length, mm	Total length of a fibre within the observed area of all specimens
l_i	Fibre length, mm	Length of a fibre within the observed area of each specimen i
m	Weibull shape parameter	Shape parameter of the 2-parameters' Weibull distribution
$N(\varepsilon_{\text{fibre}})$	Total number of break points	Total number of fibre break points in all specimens at $\varepsilon_{\text{fibre}}$
Δ	Displacement, mm	Displacement given between gauges
$\Delta\varepsilon_{\text{film}}$	Incremental film strain	The magnitude of the strain on the film in each step

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