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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 39484-2020

Fiber-reinforced plastic composite materials The calibrated end load split test (C-ELS) and the effective crack length method are used to determine the type II fracture toughness of unidirectional reinforced materials

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

The translation method used in this standard is equivalent to ISO 15114.2014 "Calibrated end load split test for fiber reinforced plastic composite materials"

(C-ELS) and effective crack length method to determine the type II fracture toughness of unidirectional reinforced materials."

The Chinese documents that have a consistent correspondence with the international documents cited in this standard are as follows.

---GB/T 2918-2018 Standard environment for condition adjustment and testing of plastic specimens (ISO 291.2008, MOD);

---GB/T 17200-2008 Rubber and plastic tensile, compression and bending testing machine (constant speed drive) technical specification (ISO 5893.

2002, IDT);

---GB/T 28891-2012 Fiber reinforced plastic composite material unidirectional reinforced material I type interlaminar fracture toughness determination GIC

(ISO 15024.2001, IDT).

This standard was proposed by the China Building Materials Federation.

This standard is under the jurisdiction of the National Fiber Reinforced Plastics Standardization Technical Committee (SAC/TC39).

Drafting organizations of this standard. Beijing FRP Research and Design Institute Co., Ltd. and Beijing FRP Research and Design Institute Co., Ltd.

1 Scope

This standard specifies the use of calibrated end load split test (C-ELS) and the effective crack length method to determine unidirectional fiber reinforced plastic composite materials

Method of type II fracture toughness.

This standard applies to carbon fiber or glass fiber reinforced thermoset and thermoplastic composite materials.

The scope of application of this standard is not limited to these types of fibers and layup methods, other types of fibers or layup laminates can be used as reference.

2 Normative references

The following documents are indispensable for the application of this standard. For dated reference documents, only the dated version applies to this standard.

For undated references, the latest version (including all amendments) applies to this standard.

ISO 291 Standard environment for conditioning and testing of plastic specimens

ISO 5893 Rubber and Plastics Test Equipment Tension, Bending and Compression Type (Constant Speed Drive) Specification

ISO 15024 Fiber Reinforced Plastic Composite Material Unidirectional Reinforced Material Determination of Type I Interlaminar Fracture Toughness GIC

3 Symbols and terms

The following terms and definitions apply to this document.

a---measured delamination length, loading line (the plane perpendicular to the width of the specimen and passing through the center of the pin hole of the loading block and the delamination plane

Intersection line) to the distance from the tip of the layer on the edge of the sample (see Figure 1);

a₀---the length of the embedded film, the distance from the loading line to the end of the embedded film (see Figure 1);

a_p---length of the pre-crack, the distance from the loading line to the tip of the pre-crack;

b---sample width;

C---Sample flexibility Δ/P ;

C_{max}---The flexibility of the sample at the maximum load;

C₀---The initial flexibility of the sample, ignoring the initial effect, such as. the gap when the sample is fixed;

C_{5%}---The initial flexibility of the sample is increased by 5%;

delta---The displacement of the loading head of the testing machine;

E1---The elastic modulus obtained through three-point bending test or fixture calibration test;

GIIC---Type II shear loading critical energy release rate

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