International Standard

ISO 12817

Fibre-reinforced plastic composites — Determination of open-hole compression strength

Composites plastiques renforcés de fibres — Détermination de la résistance à la compression avec trou nu

Second edition
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

The document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*.

This second edition cancels and replaces the first edition (ISO 12817:2013), which has been technically revised.

The main changes are as follows:

— the measurement of the roundness of the hole has been added;

— the dimensions of the test specimens for method 2 has been corrected;

— the preliminary loading has been modified;

— the loading procedure has been added;

— the failure mode has been refined, and the figure of typical failure modes has been changed;

— the roundness of the hole in the test reports has been added.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

In preparing this document, reference has been made to other similar open-hole compression methods (JIS K 7093[1], ASTM D6484/D6484M-09[2]) and related methods, i.e. open-hole tension in ASTM D5766/D5766M6[3] and pin-bearing in ISO 12815[4].

The scope covers all current and future fibre-reinforced plastic composites meeting the requirements of this document. This document incorporates three methods that have different suitability and do not necessarily yield identical properties. All the methods use the maximum load to define the open-hole compressive strength.

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Fibre-reinforced plastic composites — Determination of open-hole compression strength

1 Scope

This document specifies the test method to determine the open-hole compressive strength of laminated fibre-reinforced plastic composites. The laminate is intended to be a balanced and symmetrical lay-up or be otherwise homogeneous through the thickness. This document applies to all textile diameter fibre types (carbon, glass, aramids, etc.) and matrices (e.g. thermoset, thermoplastic) that meet the requirements of this document.

This document includes three methods:

— method 1 (short specimen with support fixture);

— method 2 (short specimen without support fixture);

— method 3 (long specimen with support fixture as in ASTM D6484/D6484M-09, methods A and B).

Method 1 employs an L-shaped base fixture and two end fixtures. These end fixtures are compressed between the platens of the test machine.

Method 2 employs end supports similar to the fixtures given in ISO 14126:2023, D.1. This method is useful for cyclic loading conditions test, including under fully or partly reversed loading conditions when the specimen is clamped by hydraulic grips without support fixtures

Method 3 has two types of loading methods, i.e. 3A and 3B. In method 3A, the specimen is placed within a stabilization fixture, which is then clamped by hydraulic grips. In method 3B, the specimen is placed within a stabilization fixture and then end-loaded by platens. Full details of test methods 3A and 3B are given in ASTM D6484/D6484M-09, procedure A and procedure B, respectively.

NOTE Specimen configurations and force introduction varies for the three methods covered within this document. Results obtained using methods 1, 2 and 3 might not be equivalent for all laminates in all environments.

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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 472, *Plastics — Vocabulary*

ISO 1268 (all parts), *Fibre-reinforced plastics — Methods of producing test plates*

ISO 2818, *Plastics — Preparation of test specimens by machining*

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 and the following apply.

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