

Second edition
2023-10

Fibre-reinforced plastic composites — Determination of compressive properties in the in-plane direction

*Composites plastiques renforcés de fibres — Détermination des
caractéristiques en compression dans le plan*



Reference number
ISO 14126:2023(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 14126:1999), which has been technically revised.

The main changes are as follows:

- a new normative [Annex A](#), alignment of specimen and loading train, has been added and subsequent annexes have been renumbered;
- [Annex B](#), specimen preparation, is now normative to emphasise the importance of producing good quality specimens;
- two new informative [Annexes F](#) and [G](#) have 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.

Introduction

This document, originally published in 1999, was based on ISO 8515^[1] with the scope extended from glass-fibre reinforcement to include all fibre-reinforced plastic composites, such as composites based on carbon and aramid fibres. Other source documents consulted included ASTM D 3410^[2], SACMA SRM1^[3], prEN 2850^[4], CRAG 400^[5], DIN 65380^[6] and JIS K7076^[7]. Several different types of anti-buckling fixtures/loading jigs, different materials and different specimen sizes are covered by these source documents, although all are parallel-sided coupons. New or modified geometry support jigs are still being developed, for example in JIS K7018^[8].

This document harmonizes and rationalizes the current situation by:

- a) concentrating on the quality of the test by limiting the maximum bending strain allowable (i.e. 10 % between 10 % and 90 % of the maximum load, as recommended by ASTM), so that an axial-load case can be assumed;
- b) standardizing on two related specimen designs, one principally for aerospace type unidirectional pre-impregnated materials (i.e. Type A) and one for other materials/formats (i.e. Types B1/B2). The chosen specimen design can be used with different loading fixtures;
- c) defining acceptable failure criteria (e.g. avoiding within grip failures);
- d) including an equation for determining the specimen minimum thickness to avoid Euler buckling proposed by ASTM for harmonization purposes (taken from ASTM D 3410^[2] in a modified form);
- e) allowing any design of support/loading fixture to be used that meets the above bending requirements, using different principles of loading (i.e. essentially shear and combined loading);
- f) ensuring that the test specimen and loading/support fixture are well aligned (see [Annex A](#));
- g) concentrating on the quality of specimen preparation (see [Annex B](#));
- h) including guidance on the use of digital image correlation (DIC) for strain and bending measurements (see [Annex G](#));

NOTE 1 Compression properties measured in the through-thickness direction (direction 3 in [Figure 1](#)) are covered by ISO 20975-1^[9].

NOTE 2 Compression properties of rigid plastics having only unaligned short (<7,5 mm) fibres or no fibre content [rather than long (>7,5 mm) discontinuous or continuous fibres] is covered by ISO 604^[10].