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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 14126:1999(E)

Contents

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 14126 was prepared by ISO/TC 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*.

This first edition cancels and replaces ISO 8515:1991, which dealt only with glass-fibre-reinforced plastic composites.

Annex A forms a normative part of this International Standard. Annexes B to D are for information only.

Introduction

This standard is based on ISO 8515, with the scope extended to include all fibre-reinforced plastic composites, such as more recent composites based on carbon and aramid fibres, but retains the test conditions relevant for glass-fibre-reinforced systems. Other source documents consulted include ASTM D 3410 (buckling criteria, larger specimen width and longer gauge length), ASTM D 695 (modified version in SACMA SRM1), prEN 2850, CRAG 400, DIN 65380 and JIS K 7076 (see bibliography).

Several different types of jig, different materials and different specimen sizes are covered by these source documents. The table below presents examples, the specimen sizes being given as overall length × gauge length × width × thickness, in millimetres.

ISO 8515 (GRP)	Celanese type 110 × 13 × 6,4 × 2	End block 120 × 20 × 10 × (3 to 10)	
prEN 2850 (CFRP)	Celanese type 110 × 10 × 10 × 2	ASTM D 695 80 × 5 × 12,5 × 2	Revision includes a machined specimen with co-cured tabs.
JIS K 7076 (CFRP)	ASTM D 695 78 × 8 × 12,5 × 2	Celanese 134 × 8 × 6,5 × 2	ITTRI 108 × 8 × (6 to 12,5) × (1 to 2)
ASTM D 3410 (all fibres)	Celanese 140 × 12 × 6 × variable	ITTRI 140 × (25 to 12) × (12 or 25) × variable	
(equations/tables give required thickness for modulus, expected strength and gauge length)			
DIN 65380 (all fibres)	Celanese 112 × 8 × 6,35 × 2	ITTRI 112 × 8 × 6,35 × 2	
CRAG 400 (all fibres)	Celanese 110 × 10 × 10 × 2		
SACMA SRM1 (all fibres)	ASTM D 695 (modified) 80,8 × 12,7 × 4,8 × [1 (unidir.) or 3 (fabric)]		

These test methods use aspect ratios (height/thickness and height/width) for the gauge area covering a range of values, which appears undesirable in a test known to be susceptible to buckling failures. Also, new support jigs are still being developed. This International Standard harmonizes and rationalizes the current situation by:

a) concentrating on the quality of the test by limiting the maximum bending-buckling strain allowable at failure (i.e. 10 % as recommended by ASTM — see also 5 % level in prEN 2850), so that it is possible to justify an axial-load analysis;

b) allowing any design of jig to be used that meets this above requirement, using two methods of loading (i.e. shear and end loaded);

c) standardizing on two specimen designs, one principally for unidirectional material and one for other materials (the chosen specimen can be used with either loading method);

d) adding an informative note as annex D, which was proposed by ASTM for harmonization purposes, and is taken from ASTM D 3410 (in a modified form).