

Composites Test Fixtures

Compression After Impact, ASTM D 7137 / D 7137M

The “Boeing CAI” fixture is used to test the impact resistance of carbon and other fiber-reinforced polymer composite laminates. These materials are prone to great reduction in compressive strength, even when the impact load is insufficient to cause visible damage. The post-impact compression test is used to assess the relative performance of different composite laminates with different fiber matrix combinations. Laminates are subjected to low-velocity impact loading simulating tool drops and flying debris or may be subjected to an out-of-plane static indentation (ASTM D 6264 / D 6264M). Specimens then undergo a compression after impact (CAI) test on an electromechanical or servohydraulic testing machine.

Principle of Operation

The CAI test measures the residual strength of a composite laminate after being damaged by impact. The CAI fixture - originally designed by Boeing® and outlined in specification BSS 7260 - incorporates adjustable side plates to accommodate for both variations in thickness and overall dimension.

The specimen is a layered composite plate and is either impacted at a specified energy as described in ASTM D 7136 / D 7136M or subjected to an out-of-plane static indentation (ASTM D 6264 / D 6264M). Lastly, it is placed in the fixture and end-loaded to failure in compression.

Features

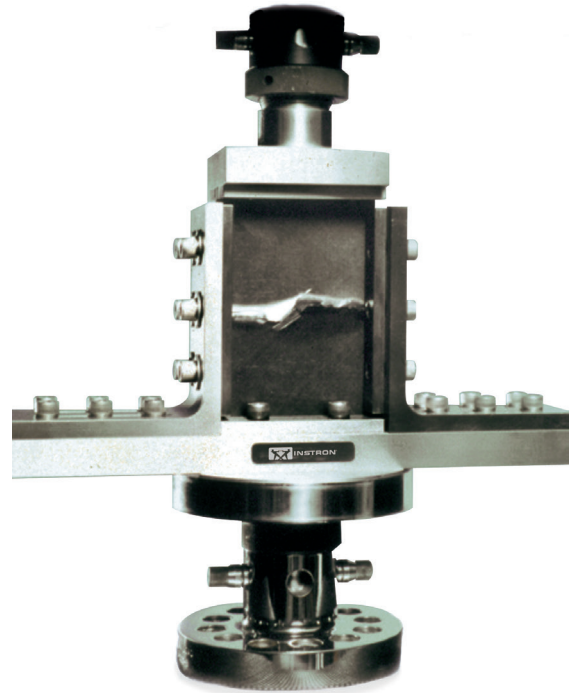
- Conforms to ASTM D 7137 / D 7137M and Boeing® BSS 7260
- Simple to use
- Stainless steel construction for easy maintenance and durability
- Suitable for non-ambient temperatures

Application Range

- Type of loading: compression
- Specimen material: polymer composite
- Specimen shapes: flat laminate specimens per specifications

Related Products

Refer to CEAST Testing Fixtures for details of impact test fixtures conforming to ASTM D 7136/ D 7136M.



Specifications

Catalog Number	-	S5385A	CP103712
Testing Standard	-	ASTM D 7137 and Boeing® BSS 7260	ASTM D 7137M
Maximum Load	kN	150	150
	kgf	15000	15000
	lbf	33000	33000
Temperature Range	°C	-75 to +250	-75 to +250
	°F	-103 to +482	-103 to +482
Specimen Thickness (Nominal)	mm	-	5.0
	in	0.2	-

Mechanical Connection

Upper Interface	-	Requires compression platen minimum diameter 50 mm (2 in) ¹	Requires compression platen minimum diameter 50 mm (2 in) ¹
Lower Interface	-	Requires compression platen minimum diameter 100 mm (4 in) ¹	Requires compression platen minimum diameter 100 mm (4 in) ¹

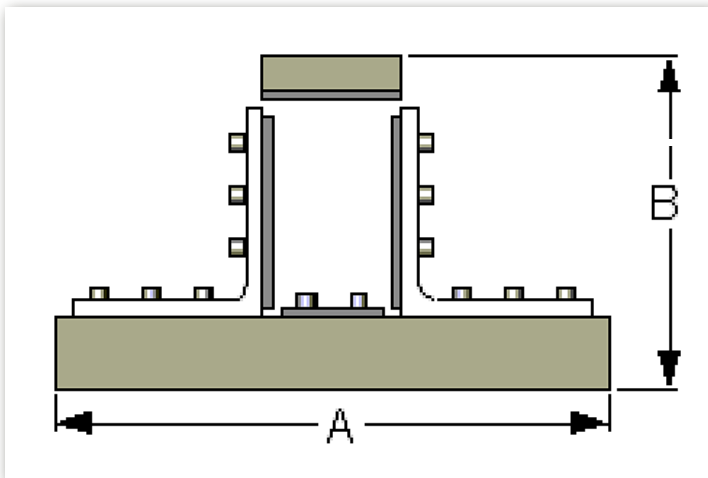
Dimensions

Effective Length (A)	mm	203	203
	in	8.0	8.0
Overall Width (B)	mm	356	356
	in	14.0	14.0

Material	-	Stainless steel with hardened end loading plates	Stainless steel with hardened end loading plates
Weight (Approximately)	kg	15	15
	lb	32	32

Notes:

1. Platens not included.



Boeing® compression after impact (CAI) fixture

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