

# DROP TOWER IMPACT TESTING

Ultra-Light Tup Holder

With the introduction of composite materials and engineering plastics in the Aerospace, Defense, Automotive and Electronic markets, having the ability to conduct impact tests at both high and low energies to determine resistance and deformation help ensure that the correct materials and design geometries are selected for enhanced product safety and liability.

## Ultra-Light Tup Holder Applications

In the R&D environment of the Aerospace and Defense markets, impact testing is used to compare materials and determine their strength. Aiming to reduce component bulk, material quantity and increase the mechanical response of sandwich composite panels and coupons, engineers experiment with combinations of low impact energies and velocities. Tests using a mass of 1 kg. and impact velocities from 3 – 4 m/s are often conducted.

Within the Automotive market, qualification of new materials is extremely important to demonstrate applicability. Prototyping of new components is expensive and is usually conducted later in development. To determine the optimal parameters for simulations on large components, the industry relies on computational analysis (CAE) tools and impact tests on small representative parts at low mass and high velocity such as 1 kg. at 11 m/s.

In the Electronics market, a variety of adhesives are used to assemble a wide range of components such as bonding battery packs, affixing glass to housing, components to bodies. These products not only have to provide strong bonds but are also expected to seal and protect the devices from environmental stresses. Their ability to absorb impact and provide the best vibration and impact resistance are key factors. To reproduce real life impacts it is crucial to test with a variety of low masses at high velocities such as 0.5 kg. at 4.4–5.4 m/s (1 m–1.50 m).

In all these scenarios, an Instron drop tower equipped with a piezoelectric instrumented tup, tup insert and ultra-lightweight tup holder for a total falling mass from 0.5 kg (for Model 9440) and 1 kg (for Model 9450) and using a range of velocities from 0.77 m/s to 14 m/s, are the perfect tools to investigate materials' response to an impact event.



1 kg Tup Holder

## Drop Towers Features and Benefits

- Impact energy from 0.1J up to 1800J (with high-energy System)
- Minimum single mass from 0.5kg
- Performs impact test according to internal and industry standards (up to 24 m/s).
- Performs impact tests according to international standards: Impact puncture, CAI, Wedge-peel, Tensile impact, Charpy, Izod tests.
- Instrumented tup to acquire the force vs displacement during each single-impact event allowing the analysis of the failure.
- Pneumatic anti-rebound device for avoidance of multiple impacts.
- Frictionless linear guidance system to minimize loss of energy and improve data reproducibility.
- Innovative 23" touch screen Dashboard with embedded Data Acquisition.
- System and Bluehill Impact software for a quick set up, simple and error-free testing.
- High resolution data acquisition chain in compliance with ISO 7500 to ensure the accuracy of the force measuring system.

- Safety enclosure of the test area to protect the operator from flying debris including carbon fiber splinters.
- Thermostatic chamber to condition test coupons or components from -70 °C to +150 °C.
- Optional extended support base accommodates wide range of large components.



## Specifications

Instrument Model		9440	9450
Impact Energy	J	0.1 - 405	0,29 - 757
	lb ft	0.22 - 299	0,44 - 558
Impact Velocity	m/s	0.77 - 4.65	
	ft/s	2.53 - 15.3	
Drop Height	mm	0.03 - 1.10	
	in	1.18 - 43.3	
Mass Range <sup>(1)</sup>	kg	0.5 - 37.5	1 - 70
	lbs	1.1 - 82.7	2.2 - 154
Machine Dimensions (W x D x H)	mm	985 x 610 x 2620	1015 x 866 x 2720
	in	38.7 x 24 x 103	40 x 34 x 107
Machine Weight	kg	340	550
	in	749	1212
Load on slab in static condition	kg/m <sup>2</sup>	1000	1570
	N/m <sup>2</sup>	10000	15402
Electrical Supply		220-240V 50/60Hz 100-120V 50/60Hz	

(1) includes tup, insert and tup holder

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