



Explosives Measurement And Test
Instrumentation:
BOE Impact Test Instrument



UTEC manufactures a Bureau of Explosives (BOE) Impact Test Instrument for in-house use and testing by end-users who need to determine the energy necessary to initiate an explosive or other energetic material via impact energy input.

The Department of Transportation (DOT) and Department of Defense (DOD) use the BOE Impact Test Instrument to determine whether a material is too sensitive for transport by conducting a 10-trial screen test. This test is presented as a means used to obtain initial impact data for a manufacturing classification. However, a more thorough test using additional drop heights may be performed as needed in order to conduct a hazards analysis, or to determine specific attributes of a known explosive formulation and its sensitivity to impact energy.



Data Summarizing Table:
The positive result test data used in these calculations.

Height (H) inches	n(+)	i	in
3	1	0	0
4	5	1	5
5	4	2	8
6	1	3	3
	Ns = 11		A = 16

$$H_{50} = 3 + 1 \frac{[16 - 1]}{[11 - 2]} = 3.95 \text{ inches}$$

The primary parts of the test apparatus are an anvil upon which the sample is placed, a moving plunger of known contact area that rests on the top of the sample, and a falling drop weight that strikes the moving plunger.

Energetic materials or the explosive sample is tested by placing it between the anvil and moving plunger. Impact energy is applied to the plunger by a constant mass weight dropped from a variable height. The amount of energy imparted to

the sample is controlled by the drop height. Initiation is observed as production of smoke, fire, or an audible pop.

An infrared gas analyzer can also be used to detect reaction products.

The BOE Impact Test Instrument is used to simulate impact conditions in processing operations where energetic or explosive material may be subjected to impact by processing equipment or pinched/crushed between moving or colliding parts. Solid, liquid, or powdered materials may be tested using special holders.

BOE Impact Test Apparatus

Designed and manufactured to perform the following tests:

- Test method 3(a)(i) as detailed in the United Nations test manual
- Section 5-4a in TB700-2 (DOD Hazard Classification Procedures)
- Test method 1011 as detailed in MIL-STD 1751A



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