



ATF-LS-E15 Ignition Susceptibility Test	Published Online: March 2018
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I. Scope:

Ignition is the act of kindling or setting on fire any combustible substance. An ignition susceptibility test (IST) is conducted to determine if suspected intact explosives or fuse will support combustion. Many of these materials exhibit characteristic burning behavior when ignited. Although additional testing is required for positive identification, the burning characteristics may be useful indicators of the identity of the suspect material.

II. References:

1. Fedoroff, B.T. and Sheffield, O.E. "Encyclopedia of Explosives and Related Items," PATR 2700, Picatinny Arsenal, Dover, NJ, Vol. 7, 1975, p 11.
2. Washington, W.D. and Midkiff, Jr., C.R., "Systematic Approach to the Detection of Explosive Residues. I. Basic Techniques," Journal of the AOAC, Vol. 55, No. 4, 1972, p. 811-822.
3. Washington, W.D., Kopec, R.J. and Midkiff, Jr., C.R., "Systematic Approach to the Detection of Explosive Residues. V. Black Powders," Journal of the AOAC Vol. 60, No. 6, 1977, p. 1331-1340.
4. Meyers, R.E., "A Systematic Approach to the Forensic Examination of Flash Powders," Journal of Forensic Sciences, Vol. 23, No. 1, 1978, p. 66-73.

III. Apparatus/Reagents:

1. Tweezers, spatula, or other suitable instrument
2. Ignition source (burner, match, etc.)

Reference Material

A reference material of known explosive may be used for comparative purposes. If a reference material is used, the lot number or unique identifier must be noted.

IV. Safety Precautions:

Use as small a sample as possible. Make sure the area is clear of any flammable or explosive materials (solvents, containers of explosives, etc.). Perform test in a hood, if practical, and wear eye protection.

V. Procedures:

Remove a small representative sample of the suspected explosive. Using a spatula or other appropriate tool, introduce the sample to an ignition source (flame) and observe the resulting effect. Make note of the physical changes that occur in the sample, such as flame/flash colors, smoke, sound (gas release), remaining residues, etc.

A length of fuse can be affixed to the end of a probe or held in tweezers and ignited. The observed burning characteristics that demonstrate the functionality of the fuse shall be noted.

Some compounds and energetic mixtures will not burn unconfined in an open flame. Light confinement in a rolled piece of tissue paper may be helpful in the ignition of these mixtures. It should be noted that a negative IST result does not necessarily indicate the reactivity of a substance. Some explosives will not ignite even if confined.

Extreme caution must be exercised when testing suspected primary high explosives as a very small sample will release a great amount of energy.

VI. Quality Assurance/Quality Control:

The physical condition of the sample, along with the ignition technique, need to be taken into consideration if the sample does not burn as expected. Conditions that may interfere include excessive moisture, mixtures or impure samples, and improper ignition technique.