



Trash Receptacles – New Standards Help Close the Performance Gaps

How Bomb Squads and Bomb Technicians can help

By Grant Haber

IABTI bomb technicians and military EOD may recall my article from the March/April 2004 Detonator titled, "Mitigating the Effects of Terrorist Attack." The article included an outline which indicated how bomb resistant trash receptacles should be tested to determine accurate explosives protective ratings and to establish reliable performance expectations in the real world, should an explosive be detonated within the receptacle. I'm pleased to report ASTM International has published Bomb Resistant Trash Receptacle standards, which can now be used to help customers separate fact from fiction when it comes to vendor's claims for any model of bomb resistant trash bin.

Since IABTI bomb technicians, and military EOD, are generally not the people purchasing bomb resistant trash bins, you may be wondering why this article is in the Detonator. When you finish reading this article, you will understand why these ASTM standards benefit our community, and how these ASTM standards can be utilized by our community to make positive contributions toward protecting civilian bomb technicians, military EOD, and enhancing public safety.

The designations for the two ASTM standards related to bomb resistant trash receptacles are E 2639-09a, titled, "Standard Test Method for Blast Resistance of Trash Receptacles" and E2740-10, titled, "Standard Specification for Trash Receptacles Subjected to Blast Resistance Testing."

The scope of the standard test method provides a procedure for characterizing the blast resistance of a trash receptacle when an explosive is detonated within the receptacle. The procedure



Side wall test photo taken at EMRTC of a bomb resistant trash receptacle using C4 Explosives.



Post Detonation: Close-up of featured test photo – American Innovations Protector Model Bomb Receptacle. Notice the construction of the test stand used during this testing.

measures the magnitude of the external overpressures, and determines the extent and location of any primary or secondary fragmentation produced during the explosion. This test method is intended to be performed in open-air test arenas, and it is not intended to analyze the effects of a fireball resulting from the detonation.

During testing, a trash receptacle is placed on a steel plate, having a minimum thickness of 150mm (6 inches), and a minimum area of 1.2 x 1.2 m (4 x 4 ft), and placed in the center of a test arena with witness panels, silhouettes, and pressure sensors. A solid test stand replicates a real world deployment, and ensures the bomb receptacles are performing as represented without the aid of the ground. A new, randomly selected receptacle is required for every test.

A minimum of three tests are conducted, including two bare charge tests, and one fragmentation test. Unless otherwise agreed by the testing laboratory, and the party commissioning the test, a bare C4 explosive charge is used as the test explosive, at a relative effectiveness factor of 1.34 in relation to 0.45 kg (1 lb.) of trinitrotoluene (TNT). The charge is to be fabricated by packing C4 into a cylindrical cardboard tube, with height of the tube measuring 1.0 to 1.5 times the diameter of the tube, and the density of the explosive charge to be uniform throughout the tube. Engineers can substitute one explosive for another, when using blasting equations that are designed for TNT.

For the fragmentation charge as defined in the ASTM standard, "Secure rings of +/- 0.03 mm (0.35 +/-0.001 in.) American Iron and Steel Institute (AISI) Type 440, Grade 25 stainless steel balls (10 balls per 0.45 kg [1 lb] of explosive charge) horizontally to the outside of the

cardboard tube at the center of the tube's length. Check that the stainless steel balls are placed uniformly around the tube."

The scope of the ASTM standard specification provides performance requirements for trash receptacles when subjected to the explosive tests described in Test Method E2639.

In short, a successful test is achieved when the following conditions are met: The trash receptacle must be able to reduce radial blast pressure, direct the blast effects upwards, and remain standing after each test. During the explosion, the outer wall cannot be breached (cracks, splits, or holes), primary fragmentation must be contained during fragmentation tests, and no secondary horizontal fragmentation can be generated from any metallic components from the trash receptacle.

The whole thought process behind creating test and performance standards many years before this ASTM committee was even formed, was simply to build a safety factor into this proactive anti-terrorism technology. Knowing that terrorists gather intelligence from the internet, among other open sources, and since many customers for this anti-terror technology foolishly publicize explosives protective ratings in open forums during their procurement process, it became apparent that a safety factor was needed.

Before spelling out the why the bomb squad community should care about performance verification, it is important to share the following:

For more than a decade, bomb resistant trash bins with grossly misrepresented performance capabilities have been deployed at airports, transit stations, government buildings, and so forth. For the bomb technicians who participated in some of the post-deployment, independent testing, they can speak from first-hand knowledge about which vendor's bomb receptacles turn into oversized hand grenades, and which vendor's bins actually perform as represented. The real question that remains unanswered, is why owners of the misrepresented bomb receptacles have not removed them from service, despite the security gaps their own independent testing has verified.



An American Innovations bomb-resistant trash receptacle, with anti-graffiti black finish, and a weatherproof cover.

Aside from placing public safety in harm's way, I can sum up in two words why civilian bomb squads and military EOD units should care about the performance of the bomb bins deployed at locations within their areas of jurisdiction: "Secondary Devices." When called out for the next suspicious bag, package, or vehicle at an airport, transit station, or other public place known as a common target for IED attacks, take notice to the distance between you and these trash bins. Given your background, I need not describe what can happen to you and other first responders, should terrorists have secondary devices buried underneath the trash in these bins.

So, you are probably asking yourself what you can say or do to reduce your exposure from trash can bombs, and to make a positive contribution toward public safety at these high-profile public gathering places. For existing deployments, ask the customer if your bomb squad can take one or two of their beat-

up looking, or oldest, bomb receptacles out to the range for performance verification testing. Aesthetics should not impact how one receptacle should perform over another. For future procurements, suggest they implement a random selection, product acceptance testing policy into their contract, and offer to have your bomb squad randomly select a unit or two from the entire shipment for performance verification testing, before any units are deployed.

A random selection, product acceptance testing policy is the only effective means of ensuring that a vendor does not provide customers with test reports and supporting videos for product A, then ship product B, when they are producing them in bulk for a given deployment. IABTI members have the unique opportunity to take a leadership role in helping put an end to a bait and switch tactic that has been employed for years by some unethical vendors. Comparing the submitted test report, and supporting product testing video, to your independent testing, is the only foolproof means for separating fact from fiction, when it comes to the true performance of any particular bomb receptacle.

Now that an easy to implement, and low-cost plan for performance verification has been outlined, I would like to make a few final points, in an attempt to maximize the benefit this proactive, anti-terror technology was meant to deliver. Since there are limited vendors supplying this capability, customers who need to solicit multiple bids to satisfy an internal procurement policy, should do so through a closed bid process. Publicizing specifications, such as force protective ratings, or exact locations where these bomb bins will be deployed, is going to give the edge right back to the terrorists.

Grant Haber has been closely involved with raising awareness about performance standards, establishing policies to protect security sensitive but unclassified information, along with the development of products and training programs tailored toward closing security gaps and enhancing mission effectiveness for field operators. Haber served on the Rockland County Homeland Security Task Force as liaison for the Rockland Business Association.