Homeland Security
Science and Technology

TechNote

U.S. Department of Homeland Security
SAVER
System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL).

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact the SAVER Program Support Office.

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Blast Resistant Trash Receptacles

Blast resistant trash receptacles (BRTRs) protect people from primary and secondary fragmentation that would generally result from the detonation of an explosive device inside an ordinary trash receptacle. ASTM International has issued two standards that currently help consumers verify a manufacturer's claim about the performance of a BRTR. A third ASTM standard has also been issued to guide the deployment of BRTRs in crowded places. Property managers or security directors can take advantage of the standards to ensure that BRTRs will function to protect against the security gap posed by trash receptacles in public spaces.

How They Work

Conventional BRTRs have single- or multiple-wall technology coupled with a blast cushion designed to diffuse the force of an explosion. Additionally, they direct the force of the blast upwards and are meant to have no metal parts in the blast path that could fragment and become airborne, eliminating a potential threat to bystanders. Some BRTRs use composite materials and unique construction techniques to minimize fragmentation. Lids, featured on some models, are meant to remain attached to the waste receptacle during an explosion.

Figure 1. Blast Resistant Trash Receptacle Undergoing Testing

How They Are Tested

Seventy five tests of 15 models of BRTRs by the Naval Explosive Ordnance Disposal Technology Division (NAVEODTECHDIV) in 2005 found substantial variations among different products, resulting in the development of standards. ASTM International has since issued two standards related to BRTRs: E 2639-12, *Standard Test Method for Blast Resistance of Trash Receptacles*, and E 2740-12, *Standard Specification for Trash Receptacles Subjected to Blast Resistance Testing*. These standards are now being routinely used by manufacturers and procurers of BRTRs. For example, the city of Chicago utilized them when deciding what BRTRs to purchase for the NATO and G-8 summits during 2012.

Standard E 2639-12 provides a procedure for characterizing the blast resistance of trash receptacles when an explosive is detonated from within the receptacle. The tests described in E 2639-12 are intended for open-air test arenas and require that a new, randomly selected receptacle be used for every test.

During a test, the trash receptacle is placed on a steel plate in the center of the test arena with witness panels, silhouettes (a witness panel that is

constructed in the approximate shape of a human), and a camera station with normal-speed and high-speed cameras. Optional pressure sensors and data acquisition systems can be used at the discretion of the users and testers.

An explosive charge is placed at one of four predetermined locations within the receptacle and detonated. The receptacle is then inspected for breaches in its exterior surface, and the extent and location of fragments produced are recorded.

A minimum of three tests are conducted, including two bare charge tests and one fragmentation test. The test explosive recommended for use is a bare C4 explosive charge. The fragmentation charge has secure rings of American Iron and Steel Institute (AISI) Type 440, Grade 25 stainless steel balls placed uniformly around a cardboard tube containing the charge.

Standard E 2740-12 provides the performance requirements for BRTRs when they are subjected to the test method described in E 2639-12. Performance of the BRTR is evaluated by whether it: 1) directs the blast effects, pressure, and fragments upwards; 2) contains primary fragments; 3) does not produce secondary fragments from any metallic components of the trash receptacle; and 4) structurally withstands the detonation. The presence of breaches on the outer wall are recorded, measured, and evaluated for direct openings from the exterior to the interior of the receptacle with a 4 mm (3/16 in.) steel rod.

Applications

A third ASTM standard, E 2831/E 2831M-11, *Standard Guide for Deployment of Blast Resistant Trash Receptacles in Crowded Places*, gives guidance for the placement of trash receptacles at both exterior and interior locations of facilities and venues. It provides basic recommendations for various operational and explosive effects considerations. Operational considerations take into account the impact of the use of BRTRs during the collection and removal of trash from the facility or venue. Explosive considerations pertain to the mitigation of explosive effects resulting from the detonation of a device in a receptacle.

E 2831/E 2831M-11 also provides a list of factors to consider when developing a threat assessment to evaluate deployment of BRTRs. It includes directives on both recommended and non-recommended placements of BRTRs. For example, since most blast products are directed vertically in BRTRs, significant damage could occur to overhead structures when receptacles are placed in indoor locations.

The standards provide a basic framework of guidance and considerations for individuals in both the private and public sectors who are considering the purchase and/or deployment of BRTRs. Every facility and venue has unique associated factors, such as demographics, location, and functions, for which the basic recommendations for deployment may not be applicable. The standards are also scalable and can therefore provide useful information on performance at any threat level.

Figure 2. BRTR deployment in a public venue
(Photo Courtesy of Mistral Security Inc.)

Features

BRTR models are available in attractive designs and various laminates and colors. They usually accommodate plastic liners and sometimes feature internal drainage out of the bottom or the side. Some models also feature lids and optional cigarette trays. Installation comprises leveling the BRTR and, if required, anchoring. The containers can weigh between 200 and 2,000 pounds.

Conclusions

BRTRs help mitigate the threat of concealed explosives in crowded venues and buildings. The standards developed by ASTM can assist buyers in evaluating various BRTRs and selecting the appropriate model for the threat level needed, and deploying them to ensure maximum protection.

References and Resources

ASTM E 2639-12, *Standard Test Method for Blast Resistance of Trash Receptacles*

ASTM E 2740-12, *Standard Specification for Trash Receptacles Subjected to Blast Resistance Testing*

ASTM E 2831/E 2831M-11, *Standard Guide for Deployment of Blast Resistant Trash Receptacles in Crowded Places*

Standards can be accessed at: http://www.astm.org/DHS/