



# Blast Resistant Trash Receptacles


## Market Survey Report

September 2022



Science and  
Technology





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The *Blast Resistant Trash Receptacles Market Survey Report* was prepared by the National Urban Security Technology Laboratory—in conjunction with the U.S. Army Combat Capabilities Development Command (DEVCOM)—for the U.S. Department of Homeland Security, Science and Technology Directorate pursuant to Financial Transaction FTLF-21-FT020.

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## FOREWORD

The National Urban Security Technology Laboratory (NUSTL) is a federal laboratory within the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T). Located in New York City, NUSTL is the only national laboratory focused exclusively on supporting the capabilities of federal, state, local, tribal, and territorial responders to address the homeland security mission. The laboratory assists responders with the use of technology to prevent, protect against, mitigate, respond to, and recover from homeland security threats and incidents. NUSTL provides expertise on a wide range of subject areas, including chemical, biological, radiological, nuclear, and explosive detection, personal protective equipment, and tools for emergency response and recovery.

NUSTL manages the System Assessment and Validation for Emergency Responders (SAVER) program, which provides information on commercially available equipment to assist response organizations in equipment selection and procurement. SAVER knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the responder community: “What equipment is available?” and “How does it perform?” The SAVER program works with responders to conduct objective, practitioner-relevant, operationally-oriented assessments and validations of commercially available emergency response equipment. Having the right tools provides a safer work environment for responders and a safer community for those they serve.

NUSTL is responsible for all SAVER activities, including selecting and prioritizing program topics, developing SAVER knowledge products, and coordinating with other organizations to leverage appropriate subject matter expertise. In conjunction with the U.S. Army Combat Capabilities Development Command (DEVCOM), NUSTL conducted a market survey of commercially available blast resistant trash receptacles. This equipment falls under the AEL reference number 14EX-00-BCAN titled *Receptacles, Trash, Blast-Resistant*.

SAVER reports are available at [www.dhs.gov/science-and-technology/saver-documents-library](http://www.dhs.gov/science-and-technology/saver-documents-library).

Visit the NUSTL website at [www.dhs.gov/science-and-technology/national-urban-security-technology-laboratory](http://www.dhs.gov/science-and-technology/national-urban-security-technology-laboratory) or contact the lab at [NUSTL@hq.dhs.gov](mailto:NUSTL@hq.dhs.gov).



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## EXECUTIVE SUMMARY

Blast resistant trash receptacles (BRTRs) are heavily reinforced trash bins designed to protect people from the primary and secondary fragments caused by the detonation of an explosive device. BRTRs are often deployed in locations that are at high risk for terrorism, particularly if the area features elevated foot traffic.

Between June 2021 and September 2021, the U.S. Army Combat Capabilities Development Command (DEVCOM) and the National Urban Security Technology Laboratory conducted a market survey of commercially available BRTRs for NUSTL's Systems Assessment and Validation for Emergency Responders (SAVER) program. The survey identified 26 products made by eight different manufacturers.

Blast resistant trash receptacles featured in this report are designed to mitigate the risk posed by explosives that may be employed in an act of terrorism. Many of these models cater to a particular threat level and offer a range of explosive mitigation profiles. Many of these receptacles comply with the ASTM International standards E2639-12 (2018) and E2740-12 (2018), two standards which quantify testing parameters as well as blast mitigation performance evaluation. Some models, produced by international manufacturers, also conform to other national standards. The blast mitigation profiles of the BRTRs featured in this market survey report have not been independently verified by the SAVER program.

The purpose of this market survey is to provide emergency responder agencies with information to guide them in making operational and procurement decisions. Information included in this report has not been independently verified by NUSTL. When making procurement decisions, emergency response agencies should carefully research the overall capabilities, limitations, and technical specifications of each product in relation to their agency's operational needs. Interested parties should take great care to evaluate the risk for a particular site prior to purchasing a BRTR to provide adequate protection.

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## 1.0 INTRODUCTION

Blast resistant trash receptacles (BRTRs) are structurally augmented trash bins designed to contain the primary and secondary fragments produced by an explosive device detonation. These bins are often placed in areas where the risk of an act of terrorism involving an explosive is heightened to reduce the probability of damage to human life and property. To provide organizations with up-to-date information to promote informed purchasing, the System Assessment and Validation for Emergency Responders (SAVER) program conducted this market survey to update findings from a [2013 publication](#). This market survey falls under Authorized Equipment List reference number 14EX-00-BCAN, titled “Receptacles, Trash, Blast-Resistant.”

Between June 2021 and September 2021, the U.S. Army Combat Capabilities Development Command (DEVCOM) and the SAVER program conducted a market survey of BRTRs. This market survey report is based on information gathered from manufacturer and vendor websites, internet research, industry publications, and a government-issued [request for information](#) (RFI) that was posted on the System of Award Management website. The U.S. Department of Homeland Security (DHS) Science and Technology Directorate’s (S&T) Technology Scouting Group also contributed to the market research used in the development of this report.

For inclusion in this report, the manufacturer had to claim that the BRTR meets the following performance requirements upon the detonation of an explosive:

- Directs the blast effects, pressure, and resultant fragments upwards
- Contains the primary fragments
- Does not produce secondary fragments from any metal or other component of the trash bin
- Structurally withstands the detonation

Due diligence was performed to develop a report that is representative of products in the marketplace.



## 2.0 BLAST RESISTANT TRASH RECEPTACLES OVERVIEW

BRTRs are constructed to minimize the blast effects of an explosive within the receptacle by orienting the blast path vertically and containing shrapnel. It is vital for BRTRs to maintain structural integrity, while containing the blast so that secondary fragments do not form from metallic or other components of the bin. As the need for threat mitigation may differ from site to site (e.g., outdoors versus indoors, expected foot traffic), it is critical that buyers discuss their specific needs with manufacturers to determine the most effective product. Buyers are also encouraged to inquire about any standards that a specific product has met through testing.

### 2.1 Current Technologies

Conventional BRTRs utilize single or multiple-layer suppression technologies in conjunction with blast cushions to diffuse and direct the force of an explosion. By directing the blast vertically, the resulting pressure releases in a way that reduces the risk of damage to individuals and objects around the bin. Blast resistant receptacles are also designed to prevent metallic or other components from entering the blast path, thereby minimizing the chance of secondary fragments becoming airborne. Some BRTR models employ composite materials and proprietary component geometries that reduce fragmentation outside of the receptacle. Most BRTRs incorporate a combination of these elements to produce as robust containment as possible.

Installation of a BRTR usually involves leveling (i.e., ensuring that the surface upon which the receptacle is placed is as flat as possible) and, if required due to a particular threat level and corresponding weight, anchoring. While lighter BRTR models can weigh around 200 pounds, larger and stronger BRTRs may weigh upwards of 2,000 pounds.

#### 2.1.1 Variety and Accessories

Some BRTR models are available in several laminates, finishes, and colors. If a model includes a lid to assist in its primary role of waste collection, the lid is designed to remain attached to the unit upon the detonation of an explosive. Most are designed to accommodate plastic liners for ease of service. Some BRTRs may include a cigarette disposal tray option.

#### 2.1.2 Threat Level Response

Manufacturers produce a range of BRTRs that vary in structural integrity and suppression capabilities. A threat level assessment should be carried out by stakeholders at the facility, security personnel, and local first responders and should consider the level of congestion, entry and exit points, critical structural elements, location of hazardous materials, and existing security assets. This is not a complete list, and the labelling of different threat levels is subjective and dependent on the user. ASTM Standard E2831-11(2018), “Standard Guide for Deployment of Blast Resistant Trash Receptacles in Crowded Places” (further discussed in Section 2.3.1) provides information about threat assessment considerations. Blast receptacles designed for “low-threat” areas generally incorporate a limited number of mitigation technologies and are considerably lighter and more portable. Conversely, receptacles designed for “high-threat” areas employ several mitigation technologies to maximize blast containment. These units are considerably heavier and therefore fixed in location.

## 2.2 Applications

Trash bins pose a significant risk because they can easily conceal an explosive device placed by a terrorist in a public area. They are especially attractive to potential attackers because of their material composition: conventional metal trash cans are capable of fragmenting into shrapnel that can greatly endanger passersby. BRTRs are installed for the purpose of eliminating or greatly reducing the potential for fatalities, injuries, and structural damage. Increasingly, BRTRs are deployed in areas with high foot traffic, including train stations, airports, government buildings, and shopping centers. In addition to mitigating blast effects, BRTRs must also fulfill their main role of collecting waste. They must be placed in areas that are easily accessible to passersby so they can dispose of waste and sanitation workers so that waste may be collected regularly. If the BRTR is to be placed outdoors, it must also feature drainage capabilities.

## 2.3 Applicable Standards

### 2.3.1 ASTM International Standards

Two ASTM standards, E2639–12 (2018), “Standard Test Method for Blast Resistance of Trash Receptacles” [1] and E2740–12 (2018), “Standard Specification for Trash Receptacles Subjected to Blast Resistance Testing” [2], outline the most up-to-date evaluation standards for BRTR performance.

ASTM E2639, *Standard Test Method for Blast Resistance of Trash Receptacles*, provides a procedure for testing the performance of a BRTR when an explosive is detonated within it. The explosive charge is specified but may be changed upon agreement between the party commissioning the test and testing laboratory and may be placed in any of four locations within the BRTR. The charge size must remain the same for the test series. The procedure assesses the release of primary and secondary fragments using witness materials as well as physical damage to the BRTR following detonation of the charge.

ASTM E2740, *Standard Specification for Trash Receptacles Subjected to Blast Resistance Testing* lists performance criteria for BRTRs when tested in accordance with the E2639 test method. Blast containment performance is evaluated in terms of four categories:

1. Upward direction of blast effects, pressure, and resultant fragments
2. Containment of primary fragments
3. Absence of secondary fragment formation
4. Structural integrity following detonation

ASTM E2740 contains a note stating that blast protection levels of trash receptacles evaluated according to this standard should not be stated in publicly disseminated marketing materials. Organizations considering the purchase of a BRTR model that has been evaluated according to this standard should contact the manufacturer to request a copy of the test report. It may be prudent for organizations that acquire BRTRs to have a random sample of the acquired products independently tested to verify that the blast resistance performance of acquired products matches those in the test reports and is consistent with the needs of the purchaser.

ASTM E2831/E2831M–11 (2018), “Standard Guide for Deployment of Blast Resistant Trash Receptacles in Crowded Places” [3], details the evaluation protocol for determining the threat level of a potential BRTR deployment site.

This guide provides information regarding optimal BRTR placement inside and outside of certain types of buildings and venues, accounts for expected servicing and maintenance for regular trash disposal and incorporates blast mitigation effects in its distribution guidelines (e.g., since most BRTRs direct blasts upwards, placing a BRTR underneath a critical structure could result in catastrophic damage).

ASTM E2831/E2831M also provides a list of factors to consider when developing a threat assessment model for BRTR distribution. It specifically recommends where blast receptacles should and should not be placed with respect to high-value facilities and high foot traffic areas. The standard notes that placement constraints should be observed with the input of security personnel.

ASTM E2740 and E2831 enable potential buyers in both private and public sectors to compare BRTR models and evaluate specific public safety needs. The security needs of each site are unique, and the purchaser of BRTRs should conduct a careful threat analysis informed by the information in these standards.

Testing shall be performed at an independent commercial or government explosive testing laboratory following conformance with applicable safety standards and laws. The testing laboratory shall have all required licenses and permits for explosive testing.

Prospective buyers of BRTRs should require manufacturers of those models being considered for purchase to provide a test report demonstrating that testing was done as required by ASTM E2740 and all requirements (including design, performance, and additional testing requirements) of ASTM E2740 were met.

### **2.3.2 United Kingdom Home Office Scientific Development Branch (HOSDB)**

Blast resistant trash receptacle performance may also be evaluated according to UK Home Office Publication No. 23/13<sup>1</sup>, “Determination of the Explosion Resistance of Litter and Recycling Bins – Test Method,” Version 2.0, July 2014 [4]. This standard is sponsored by the Centre for the Protection of National Infrastructure (CPNI) and was developed and is administered by the Centre for Applied Science and Technology (now part of the Defence Science and Technology Laboratory (Dstl)), a government agency. This standard specifies some general design guidelines and provides four test procedures for determining the explosion resistance of BRTRs, including assessing the mitigation of both primary and secondary fragments and movement of the BRTR. The results of the four test procedures (two compulsory and two optional) are combined to yield an overall assessment score.

For each test procedure, the BRTR can be evaluated in a series of tests with increasing explosive charges at specific locations within the BRTR. Performance is assessed in terms of the mass of the explosive charge and the measured energy of primary or secondary fragments that penetrate the BRTR. The values for each test series are combined to give a score for that test procedure. The resultant scores for all test procedures are combined, and a corresponding protection rating for the BRTR is calculated. The protection rating is from one to ten stars, with a higher star value indicating better performance.

Testing must be performed by a testing laboratory with the appropriate licenses and expertise, which then assigns a provisional rating based on their test results. The test report and data are forwarded to DSTL for analysis, approval, and determination of awarded protection rating.

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<sup>1</sup> Home Office Publication No. 23/13 was based on and supersedes previous publications PSDB 4/94 and HOSDB 70/06. The protection ratings awarded to BRTRs evaluated under PSDB 4/94 and HOSDB 70/06 remain valid.

Any BRTR that achieves a star rating may, at the manufacturer's request, be added to an online Catalogue of Security Equipment ([www.cpni.gov.uk/cse-categories/litter-bins](http://www.cpni.gov.uk/cse-categories/litter-bins)), which lists the general specifications of the BRTR and the manufacturer's contact details. Specific ratings and performance may be confirmed with the manufacturer or via the CPNI General Enquiries form found online at [www.cpni.gov.uk/general-enquiries-form](http://www.cpni.gov.uk/general-enquiries-form).

## 2.4 Emerging Technologies

### 2.4.1 Naval Surface Warfare Center (Indian Head Division) Blast Resistant Trash Can Conversion Kit

Two prominent downsides to conventional BRTRs are their cost and weight. Once deployed in a particular location, it can be laborious to move a BRTR to a different site. In addition, the cost of purchasing multiple BRTRs can be prohibitive to those looking to increase public safety. With these challenges in mind, researchers at the Naval Surface Warfare Center have developed a kit to modify a standard waste receptacle into a blast-resistant one<sup>2</sup>. The product has two components: an inner plastic lining surrounded by a liquid suspension of water, antifreeze, and cornstarch, which is used to absorb blast shock, and an outer ballistic liner. The kit is designed to be more easily deployed than traditional BRTRs and is compatible with most standard-size metal trash cans. In addition, it features compatibility with flash X-ray procedures. Although the kit is portable and low cost, its efficacy in blast containment may be of concern, especially when compared to that of conventional BRTRs.

The product has been patented and is available via license agreement to interested manufacturers and vendors.

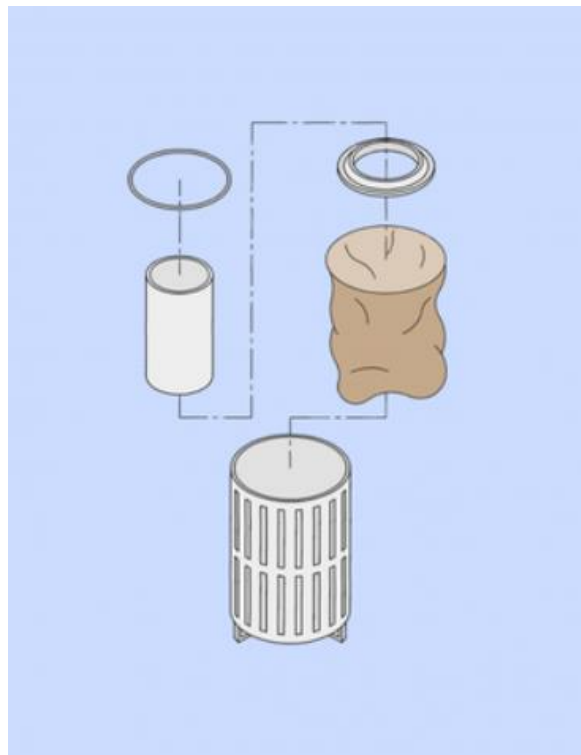


Figure 2-1 Illustration from U.S. Patent 10,539,404 "Blast Containment System for Trash Cans."

<sup>2</sup> <https://techlinkcenter.org/technologies/blast-resistant-trash-can-kit/db9b94e4-3a00-41e4-813c-8aaac9281a64>

### 3.0 PRODUCT INFORMATION

Section three provides product information about 26 BRTRs produced by eight different manufacturers. Table 3-1 lists products alphabetically by manufacturer and summarizes their characteristics as defined below. Additional detail on each BRTR is provided in the subsections that follow. Product information presented in this report was obtained directly from manufacturers, vendors, and their websites from June 2021 to September 2021. This information has not been independently verified by the SAVER program.

Product information in Table 3-1 is defined as follows:

**Manufacturer Model** indicates the manufacturer of a particular model.

**Price** indicates the specific price or price range provided by the manufacturer or distributor. Within a range, the unit price will vary depending on bulk product discounts and customizable features as selected by the purchaser.

**Product Size** indicates the exterior dimensions of the model both the diameter and the height (from the base of the receptacle to the uppermost opening). All products are cylindrically shaped. Values are reported in inches and rounded to the nearest tenth of an inch or quarter of an inch, depending on measurements reported from the manufacturer. For some products, only the diameter of the receptacle opening was available.

**Volume** indicates the volume of the trash receptacle in gallons, rounded to the nearest full gallon.

**Weight** indicates the weight of the blast receptacle in pounds, rounded to the nearest full pound.

**Mitigation Technology** indicates the type of technology used to contain or diffuse an explosive force. Responses include multiple wall technology, blast cushions, compressive layers, and nondescript proprietary technologies. For security purposes, some models do not disclose any of this information.

**Tested to ASTM Standards** indicates whether the manufacturer claims that the BRTR model's blast resistance has been evaluated according to ASTM standards E2639 or E2740 (as explained in Section 2.3.1).

**Tested to UK HOSDB Test Method** indicates whether the product's blast resistance has been – according to the manufacturer – evaluated to meet UK HOSDB Publication 23/13 (see explanation in Section 2.3.2). The product's HOSDB star rating, based on test results, is provided where this information was available.

**Accessories** indicates the equipment options included with the product or available for purchase at additional cost.

**Table 3-1 Blast Resistant Trash Receptacle Comparison Matrix**

<b>Manufacturer: Model</b>	<b>Price (\$)</b>	<b>Product Size (d x h) (in.)</b>	<b>Volume (gal.)</b>	<b>Weight (lbs.)</b>	<b>Mitigation Technology</b>	<b>Tested to ASTM Standards</b>	<b>Tested to UK HOSDB Test Method</b>	<b>Accessories</b>
American Innovations, Inc.: <i>Guardian (G Series) Bomb Receptacle</i>	*	29 x 37, 27 x 39 with extension of leveling legs	30 or 40	1,380	Proprietary triple wall design	Yes	No	Product comes with weatherproof waste bin top and replacement inner liner. A custom lifting tool is provided with every order.
American Innovations, Inc.: <i>Protector (P Series) Bomb Receptacle</i>	*	29 x 37, 27 x 39 with extension of leveling legs	30 or 40	1,600	Proprietary triple wall design	Yes	Yes HOSDB 10-star rating	Product comes with weatherproof waste bin top and replacement inner liner. A custom lifting tool is provided with every order.
American Innovations, Inc.: <i>Defender (D Series) Bomb Receptacle</i>	*	29 x 37, 27 x 39 with extension of leveling legs	30 or 40	1,900	Proprietary triple wall design	Yes	Yes HOSDB Star rating not available	Product comes with weatherproof waste bin top and replacement inner liner. A custom lifting tool is provided with every order.
BlastGard Technologies: <i>BlastGard MTR 91</i>	*	30 x 32 30 x 36 with trash lid	35	~1,400	Triple wall technology	*	*	Can optionally be fitted with internal layer of <i>BlastWrap</i> , a thin, flexible layer of material designed to mitigate blasts and suppress flash fires resulting from explosions.

Manufacturer: Model	Price (\$)	Product Size (d x h) (in.)	Volume (gal.)	Weight (lbs.)	Mitigation Technology	Tested to ASTM Standards	Tested to UK HOSDB Test Method	Accessories
BlastGard Technologies: <i>BlastGard MTR 101</i>	*	30 x 32 30 x 36 with trash lid	35	~1,900	Triple wall technology	*	*	Can optionally be fitted with internal layer of <i>BlastWrap</i> , a thin, flexible layer of material designed to mitigate blasts and suppress flash fires resulting from explosions.
BOGGES: <i>Blast Resistant Litter Bin BK/L-I</i>	*	25.6 x 35.4	30	948	Proprietary blast resistant material <i>fibreconcrete</i>	*	*	*
BOGGES: <i>Blast Resistant Litter Bin BK/L-III</i>	*	27.5 x 35.4	30	992	Two Layer Laminate filled with Proprietary blast resistant material <i>fibreconcrete</i>	*	*	*
BOGGES: <i>Blast Resistant Litter Bin BK/L-IV</i>	*	28 x 35.4	30	617	High strength outer layer plus an inner compressive layer	*	*	*

Manufacturer: Model	Price (\$)	Product Size (d x h) (in.)	Volume (gal.)	Weight (lbs.)	Mitigation Technology	Tested to ASTM Standards	Tested to UK HOSDB Test Method	Accessories
Centerpoint Manufacturing: <i>Decor Security Trash Receptacle</i>	*	29.75 x 32 31.75 x 38 Product size depends on volume	30, 35 or 40	720 to 1,950  Product weight depends on protection level	Proprietary compression absorption resilient layer technology with triple wall	*	*	Waterproof cover available for 35 and 40 gal. sizes
Centerpoint Manufacturing: <i>Universal Security Trash Receptacle</i>	*	27.25 x 31.5 29.25 x 37.5  Product size depends on volume	30, 35 or 40	720 to 1,950  Product weight depends on protection level	Proprietary compression absorption resilient layer technology with triple wall	*	*	Waterproof cover available for 35 and 40 gal. sizes
Centerpoint Manufacturing: <i>Infinity Security Trash Receptacle</i>	*	27.25 x 31.5 29.25 x 37.5  Product size depends on volume	30, 35 or 40	720 to 1,950  Product weight depends on protection level	Proprietary compression absorption resilient layer technology with triple wall	*	*	Waterproof cover available for 35 and 40 gal. sizes
CIS Street Furniture: <i>Type 4180 Anti-Bomb Bin</i>	*	22.5 x 40	16	*	Outer steel layer paired with inner compressive layer	*	Yes HOSDB Star rating not available	*



Manufacturer: Model	Price (\$)	Product Size (d x h) (in.)	Volume (gal.)	Weight (lbs.)	Mitigation Technology	Tested to ASTM Standards	Tested to UK HOSDB Test Method	Accessories
CIS Street Furniture: <i>Type 4181 Anti-Bomb Bin</i>	*	25.6 x 40	21	*	Outer steel layer paired with inner compressive layer	*	Yes HOSDB star rating not available	*
Dynasafe: <i>DynaKEEPR L4</i>	*	18.1 x 30.5	19	221	Multiple walls	Yes	Yes HOSDB 10-star rating	*
Energetics Technology Ltd.: <i>Halo 80 Blast Protected Litter Bin</i>	*	22 x 31	18	258	Proprietary SABREMAT shock attenuation material	*	Yes HOSDB star rating not available	Product can include stainless steel sheath, recycling lid and waste separator, removable plastic liner, and cigarette plate.
Energetics Technology Ltd.: <i>Halo 80 LA Blast Resistant Litter Bin</i>	*	22 x 39	18	258	Proprietary SABREMAT shock attenuation material	*	Yes HOSDB star rating not available	Product can include stainless steel sheath, recycling lid and waste separator, removable plastic liner, cigarette plate, and rain cover lid.
Energetics Technology Ltd.: <i>Halo 80 Plus Blast Resistant Litter Bin</i>	*	22 x 31	18	484	Proprietary SABREMAT shock attenuation material combined with other proprietary technology	*	Yes HOSDB 7-star rating	Product can include stainless steel sheath, recycling lid and waste separator, removable plastic liner, cigarette plate, and rain cover lid.

Manufacturer: Model	Price (\$)	Product Size (d x h) (in.)	Volume (gal.)	Weight (lbs.)	Mitigation Technology	Tested to ASTM Standards	Tested to UK HOSDB Test Method	Accessories
Energetics Technology Ltd.: <i>Halo 160 Blast Resistant Litter Bin</i>	*	28.9 x 32.3	40	440	Proprietary SABREMAT shock attenuation material	*	Yes HOSDB Star rating not available	*
Energetics Technology Ltd.: <i>TC95 Blast Protected Litter Bin</i>	*	28 x 33	21	871	Proprietary SABREMAT shock attenuation material	*	Yes HOSDB 7-star rating	Product can include stainless steel sheath, recycling lid and waste separator, removable plastic liner, cigarette plate, and rain cover lid.
Mistral Security, Inc.: <i>BCR X10</i>	<2,000	20.8 (opening diameter)	10	~230	Multiple blast walls and blast cushion	Yes	No	Product can include locking lid, removable liner, anchoring system, and rain cover lid.
Mistral Security, Inc.: <i>BCR X20</i>	<\$2,200	24.8 (opening diameter)	20	~320	Multiple blast walls and blast cushion	Yes	No	Product can include locking lid, removable liner, bifurcated lid and liner, anchoring system, and rain cover lid.
Mistral Security, Inc.: <i>BCR Level 1</i>	\$3,000 to \$4,000	29.3 x 40.9	40	~900	Multiple blast walls and blast cushion	Yes	No	Product can include locking lid, removable liner, bifurcated lid and liner, paper lid, anchoring system, and rain cover lid.

Manufacturer: Model	Price (\$)	Product Size (d x h) (in.)	Volume (gal.)	Weight (lbs.)	Mitigation Technology	Tested to ASTM Standards	Tested to UK HOSDB Test Method	Accessories
Mistral Security, Inc.: <i>BCR Level 2</i>	\$3,500 to \$4,000	30 x 39	40	~1,200	Multiple blast walls and blast cushion	Yes	No	Product can include locking lid, removable liner, bifurcated lid and liner, paper lid, anchoring system, and rain cover.
Mistral Security, Inc.: <i>BCR Level 3</i>	\$3,500 to \$4,000	30 x 39	40	~1,200	Multiple blast walls and blast cushion	Yes	No	Product can include locking lid, removable liner, bifurcated lid and liner, paper lid, anchoring system, and rain cover.
Mistral Security, Inc.: <i>BCR Level 4</i>	\$4,500 to \$5,500	31.3 x 39	40	~1,500	Multiple blast walls and blast cushion	No	No	Product can include locking lid, removable liner, bifurcated lid and liner, paper lid, anchoring system, and rain cover.
Mistral Security, Inc.: <i>BCR Level 5</i>	<\$6,000	31 x 41	40	~1,500	Multiple blast walls and blast cushion	No	No	Product can include locking lid, removable liner, bifurcated lid and liner, paper lid, anchoring system, and rain cover.
* indicates "Information not available"								

### 3.1 American Innovations, Inc., Guardian, Protector and Defender Bomb Receptacles

American Innovations, Inc. makes three BRTR models with ascending threat level mitigation: Guardian (G Series), Protector (P Series), and Defender (D Series). The Guardian model provides the lowest blast protection while the Defender model provides the highest. All three models feature a proprietary triple wall design that withstands explosions from a variety of charge orientations and prevents horizontal fragmentation. The blast resistance of all three models has been evaluated according to ASTM test standards. The Protector and Defender models have also been tested according to the UK HOSDB test method. The Protector has an HOSDB 10-star rating; the HOSDB star rating of the Defender series was unavailable at the time of publication of this report.

The Guardian, Protector, and Defender have the same external dimensions of 29 inches by 37 inches, are available with 30- and 40-gallon bin liners and comply with the reach and access criteria of the Americans with Disabilities Act (ADA). All three models come with weatherproof tops and replacement inner liners. They are designed to be easily moved with a custom lifting tool that is provided with every order.

Installation and maintenance instructions are included with every order. Technical assistance with installation is available at no charge via email or telephone; on-site supervision or installation services can be provided for a fee. Warranties between two and five years (length dependent on selected finish) are available for all three models.

American Innovations declined to provide pricing information for any of its products, citing large fluctuations in material prices due to COVID-19 pandemic-related supply chain difficulties.

### 3.2 BlastGard Technologies, BlastGard MTR 91 and MTR 101

BlastGard Technologies' BRTRs employ internal triple wall technology and can be fitted with optional "BlastWrap® material designed to mitigate blasts and suppress flash fires resulting from explosions. The MTR 101 provides a greater level of blast resistance than the MTR 91 but is significantly heavier as well. The MTR 91 weighs approximately 1,400 pounds while the MTR 101 weighs approximately 1,900 pounds. When anchored according to instructions these models resist over 4,000 pounds of horizontal or vertical force. Information about whether of either model has been evaluated according to ASTM standards or UK HOSDB test method was unavailable at the time of publication of this report.

Both BlastGard models have a diameter of 30 inches, stand 32 inches tall (36 inches with trash lid), and have a 35-gallon storage capacity. They comply with reach and access criteria of ADA. These BRTRs – available in a variety of colors, patterns and metal finishes – are designed with weatherproof covers and a partially galvanized exterior for outdoor deployment.

Installation and maintenance instructions are provided with every order and technical assistance on installation is available by email or telephone at no cost.



**Figure 3-1 Guardian, Protector, and Defender models (all have same exterior appearance)**

*Image Credit: American Innovations, Inc.*



**Figure 3-2 BlastGard MTR 91**

*Image Credit: BlastGard Technologies*

No information on prices or warranties was available at the time of publication of this report.

### 3.3 BOGGES, Blast Resistant Litter Bin BK/L-I, L-III, and L-IV

BOGGES, a Czech Republic-based manufacturer, offers three BRTR models with ascending threat level protection: the BK/L-I, BK/L-III, and the BK/L-IV. The BK/L-I is designed to offer protection against lesser explosive effects when compared to other BOGGES blast mitigation products. The bin employs a proprietary compressive material named “fibreconcrete,” which absorbs the majority of a charge’s energy and prevents ejection of fragments. The BK/L-III is built to contain medium level threats and features a two layer high-strength laminate construction filled with BOGGES’ proprietary fibreconcrete to direct the blast energy upwards and diffuse lateral forces. The BK/L-IV is BOGGES’ most explosive-resistant receptacle, designed for the highest threat levels. In addition to the mitigation technologies featured in the two less protective models, the BK/L-IV employs a high strength outer layer with an inner compressive layer to reduce residual blast effects. The manufacturer states the product is tested and certified by a professionally accredited test center. However, information about whether any model has been evaluated according to ASTM standards or UK HOSDB test method standards was unavailable at the time of publication of this report.

BOGGES’s three models are very similar in size and have a height of 35.4 inches. The BK/L-I, BK/L-III, and BK/L-IV have diameters of 25.6, 27.5 and 28 inches respectively. All three hold a volume of 30.4 gallons. The BK/L-I weighs 948 lbs. The BK/L-III weighs 992 lbs. and the BK/L-IV weighs 617 lbs. All three models come in a variety of outer colors and finishes and can be emblazoned with logos. The BK/L-IV model uses standard wastebasket bins.

No information on prices or warranties was available at the time of publication of this report.



**Figure 3-3 Blast Resistant Litter Bin BK/L-I**

*Image Credit: BOGGES*



**Figure 3-4 Blast Resistant Litter Bin BK/L-III**

*Image Credit: BOGGES*



**Figure 3-5 Blast Resistant Litter Bin BK/L-IV**

*Image Credit: BOGGES*

### 3.4 Centerpoint Manufacturing, Decor, Universal, and Infinity Security Trash Receptacles

Centerpoint Manufacturing offers three models of BRTRs: Decor, Universal, and Infinity. All three employ a proprietary triple wall technology designed to direct blast effects upward, while containing fragmentation. All models also use Compression Absorption Resilient layers. Centerpoint Manufacturing's three BRTR models offer a total of five levels of threat protection based on the size of the explosive threat. Information about whether any model has been evaluated according to ASTM standards or UK HOSDB test method standards was unavailable at the time of publication of this report.

All Centerpoint models come in 30-, 35-, and 40-gallon capacities. The physical dimensions of each model differ depending on what holding capacity is selected. The 35- or 40-gallon capacity versions of all three models may be outfitted with waterproof covers. The Decor Security Trash Receptacle features a stainless steel finish with either a galvanized metal or stainless steel top. It varies in weight from 720 to 1,950 lbs. depending on the required threat level response. The Universal Security Trash Receptacle features painted steel in several colors and an anti-graffiti finish option. Unlike the Decor and Infinity models, the Universal model does not offer stainless steel or customizable design options. It varies in weight from 700 and 1,900 lbs. depending on the required threat level response. The Infinity Security Trash Receptacle offers a stainless steel finish similar to that of the Decor model, but it also offers an anti-graffiti finish. It varies from 700 to 1,900 lbs. depending on the required threat level response. All models comply with reach and access criteria of the ADA.

Installation manuals are included with each receptacle, and both on-site and phone support are available. A lifting tool to aid installation is provided with every order.

No information on prices or warranties was available at the time of publication of this report.



**Figure 3-6 Decor Security Trash Receptacle**

*Image Credit: Centerpoint Manufacturing*



**Figure 3-7 Universal Security Trash Receptacle**

*Image Credit: Centerpoint Manufacturing*



**Figure 3-8 Infinity Security Trash Receptacle**

*Image Credit: Centerpoint Manufacturing*

### 3.5 CIS Street Furniture, CIS Type 4180 and Type 4181 Anti-Bomb Bins

CIS Street Furniture offers two BRTR models: CIS Type 4180 and CIS Type 4181. Both employ a high strength steel outer layer in conjunction with a patented “compressive” inner layer to absorb blast energy and resist fragments. The blast resistance of both models has been tested to the standard HOSDB test method; however, no information on their HOSDB star ratings was available at the time of publication of this report. No information about whether the blast resistance of either model has been evaluated in accordance with ASTM standards was available at the time of publication of this report.

Both CIS Street Furniture models are 40 inches tall. The Type 4180 has a 22.5-inch diameter and a 15.8-gallon storage capacity, while the Type 4181 has a 25.6-inch diameter and a 21.1-gallon storage capacity. Information on the weight of each model was not available at the time this report was published.

No information on prices, warranties, installation, or technical support on installation was available for either model at the time of publication of this report.

### 3.6 Dynasafe, DynaKEEPR L4

Sweden-based Dynasafe manufactures the DynaKEEPR L4. This BRTR is designed to protect against high speed fragments and lateral blast waves. Its suppression bin features a dual casing, which may be combined with an inner bomb suppression chamber depending on the security level required. The DynaKEEPR L4 has been evaluated according to ASTM standards, although information on which specific standards is not available. Dynasafe states it received a 10-star HOSDB rating.

The DynaKEEPR L4 has a diameter of 18.1 inches and a height of 30.5 inches. It weighs 221 lbs.

Dynasafe provides buyers with installation support via training and maintenance teams.

No price or warranty information was available at the time of publication of this report.



**Figure 3-9 CIS Type 4180 Anti-Bomb Bin**

*Image Credit: CIS Street Furniture*



**Figure 3-10 DynaKEEPR L4**

*Image Credit: Dynasafe*

### 3.7 Energetics Technology, Ltd.: Halo 80, Halo 80 LA, Halo 80 Plus, and TC95

Energetics Technology, Ltd. (formerly Aigis Blast Protection, Ltd.) offers five BRTR models: Halo 80, Halo 80 LA, Halo 80 Plus, Halo 160, and TC95. All of them employ a proprietary SABREMAT (short for “shock attenuating blast resistant material”) technology to protect against blast effects. The manufacturer states the Halo 80 Plus withstands explosive charges more than double the size of those tested with the Halo 80 model. The blast resistance of all five models has been tested to the UK HOSDB test method; the Halo 80 Plus and TC95 earned 7-star HOSDB ratings. No information on the HOSDB star rating of the other three models was available at the time of publication of this report, nor was any information about whether the blast resistance of any of the five models has been evaluated according to ASTM standards.



**Figure 3-11 Halo 80**

*Image Credit: Energetics Technology, Ltd.*

Size, weight, and storage capacities of the different models vary. The Halo 80 has a diameter of 22 inches, a height of 31 inches, an 18-gallon storage capacity and weighs 258 pounds. The Halo 80 Limited Aperture (LA) has a diameter of 22 inches, a height of 39 inches, an 18-gallon storage capacity and weighs 258 pounds. The Halo 80 Plus has a diameter of 22 inches, a height of 31 inches, an 18-gallon storage capacity and weighs 484 pounds. The Halo 160 has a diameter of 28.9 inches, a height of 32.3 inches, a 40-gallon storage capacity and weighs 440 pounds. The TC95 has a diameter of 28 inches, a height of 33 inches, a 21-gallon storage capacity and weighs 871 pounds.

Most of these models can be outfitted with stainless steel sheaths, recycling lids, waste separators, removable plastic liners and cigarette plates. All models except for the Halo 80 can accommodate rain covers. Some accessories reduce the UK HOSDB ratings for the Halo 80 Plus and TC95 to three stars. The Halo 80, Halo 80 LA, and Halo 80 Plus can be equipped with powder-coated sleeves for color variety or a brushed stainless steel sleeve.

The Halo 80 and TC95 models come with 12-month warranties; warranty information on other models, however, was not available at the time of publication of this report. Similarly, pricing information was not available for any model at the time of publication of this report.



**Figure 3-14 Halo 80 LA**

*Image Credit: Energetics Technology, Ltd.*



**Figure 3-15 Halo 80 Plus**

*Image Credit: Energetics Technology, Ltd.*



**Figure 3-16 TC 95**

*Image Credit: Energetics Technology, Ltd.*



### 3.8 Mistral Security, Inc., BCR X10, X20, L1, L2, L3, L4, and L5

Mistral Security offers seven different BRTR models, all of which employ multiple wall and blast cushion technologies to achieve blast mitigation. Models L1 through L5 provide ascending blast suppression capabilities. The blast resistance of the BCR X10, BCR X20, and the L1 through L3 models has been evaluated to ASTM standards. The L4 and L5 models have not been evaluated to ASTM test standards but are based on the same design as the L1 to L3 models. None of the seven models has been evaluated according to the UK HOSDB test method.

All Mistral BRTR models are equipped with plastic lids and liners to ensure central detonation and minimize fragment formation. All products are available in 10-, 20-, or 40-gallon storage volumes. As for physical attributes, the X10 has an opening diameter of 20.8 inches and weighs 230 pounds. The X20 has the same opening diameter (20.8 inches) and weighs 320 pounds. The L1 has an opening diameter of 29.3 inches, a height of 40.9 inches, and a weight of 793 pounds, while the L2 has an opening diameter of 30 inches, a height of 39 inches, and a weight of 1,102 pounds. The L3 has an opening diameter of 30 inches and a height of 39 inches – the same dimensions as the L2 but it provides greater blast protection. Product weight of the L3 was not available. The L4 has an opening diameter of 31.3 inches, a height of 41.3 inches, and a weight of 1,492 pounds. Finally, the L5 has an opening diameter of 31 inches, a height of 41 inches, and weighs 2,050 pounds.

Optional features for Mistral BRTRs include bifurcated plastic lids and liners for double stream waste-recycling. Additionally, some products can be outfitted with a paper lid. Mistral offers rain cover lids for some BCRs to assist with weather mitigation (particularly snow). Anchoring systems provide additional support to outdoor models. Customers can choose between painted and stainless steel finishes.

Mistral offers a standard 1-year warranty on its BRTRs. An extended warranty is also available.

Mistral does not publicly disclose exact product prices without vendor contact. Prices of both the X10 and X20 models are less than \$2,000. The L1 is between \$3,000 and \$4,000; the L2 and L3 are between \$3,500 and \$4,500; the L4 is between \$4,500 and \$5,500; and the L5 is under \$6,000.



Figure 3-15 BCR X10

Image Credit: Mistral Security, Inc.



Figure 3-16 BCR L1-L5

Image Credit: Mistral Security, Inc.



Figure 3-17 L1-L5 Model Series

Image Credit: Mistral Security, Inc.

## 4.0 MANUFACTURER CONTACT INFORMATION

Additional information on the blast resistant trash receptacles included in this market survey report can be obtained from the manufacturers listed in the below table.

**Table 4-1 Manufacturer Contact Information**

Manufacturer	Address & Phone Number	Website & E-mail
American Innovations, Inc.	383 West Rte. 59 Spring Valley, NY 10977 1 (845) 371-3333	<a href="http://www.americaninnovations.com">www.americaninnovations.com</a>
BlastGard Technologies	2901 E. 4th Ave., Unit J Columbus, OH 43219	<a href="http://blastgardtech.com">blastgardtech.com</a> <a href="mailto:info@blastgardtech.com">info@blastgardtech.com</a>
BOGGES	BOGGES, spol. s r.o. IČO: 24719064 Czech Republic	<a href="http://blastresistantbin.com">blastresistantbin.com</a> <a href="mailto:info@boggess.cz">info@boggess.cz</a>
Centerpoint Manufacturing	37615 State Hwy. 59 Bay Minette, AL 36507 1 (251) 591-0011	<a href="http://www.centerpointmfg.com/contact-us">www.centerpointmfg.com/contact-us</a> <a href="mailto:dfannon@centerpointmfg.com">dfannon@centerpointmfg.com</a>
CIS Street Furniture	PO Box 1507 Guildford GU1 9UY United Kingdom 44 01483 203388	<a href="http://www.cis-streetfurniture.co.uk/contact-us">www.cis-streetfurniture.co.uk/contact-us</a> <a href="mailto:sale@cis-streetfurniture.co.uk">sale@cis-streetfurniture.co.uk</a>
Dynasafe	124 Court Sq. E. Talladega, AL 35160 1 (256) 368-1216	<a href="http://dynasafe.com">dynasafe.com</a> <a href="mailto:russ.glesner@dynasafe.com">russ.glesner@dynasafe.com</a>
Energetics Technology, Ltd.	Trusley, Sutton-on-the-Hill Ashbourne Derbyshire, DE6 5JP 44 (0) 1283 732339  U.S. Distributor: Field Forensics Tactical, a division of Field Forensics, Inc 1601 3rd St. South Saint Petersburg, FL 33701 1 (877) 809.4253.	<a href="http://www.energetics-technology.com">www.energetics-technology.com</a> <a href="mailto:enquiries@energetics-technology.com">enquiries@energetics-technology.com</a>  U.S. Distributor: <a href="http://ffitactical.com">ffitactical.com</a> <a href="mailto:info@ffitactical.com">info@ffitactical.com</a>
Mistral Security, Inc.	7910 Woodmont Ave. Suite 820 Bethesda, MD 20814 1 (301) 913-9366	<a href="http://www.mistralsecurityinc.com">www.mistralsecurityinc.com</a> <a href="mailto:securitysale@mistralgroup.com">securitysale@mistralgroup.com</a>

## 5.0 CONCLUSIONS

BRTRs are designed to mitigate the danger posed by explosives detonated inside trash receptacles in areas with high foot traffic. They achieve this by directing blast effects upwards, preventing primary and secondary horizontal fragmentation, and containing overpressure as well as any other blast products. Facility operators should select a BRTR to respond to a specific threat level and environment.

This market survey identified 26 BRTR models from eight different manufacturers. Many provide a specific threat mitigation with a corresponding suppression profile. Some commercially-available BRTRs have been tested against ASTM standards or the UK HOSDB test method, quantifying their efficacy and allowing buyers to choose with greater confidence. Many of the models profiled in this report are available with an extensive degree of customization and accessory selection, including options for drainage systems, rain covers, bolting anchor points, plastic liners, cigarette trays, recycling partitions, and blast lids.

BRTRs cater to a wide range of threat levels and environments. Purchasers are encouraged to determine which features are the most necessary for a particular threat response and to require prospective manufacturers provide them a report demonstrating their BRTRs performance when tested as required by relevant standards.

## REFERENCES

- [1] American Society for Testing Materials International, *Standard Test Method for Blast Resistance of Trash Receptacles*, ASTM E2639-12, West Conshohocken, PA, 2018.
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- [4] Centre for Applied Science and Technology, *Home Office Publication No. 23/13, Determination of the Explosion Resistance of Litter and Recycling Bins – Test Method HOSDB 23/13*, Version 2.0 ed., United Kingdom Home Office, 2014.