



BANTOX® & BLASTOX®

Statement of Qualifications and Experience for Bantox® and Blastox® Products

Manufactured by
The TDJ Group, Inc.

Distributed by
J Carpenter Environmental, LLC

TDJ Background

TDJ is a manufacturing company that produces dry reagents that are used to stabilize heavy metals in a broad array of industrial, blasting media, and remediation wastes. The company produced the first commercially viable lead stabilization reagent for the foundry industry in 1986. That product, called Bantox®, received its first patent in 1987, and gained regulatory approval for numerous applications from federal and state agencies. Since then, other heavy metal formulations and patents have been commercialized.

In the 1990's, TDJ adapted the technology to the abrasives market to stabilize leaded painted when it is removed from surfaces through abrasive blasting. This product was called Blastox® and quickly became the best-selling abrasive remediation product both domestically and internationally. Contractors also started using it for lead soil remediation and found it effective at low dosages.

In the 20+ years since its introduction both TDJ's Bantox® and Blastox® products have been used to stabilize more than 1,000,000 tons of waste. Blastox® alone has been used to de-lead more than 100,000,000 square feet of lead paint surfaces. More than 500,000 tons of TDJ-stabilized waste products have also been used for engineered backfill applications.

J Carpenter Environmental Background

J Carpenter Environmental (JCE) is a distribution company that specializes in waste treatment and pollution control products. JCE is a subsidiary of Carpenter Brothers Inc., the largest product and equipment distribution company for the metal casting industry.

JCE staff have extensive experience in industrial waste treatment and soil remediation methods and products. JCE is the exclusive distributor of TDJ's Blastox and Bantox products in the United States for the metal casting industry and soil remediation.

Remediation Products

Bantox® and Blastox® are complex calcium silicate chemistries, which are listed as US EPA Best Demonstrated Available Technologies (BDAT) for stabilizing heavy metal wastes. They are available in a number of special blends and particle sizes that have been designed to treat different types of waste in a wide range of applications and blending

equipment configurations. The most commonly used forms of Blastox® and Bantox® are designed for lead and cadmium waste. Other special products versions are available to stabilize chromium and other toxic metals.

The chemical admixture application rates used for a particular waste or soil treatment application will depend primarily on the waste heavy metal content and the waste matrix. Federal, state and the local regulatory requirements governing waste disposal and landfill acceptance criteria will also affect the amount needed to achieve a project's performance objectives.

Bantox® and Blastox® were originally developed to reduce heavy metal leaching in waste so that the waste can pass the USEPA Toxicity Characteristic Leaching Procedure (TCLP) regulatory limits for hazardous waste. Both products also can be used to achieve more stringent limits set using the US EPA's testing procedures such as the Synthetic Precipitation Leach Procedure (SPLP), TCLP and Multiple Extraction Procedure (MEP).

Blastox® has also been tested by NIOSH for standards compliance. According to NIOSH testing, Blastox® does not contain detectable levels of quartz or cristobalite crystalline silica, normally referred to as "free" silica.

Product Chemistry

The Blastox® and Bantox® stabilization process has three steps:

1. The addition of Blastox® or Bantox® creates an alkaline waste matrix in which various heavy metals become more resistant to acidic leaching.
2. Addition and substitution reactions change the chemical form of the lead from a lead oxide, carbonate or hydroxide to a lead silicate. Lead Silicate is significantly less soluble than most other lead compounds.
3. Physical encapsulation of the waste, which limits water access and leaching.

The reactions occur concurrently and each contributes to form a stable new waste matrix. TDJ's products should not be confused with products that "mask" or otherwise temporarily "fool" EPA and state waste test methods by altering the chemistry of the leach solution. The leachability of lead is affected by two factors: the chemical form of the lead, and the pH of the leachate. The leachability or extractability of lead can be masked or temporarily minimized by "plating" or pH buffering reactions. For example, a TCLP test can be passed by adding iron powder to a waste. This allows the lead to temporarily adhere or plate to the iron, rendering it un-leachable during the test. Unfortunately, when the iron oxidizes – which will happen in a landfill – the lead leaches, and if tested again, would likely revert to being hazardous. A TCLP can also be passed by adding a buffering agent to the waste that will neutralize the acid used in a TCLP test. When it loses its buffering capacity, the waste will again exhibit a hazardous characteristic.

Independent Product Testing & Compliance With Leach Test Protocols

TDJ Chemistries has been tested by the US EPA, US Department of Defense (DoD), Army Corps of Engineers Research Laboratory, US Federal Highway Administration (FHWA) and State Departments of Transportation (DOTs). Summaries of these tests are available at your request.

TDJ Chemistries were developed to provide long-term stabilization of heavy metals, and accordingly it allows compliance with the USEPA Toxicity Characteristic Leaching Procedure (TCLP). Additionally, it can be used to comply with EPA's Multiple Extraction Procedure (MEP, Method 1320) and with the Synthetic Precipitation Leach Procedure (SPLP, EPA Method 1312).

Blastox® 215 Soil Remediation Case Studies

Location: Former Auto Assembly Plant - St. Louis, MO
Client: Brandenburg Industrial Services

Brandenburg was the general contractor that dismantled the plant, removed subsurface structures, and remediated contaminated soil. Prior to modern waste disposal regulations, the assembly plant dug trenches on the plant property and used them to burn debris and bury waste. Lead solder, e-coat, and related lead bearing manufacturing debris was buried in several areas and caused soil contamination in excess of 100 mg/l TCLP. Brandenburg had tried a lead stabilization reagent for a small initial soil removal, but it required an 8% dose rate. J Carpenter Environmental and TDJ did treatability work with Blastox® and found that the dose rate could be cut in half to 4%. More than 10,000 tons of soil were stabilized with Blastox® and removed from the site

Location: Abandoned Industrial Property near School in Chicago, IL
Client: Brandenburg Industrial Services

An abandoned industrial property in the Greater Chicago area needed to be cleaned up before it could be put back into productive use. When tested via the TCLP without any reagent, the leach values for the hazardous soils ranged from 6.3 mg/l to 189 mg/l. Based on their successful use of Blastox® 215 at another site, the contractor contacted J Carpenter Environmental to see what dose rate would be required. In conjunction with J Carpenter Environmental, TDJ Group conducted a treatability study and concluded that 4% dose of reagent would be sufficient. 4,000 tons of soil were successfully stabilized on-site using Blastox® 215.

Location: Firing Range Andover, MD
Client: Goel Services

This project had unusually high lead TCLP, where some areas exceeded 1000 mg/l. The remediation contractor, which performed its own treatability tests, reported that the hot spots were successfully treated with a 5% dose and the rest of the areas averaged 2%. Approximately 1100 tons of soil were successfully managed as a non-hazardous waste.

Location: Former Scrap Yard Duluth, MN
Client: City of Duluth / Rice Lake Construction

A former scrap yard on the shore of Lake Superior needed to be remediated so that the City of Duluth could install a storm water basin. Lead contamination from battery salvage and other scrap activities over several decades left lead contamination in several areas of the site as high as 450 mg/l TCLP. The contractor, which also had the general construction contract for the storm sewer and basin, had not done a stabilization project prior to this. J Carpenter Environmental and TDJ provided technical assistance to determine the correct Blastox dosage and provided on-site training and start-up supervision for the construction crew concerning the stabilization mixing and sampling. All contaminated areas were successfully stabilized with one round of mixing with an average of 3% dose rate.

Location: Brownfield site - Springfield, MO
Client: Brownfield Authority - City of Springfield
Consultant: Terracon

This large site had several different industrial operations over the years. It started as a railroad yard, had salvage operations, and finally was a material storage area. Lead contaminated soil > 5.0 mg/L was identified throughout the site. JCE did treatability testing on soil and various waste samples. TCLP lead was >200 mg/L. The testing showed that different Blastox dosages were needed for different waste areas. JCE assisted with the project startup by providing the contractor with on-site training, and advise on laying out a grid of the treatment areas. Through the correlation of field XRF readings to lab TCLP results, the consultant was able to more precisely identify areas needing stabilization.

Location: Charlotte, NC
Client: Confidential
Consultant: ERM

This brownfield site had lead contaminated foundry waste buried at several locations. Treatability tests showed the TCLP hazardous soil could be stabilized with a 3% dose of Blastox 215 and disposed of as a non-hazardous waste. The project was completed without any issues.

Location: Former steel and wire mill - Muncie, IN
Client: Environmental Field Services
Consultant: August Mack

This former steel mill has lead contamination in several areas. TCLP test showed lead ranged up to 260 mg/L. Extensive treatability testing was conducted to zero in on the right Blastox treatment dosages for each of the areas. The treatability worked paid off because all of the areas passed after initial treatment.

Product Distribution and Contact Information

For soil remediation and most industrial waste treatment applications, Bantox® and Blastox® are distributed by J Carpenter Environmental, LLC (JCE). For more information, to request a brown bag presentation, or to place an order, contact JCE at:

J Carpenter Environmental, LLC
Office: 414-354-6555
Fax: 414-354-1960 -
www.jcarpenterenvironmental.com

Bantox® and Blastox® are manufactured by the TDJ Group, Inc. For more information about the TDJ Group, Inc, contact:

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