

Biological Agent Destruction System



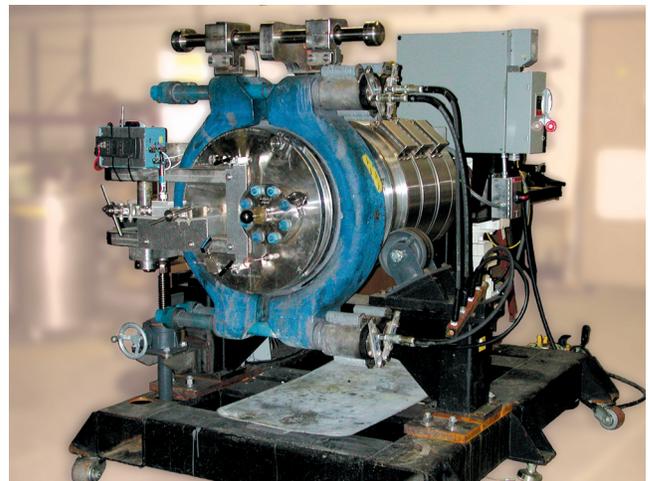
EDS System

Furthermore, a bioagent treatment system based on the EDS platform provides for fully contained treatment and a hold-test-release approach to confirm complete destruction prior to disposal of effluents. A Laboratory-Directed Research and Development program was initiated to develop preliminary concepts and to perform proof-of-concept testing.

Tests with *Bacillus thuringiensis* and *Bacillus stearothermophilus* spores were performed in a test system to evaluate its capability to treat and destroy biological agents by known methods.

The Explosive Destruction System (EDS) is an existing, proven transportable system that safely disposes of recovered chemical warfare material in an environmentally sound manner.

The system operates in a two-step process that first explosively opens the casing and deactivates explosives, and then neutralizes chemical agents. Sandia determined that treatment technologies may be needed to neutralize novel and legacy biohazards and that extension of the EDS technology to this application could be possible.



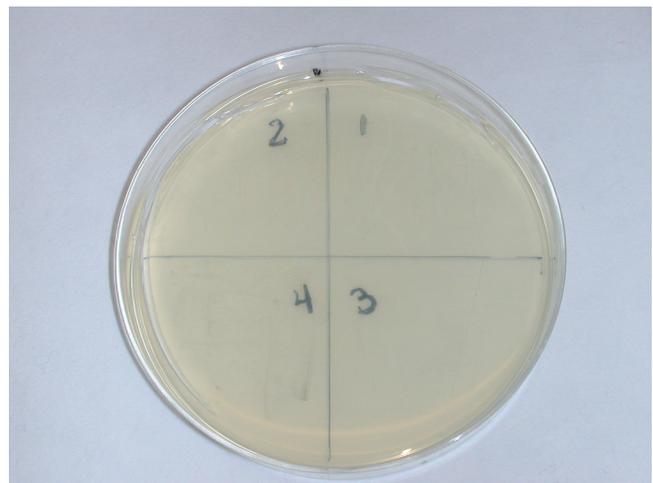
EDS Test Simulator

Treatment Method	Temperature	Duration	Vessel Rotation
Pressurized Steam	130–140°C	2 hour	Yes
Chlorine Bleach Solution (0.4 wt %)	Ambient	1 hour	Yes
Chlorine Dioxide Gas (750 ppm [vol])	Ambient	1 hour	No

The test system was operated in steam autoclave, gas fumigation and liquid decontamination modes of operation. Autoclaving was performed at 130–140°C for up to two hours. Additional tests with chlorine dioxide at 750 ppm concentration for one hour and 0.4 wt% chlorine bleach solution for one hour were also performed. Explosively opening a glass container to expose the bacterial spores prior to treatment was also demonstrated. The three treatment processes used during testing are summarized in the table.

All methods of treatment resulted in complete neutralization of the bacterial spores based on no bacterial growth in post-treatment incubations.

Results from testing confirm that extension of current EDS technology to treatment of biological agents containing items by common, known processes is



No observed activity or colony growth

possible. However some modifications are required to fully optimize EDS for bioagent applications. Additional engineering will be needed to develop a complete sampling system for post-treatment samples and to include new process treatment features.

Learn more at
http://www.ca.sandia.gov/industry_partner/demil_front.html

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