DHS Science and Technology Directorate

Office of Standards — Chemical Detection Standards Program

Hazmat teams and first responders need the right technologies to save lives.

Modern chemical weapon use began in earnest with the chlorine and mustard gasses that killed and injured hundreds of thousands in the First World War. The 1995 Tokyo subway attacks with sarin gas and accidents like the 2005 Graniteville, S.C., chlorine spill are stark reminders that chemical agents, chemical warfare agents (CWAs), and toxic industrial chemicals (TICs) remain viable threats.

Hazmat teams and first responders respond daily to a variety of suspicious materials and chemical spills, and as a result, there are a growing number of multi-agent chemical detectors on the market. The Department of Homeland Security (DHS) Science & Technology Directorate (S&T) is working to establish definitive standards and test methods for handheld and fixed-site chemical vapor detectors.

Addressing vapor, liquid and solid chemical detection needs and updating standards for detectors

In the past, many areas of homeland security suffered from a lack of conformity in products, services, and benchmarks across agencies, cities, and states. There were no standards to ensure that responders purchased, or correctly used, the right equipment, gear, and detectors. In the area of chemical detection standards, the right detection technology—standardized across the Nation—is of utmost importance.

Program accomplishments to date

Beginning in 2010, DHS, the Department of Defense (DOD), the Environmental Protection Agency (EPA) and the National Institute of Standards and Technology (NIST) began work to standardize the specifications and test methods used by all the agencies for chemical vapor detectors. Laboratory test capabilities and test methods were identified in a comparative portfolio analysis. S&T and NIST developed a compendium of reference methods for CWAs and TICs in the vapor phase, while S&T and DOD worked to identify the range of concentration levels for vapor agents needed for homeland security applications.

Standards help responders acquire the best equipment which in turn helps to save lives

S&T is committed to developing the appropriate chemical detection standards to assist first responders and officials of DHS components, such as TSA, to acquire chemical detection systems. These standards will also be used to evaluate detection systems through independent testing to ensure the performance of deployed detectors protects the public.

In addition to detecting chemicals in the vapor phase, first responders must also identify toxic liquid and solid materials by using handheld Raman spectrometers. However the analysis of unknown samples using this technology is very difficult. S&T and NIST developed techniques to improve the accuracy of identifying unknown materials. Standard reference materials have also been created to calibrate and produce comparable Raman spectra across different instruments.

ASTM International, a globally recognized leader in the development of international voluntary consensus standards, published a series of standards supporting chemical detectors that the Office of Standards helped fund the development of:

- E2852-13 Standard Guide for Acquisition, Maintenance, Storage, and Use of Hazardous Material Detection Instrumentation
- E2885-13 Standard Specification for Handheld Point Chemical Vapor Detectors (HPCVD) for Homeland Security Applications
- E2933-13 Standard Specification for Stationary Point Chemical Vapor Detectors (SPCVD) for Homeland Security Applications

Specific projects now being funded within this program:

S&T Office of Standards, supporting DHS Office of Health Affairs and the Transportation Security Administration, is supporting a transit security test bed to field chemical detectors in the field.

Interagency partners

DHS S&T is currently partnered with the DHS Office of Health Affairs and Customs and Border Protection, DOD, EPA and NIST.

Homeland Security
Science and Technology

To learn more about the Chemical Detection Standards Program, contact Philip Mattson, Director, DHS S&T ASOA/Office of Standards, at Philip.Mattson@hq.dhs.gov

2014–08-28