

Attack the network with Gemini and HazMasterG3

Chemical ID coupled with decision support strengthens left-of-boom analysis.

Chemical insights from analytical results

EOD and HazMat teams around the world rely on the Thermo Scientific™ Gemini™ analyzer for identification of explosives and chemical threats. Gemini's twin Raman and FTIR technologies identify "finished products" as well as a range of industrial chemicals that may be precursors for explosives, narcotics or chemical warfare agents.

On scene, it is not unusual for responders to discover a variety of substances yet to be combined into an HME or IED. Upon identifying hexamethylenetetramine, citric acid and hydrogen peroxide in a suspected clandestine lab, for example, investigators might ask: *What could most likely be made from that set of substances?*



HazMasterG3®, from Alluviam LLC, is an advanced decision support tool that has been integrated into the handheld Gemini instrument (starting with v1.6). It is the only CBRNE / HME / IED support software to have earned a US Department of Homeland Security certification for approved anti-terrorism technology. The tool provides key chemical insights to help interpret the analyzer's results. HazMasterG3 helps answer critical questions like these:

- What is potentially being made here?
- What ingredients in an HME formulation are missing?
- What substitute ingredients could be used in a synthesis process?
- Does it make sense to look for a specific chemical in a certain situation?
- How much of a specific formulation could be made from the identified ingredients?

Virtual mixing to model hazards

In the clandestine lab example, where hexamethylenetetramine, citric acid and hydrogen peroxide have been identified by the Gemini analyzer, an operator using HazMasterG3 could virtually mix these chemicals to model safety and handling hazards. The operator could then determine the most likely HME, CWA or narcotic formulations that could be made with the ingredients.



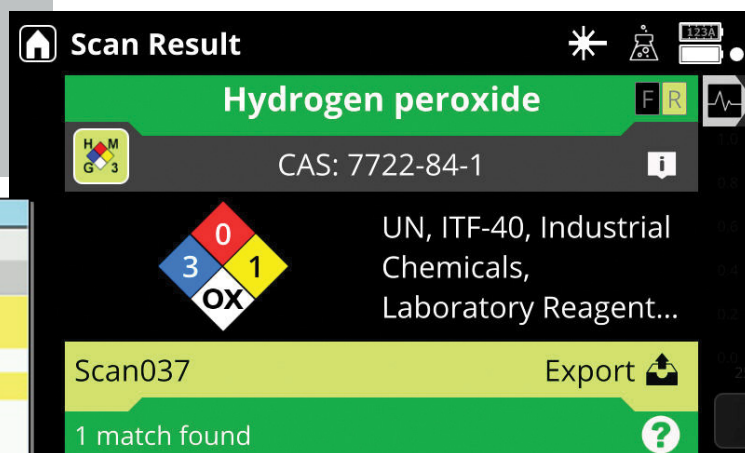
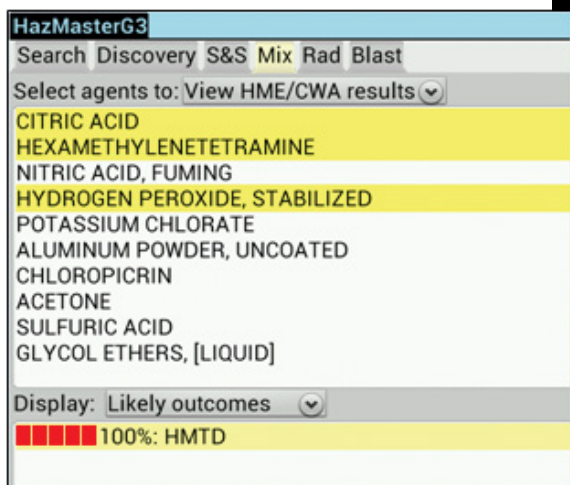
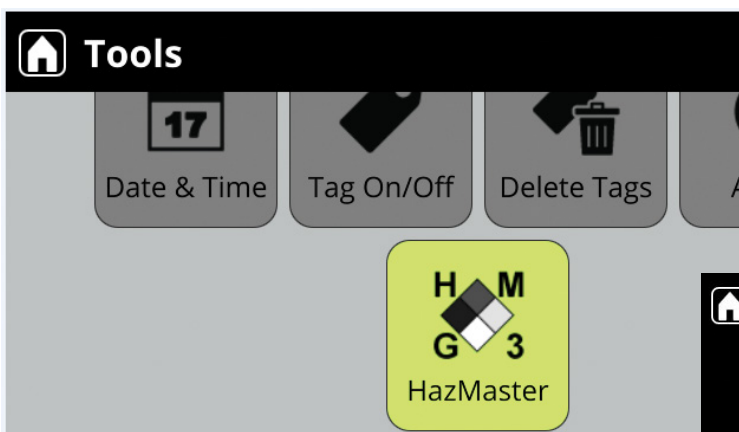
By virtually mixing the chemicals, the decision support software can instantly model the specific formulation while estimating the quantity that could be made. This capability provides actionable insights typically unavailable in the field today, without the support of a reach-back facility. Delay between observation and action could jeopardize the team's ability to disrupt, dismantle and interdict suspected threat actors or networks.

The decision support tool serves as a force multiplier for operators on the front lines of threat response. In the clan lab scenario, HazMasterG3 would determine that the most likely outcome from mixing the three substances would be HMTD, a sensitive primary explosive (see screen inset). In the event analytical questions still arise, and reach-back expertise is required, a more informed operator will be able to ask key questions for advanced support.

Evolution to a left-of-boom strategy

Strategies and tools to combat IED and HME threats have become more sophisticated over the years. Increasingly, response teams are moving from identifying installed roadside bombs, for example, to attacking the network – disrupting, dismantling and interdicting developing threats. The challenge with this “left of boom” approach is that the leading indicators become less obvious, and more sophisticated investigative and intelligence work is required to interdict the network.

Outside of conflict zones, the counter-IED end game leads to the successful prosecution of perpetrators in a court of law. Combining Gemini chemical identification with HazMasterG3 decision support puts advanced tools into the hands of investigators who need to build successful prosecution packages in order to achieve convictions in court – before an incident occurs.



Find out more at thermofisher.com/gemini