



TEST REPORT SUMMARY SPILL-X-A® Agent on Fuming Acids



008249

THE TESTS

Fifty-five gallons of sulfur trioxide, 65% Oleum, and chlorosulfonic acid were spilled into a 50 sq ft (4.6 m²) test pan. The acid pool that formed was 1-3/4 in. (4.1 cm) deep. The choice of spill-in-depth over a flat spill was made because this would be a more severe test of the effectiveness of SPILL-X-A agent. Previous testing of small (1-5 gallon) flat spills showed application of SPILL-X-A agent to be an effective means of mitigating vapor releases and neutralizing these acids in a one-step process.

DATA COLLECTED

During each test, data was collected measuring weights, temperatures and downwind acid concentrations along with waste samples for the mass balance analysis.

THE RESULTS

Application of SPILL-X-A agent along with an intermittent water fog spray proved to be a fast and effective means of dealing with spills of these acids. The effectiveness of the application was measured by performing a mass balance on the acid spilled and by examining the downwind acid concentrations. The mass balance showed that SPILL-X-A agent was most effective on chlorosulfonic acid followed by 65% Oleum and then sulfur trioxide.

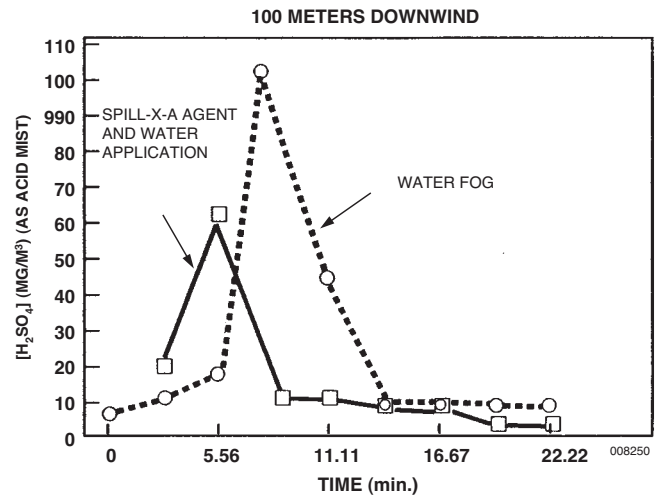
The following table shows the range of results of each acid tested.

Acid	Reaction Efficiency Range
Chlorosulfonic	78 to 86%
65% Oleum	44 to 63%
Sulfur Trioxide	38 to 54%

$$\text{Where Reaction Efficiency} = \frac{\text{Mass of Acid Reacted}}{\text{Mass of Acid Spilled}} \times 100\%$$

A comparison of the downwind acid concentrations from different tests on the same acid provides a qualitative means of measuring the effectiveness of the SPILL-X-A agent application. During the sulfur trioxide test series, a test of an existing control technique (direct application of a water spray) was run to examine acid cloud generation during application.

This profile is compared with SPILL-X-A agent application in the following chart:



Both techniques increase the concentration during initial application. However, the concentration spike from the SPILL-X-A agent application is less intense and shorter in duration than the water fog application. As the SPILL-X-A agent neutralization reaction nears completion, the acid concentration falls while the hot nonfuming sulfuric acid continues to generate acid vapors.

Visual examination during several tests showed a large reduction in the fuming five minutes after the SPILL-X-A agent application began. Complete control, where no potential for fuming existed, was accomplished in 10 to 20 minutes depending on the type of acid.

SUMMATION

The application of SPILL-X-A agent and a water fog spray on these acids proved to be effective in a worst-case scenario. Reaction efficiencies and control times will improve for flat spills normally encountered during an acid release. SPILL-X-A agent application also has advantages over existing control techniques when acid vapor control is considered. In addition, the one-step procedure leaves a nonhazardous RCRA (Resource Conservation and Recovery Act) waste* to dispose of after clean-up is complete.

*Wastes having a pH greater than 2 and less than 12.5 are considered noncorrosive for disposal purposes per current U.S. Environmental Protection Agency (EPA) Guidelines (40 CFR, Paragraph 261.22).

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