WHAT'S THE (ELEMENTAL S)TORY?

**Solvent Extraction Efficiencies**

Since there is little published data addressing extraction efficiencies of elemental sulfur from drywall matrices with time and/or degree of agitation, Lakeland Laboratories conducted a study examining three different extraction techniques. The first two graphs above represent the most practical means to extract a large number of samples in the laboratory. Each of 12 drywall samples collected from a single board were prepared by weighing 5g of pulverized drywall matrix (without paper or paints) from the 3 inch cores into a standard 40mL polyethylene septum capped and stoppered jar. Each jar was then shaken 300 rpm at 37°C for 16 hours. Results of this evaluation are summarized in Graph No. 1. The bold yellow line represents the average elemental sulfur concentration of the 12 cores. Graph No. 2 represents the same set of conditions as above, except the samples were extracted using a rotary agitator operating a 302 RPM at 25°C for 6 hours.

**Orthorhombic Sulfur - 58**

The charts above depict results of samples submitted to our laboratory for analysis of elemental sulfur in imported and domestic drywall. These data are not intended to depict the distribution of elemental sulfur concentrations in any particular population of drywall, only that population comprised of samples submitted to our laboratory for analysis. In most instances, we have no information as to the origin of any given sample, but we are often asked, “What are you seeing?” These charts are intended to answer that question. We do not have enough information to infer any correlations with regard to specific concentration levels and the likelihood of any related corrosive effects within a given structure. The primary function of the charts is to show the distribution of elemental sulfur concentrations detected in samples submitted to our laboratory with a method detection limit of 1.0 mg/kg. This limited data set does seem to show a local maximum in the 100-500 mg/kg range. Significant additional work in conjunction with others will be required to assess and confirm the significance of this concentration range.

**Spatial Distribution of Elemental Sulfur Concentrations Within a Single Sheet of Drywall**

The pictures above illustrate an evaluation of the spatial distribution of elemental sulfur within a single contiguous sheet of drywall. From each of the three boards, two of known foreign origin exhibiting corrosive properties and one of known domestic origin not exhibiting these properties, twelve 2.5" diameter cores were cut from semi-random locations within each sheet. The purpose of this evaluation was to determine to what extent elemental sulfur concentrations vary from location to location within a single board. Obviously, this is of importance to consultants and inspectors. If the concentrations varied significantly throughout a given sheet, one could place little confidence in results of a single sample from any one sheet that it was representative of the whole sheet. In Imported Drywall A and B, the relative standard deviations (RSD) of the concentrations were 9.99% and 6.48%, respectively. In the Domestic Drywall, the RSD was calculated as 24%, but this is somewhat misleading as 10 of 12 samples had no detectable concentration of elemental sulfur at a 1 mg/kg level. It appears that the three drywall sheets evaluated that the elemental sulfur concentration does not vary significantly from one location to another within a single contiguous sheet.