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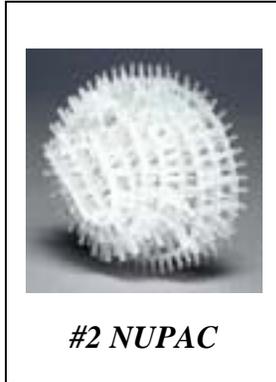
Acid Fume Scrubbing: #2 NUPAC® Used as Mass Transfer and as Demister Packing (Mist Eliminator) at Group III Metal Producer

“Only NUPAC® gave us the efficiencies that would solve the space requirements of this project.” Ralph Cook, President, Mech-Chem Associates*

The Problem

A primary manufacturer of Group III metals** from the Periodic Table had a difficult problem – how to increase their capacity – and how to prevent acid vapor escape from their plant at the high efficiencies currently demanded by society.

The plant was in a tough spot, both technically and physically. Their production stages require the use of several acids:



#2 NUPAC

**Hydrochloric (HCl) Acid, also known as Muriatic Acid
Nitric (HNO₃) Acid
Sulfuric (H₂SO₄) Acid**

Several of the production vessels also operate at elevated temperatures when using these acids. The company needed to expand their production capacity and it was realized that the existing exhaust ventilation and fume scrubbing system would not be able to service the increased plant capacity. Additionally, the plant realized that vents should be added to acid, bulk chemical and wastewater storage tanks. So the need for a completely new acid fume scrubbing system with 5000 cfm capacity existed. Also, as sulfuric acid is non-volatile, it will exist as fine droplets of 5 micron and larger size. So the new acid fume scrubber would need a very efficient demisting section.

But the plant is in an urban area. The amount of available space to use for the new acid fume scrubber was limited to what available floor space existed in their building, and this was not very much space.

The Scrubbing Solution – Use #2 NUPAC® to Pack the Tower

The plant's chosen scrubber supplier, Mech-Chem associates, asked for a recommendation for a packing that would minimize the height of the proposed scrubber. Lantec Products recommended #2 NUPAC® as this packing has superior **HTU** (height of mass transfer unit) compared to any other commercially available packing. In layman's terms, HTU is an inverse relationship – the smaller the HTU, the more efficient the mass transfer that will be supported by the given packing product.

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**From the Periodic Table: Group IIIa; B, Al, Ga, In, Tl, Group IIIb; Sc, Y, La, Ac



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NUPAC® offers a very small HTU as well as a practical pressure drop. So with NUPAC® a scrubbing system can achieve a given mass transfer efficiency with as shallow a packed bed as is possible vs. other available packings. Therefore the actual scrubber was able to be fabricated and installed on existing floor space within the plant. The scrubber, 54 inches in diameter with a packed bed of 60 inch depth, is shown in Figure 1.



Figure 1 – Production Floor Scrubber



Figure 2 – Roof Mounted Exhaust Blower

Mist Elimination Solution – Use #2 NUPAC®

Additionally, the proposed scrubber system needed a compact demisting section as well as a site for the blower. The innovative solution of the demisting requirement was to again use #2 NUPAC® as the demisting section of the scrubber. The scrubber seen in Figure 1 has 12 inches of NUPAC® installed as the demister.

This depth of NUPAC® has proven capable of removing 99%+ of the acid droplets of 10 micron and larger size for this type of scrubbing application.** This solution allowed for placement of the exhaust blower on the roof of the building. Note in Figure 2 the existing urban development that is nearby.

** Consult with Lantec Products regarding specific depth of NUPAC® required based upon project requirements. Please feel free to contact Lantec Products regarding the packing needs of your projects. Given the requirements of the project, we can offer a packing optimized to your needs.