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Marshall Laboratory
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MEMORANDUM REPORT NO. M-750

PREPARED BY: W. A. HALL

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GRASELLI CHEMICALS DEPARTMENT

INTRODUCTION:

The writer attended a meeting of Grasselli and F & F representatives in Wilmington on January 4. Present for Grasselli were B. C. Nylen, A. D. Johnson, F. E. Mask, P. F. Hoglund, and T. J. Armstrong; for F & F, G. T. Vaala, P. H. Holmberg, J. B. Bullitt, D. McBurney, F. H. Beadles, H. R. Young, and W. A. Hall.

SUMMARY:

Subjects discussed were (1) "Ludox" Colloidal Silica as an agent for (a) soiling resistance, and (b) improving the scrub resistance of latex-based paints; (2) "Velron" Hydrophobic Silica as an agent for soil and water resistance.

ACTION:

1 - W. A. Hall will continue current work on soil-resistant preparations, and will expand it from pile fabrics to smooth substrates.

2 - W. A. Hall will work on incorporating "Ludox" in a rug cleaner.

3 - W. A. Hall will study addition of "Velron" to polishes and cleaners.

4 - Research Division will re-evaluate "Ludox" in latex-based paints.

5 - Newburgh's attention is directed to the potential value of "Ludox" as a soil-resistant treatment for fabrics.

DISCUSSION:

1 - Soil Resistance of "Ludox"

Mr. Armstrong reported and demonstrated that "Ludox" imparts soil-resistance to pile fabrics, rugs and carpets in particular, to upholstery fabrics especially in the automotive field, to wallpaper, wall paints, and curtain fabrics. Numerous other substrates were discussed as potential subject for this treatment including leather, coated fabrics, window shades and book coverings.

"Ludox" may be applied by spray gun, aerosol, roller, immersion or exhausting from a bath. When sprayed or rolled, the preferred amount applied is 3% silica solids on the pile weight for rugs and carpets, which amounts to dampening the surface with "Ludox" diluted to 3% silica solids. Softeners may be added to alter the hand if desired; "Avitex" W and Apcosol 100 are suggested, at 1/4% on the 3% solution. One pint of 3% silica solids solution will deposit 1/2 ounce of silica per square yard on pile carpets at a raw material cost not exceeding 1-1/2 cents. For exhaust treatment, the preferred deposit is 1% silica solids plus 1% aluminum sulfate on the weight of the fabric.

Several firms have offered other sols in competition with "Ludox", including a colloidal stannate and colloidal titania, but all are reported to be distinctly inferior.

Treatment of pile fabrics with colloidal silica is covered by U. S. Patent No. 2,602,307, owned by the Mohawk Carpet Company, of Amsterdam, New York. An agreement has been made with Mohawk under which Grasselli may designate licensees and collect royalties for Mohawk.

It is believed that the soil resistance imparted by "Ludox" is based on the deposition of the silica particles in the cracks and crannies of the individual filaments, which shuts out the entrance of soil particles. "Ludox" has a particle size of 17 millimicrons, whereas soil particles have not been found smaller than 20, more usually 80 to 90 millimicrons.

"Ludox" provides resistance to air-borne soil only. Water will remove it, and no resistor has yet been developed for grease-borne or film type solids. Silicones are effective against water-borne solids but are incompatible with "Ludox" both in the wet state and when deposited on a surface.

Grasselli has proposed the use of "Ludox" for imparting soil resistance to a number of manufacturers and intends to continue doing so. Included are wallpaper and wallboard makers, plus a number of manufacturers of specialties, particularly for household and institutional use. In addition to treatments involving application of diluted "Ludox" itself, a shampoo for rug and upholstering fabrics was suggested, in which "Ludox" is present. The following type formula was given:

N35505

Bentonite	15%
"Ludox"	60
Triton X-100	12
Water	13
	100%

This composition is a paste, and dilution of one volume of paste with 8 volumes of water yields a product that cleans well and provides residual soil resistance simultaneously.

Mr. Nylen said that the retail product sold for treating carpets under the name "Del-lay" by the Artloom Carpet Company, Philadelphia, is based on "Ludox". This product lists at \$2.49 per quart.

2 - Scrub Resistance

Mr. Hoglund reported on laboratory experiments in which "Ludox" increased the scrub resistance of latex-based paints. They added it at the rate of 20 parts "Ludox" solids to 100 parts dry rubber solids. Morpholine had to be added to the "Ludox" beforehand. This was done to three brands of paints, including "Flow Kote" and Glidden's Spred-Satin, applied over bare wood panels. The scrub resistance after 24 hours dry was remarkable in all three brands. No data were available on applying such paints over gloss enamel or varnish.

3 - Miscellaneous "Ludox" Data

"Ludox" costs 50-55 cents per pound of solids, currently. A variety having half the particle size of the current grade has been prepared and samples are available for research, but it has not been commercialized (see Memo Report M-701). The pH value of "Ludox" is being lowered from 9 to 7 around February 1.

4 - Water Resistance

The discussion of the sensitivity of "Ludox" applications to water led to a proposal that "Velron" Hydrophobic Silica might be of interest. Its particles are coarser, and it might prove impossible to reduce them to the "Ludox" size, but several possible ways of making a "Velron" dispersion were proposed.

SALES DEVELOPMENT

W. A. Hall

W. A. HALL

WAB:SR
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