OPENING A PLEXIGLAS® PRESSURE-MOUNTED ARCHEOLOGICAL SILK SANDWICH

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ABSTRACT—Textile conservators have recently renewed concerns about the difficulties of opening a pressure mounted ‘sandwich’ when the antique fabric is silk. The static charge between silk and poly (methyl methacrylate) glazing does not dissipate with moist toweling laid over the top of the sandwich, nor with a static eliminator gun. In the past, one method used was to anticipate the problem by using an antistatic coating, no longer produced. Alternative methods involved anti-cling commercially available aerosols or cationic formulations.

1. INTRODUCTION

At an earlier TSG session, two textile conservators spoke to the problem of re-opening a pressure mounted ‘sandwich’ when the antique fabric inside the mount was silk (Giuntini 2012; Sutcliffe, 2012). The authors lamented the recalcitrant nature of static charge between the silk and the Plexiglas®: water dampened toweling did not assuage the charge, nor did a static eliminator gun. One author suggested that individual steps of the actual mounting process of Plexiglas® mounting were altered or lost during the past decades (Giuntini 2012). This short paper describes a minor but significant alteration in the sandwiching operations to address static charge and another, post-treatment possibility to control static charge when re-opening the sandwich.

2. PRIOR HISTORIES

Long ago, textile engineers and technologists developed solutions to creation of static charges during manufacturing operations. These methods were later found to be inadequate to the problems associated with the processing of synthetic fibers and their subsequent performance. *Ciba Review* devoted an entire issue to the phenomenon of static electricity in 1959. The triboelectric series and characterization of static charge were re-evaluated during the next decades (Hersh 1977; Sello and Stevens 1984). Textile conservators have had to update their understanding of static charge in response to changes in processing and use (Commoner, 1984; Spicer, 2018)

When Plexiglas® sandwiches replaced glass sandwiches, the weight, cold microclimate, and breakability were exchanged for issues associated with static and flexure. One past method used an antistatic coating. For several decades, the textile conservation laboratory at the Metropolitan Museum of Art employed a Larostat product from Pittsburgh Plate Glass (PPG) (Kajitani 1997) (figure 1). A merger of that section of PPG with Badische Aniline Soda Fabrik (BASF) subsequently reorganized the product line.

Apparently the Larostat 451, a “stearyl dimethylethyl ammonium ethosulfate,”[1] was no longer available, and a number of other Larostats were discontinued. Larostat 451 had contained a sulfate soap and a liquid amine (Hopwood 1997). In discussing the merits of the remaining Larostat products, the new Larostat FPE, or *F*ood grade *P*oly*E*thylene antistat described as a “lauric diethanoloamide” with a minor amount of diethanolamine. Larostat FPE is said to be “less corrosive than ethoxylated amine based antistats.” A dispersion of 0.1-0.2% in water was suggested (Technical Services communication undated). This product did not seem particularly useful as a topical spray to the authors. The product remains commercially available as Larostat FPE and is incorporated into polyolefin films; it may also be used a post-production surface antistatic agent.

3. OPENING A PLEXIGLAS® PRESSURE MOUNT

Nonetheless, there are ways to deaden the static charge. The simplest one is an anti-cling aerosol used for cat or dog hair and, in the past, women’s lingerie (figure 2). The active ingredients are described as denatured alcohol, a hydrofluorocarbon, isobutene, propane, a quaternary ammonium compound, isopropyl alcohol, ammonium acetate, and fragrance. We confirmed our success with the assistance of Tru Vue representatives and their hand-held static voltage measurement device. Its exponential scale was reduced from static-charged, to non-charged (10^{13} to 10^{8}).

While this method works it is suggested only for a sandwich with a disposable facing sheet of Plexiglas® : the commercial product’s formulation or its removal could damage the surface of the poly (methyl methacrylate). It will preserve the condition of the textile, but may damage the mount. Other cationics like fabric softeners may also work, with the same limitation.

While the commercial products will require good ventilation, the actual opening does not. In fact, a rush of air flow while opening the sandwich quickly could disarrange and damage the carefully preserved condition of a textile.

3. DISCUSSION OF RESULTS

Coating a finished sheet of Plexiglas® with a topical anti-static agent is not straightforward. Despite the assistance of technical representatives—chemists and technologists familiar with the working properties of the range of antistats, a direct substitution was not successful. Perhaps new machinery requirements precluded the use of the earlier product? Perhaps a wetting agent was needed? Topical coatings are rarely a single ingredient; more often they combine numerous ingredients. Yet, even with further effort would a product designed for a poly(ethylene) or

poly(propylene) film function adequately for a poly(methyl methacrylate) sheet, if the newer product was designed primarily to be incorporated into the polyolefin film as it was being cast?

Killing the static charge for a specific short-term purpose is more easily accomplished. The choice between saving the glazing or saving the object is relatively simple.

4. CONCLUSIONS

There were materials and methods to cope with the vagaries of materials in the past. Some of these have been lost due to changes in manufacture, aesthetics, and advances in safety. There are now Plexiglas® options that permanently counter static charge. The authors encourage others to plan and to test new solutions to problems. Mock-ups and 'dummy trials' remain a wonderful tool in practice, not just for training.

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NOTES

[1] Commercial characterizations of chemical compounds do not follow IUPAC standards.

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LIST OF FIGURES