**Replacement of Colored Plexiglas™ in Modern Sculpture**

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### Degree of Conservation: Ethical Considerations

**Background of sculpture:** *Silent Sound* entered the Grey Art Gallery collection in 1976. It was in a damaged and deteriorated state when it arrived at the Conservation Center; multiple treatment options were discussed. A review of the literature and searches through several databases did not reveal the biography or current location of the artist. Therefore, a treatment decision was made in collaboration with the collection's curator.

**Condition Before Treatment:** Broken and faded fluorescent pink Plexiglas™ disks, corroded steel rods, corroded iron base, detached and fallen lead tubes, non-original pressure sensitive tape added later to number the rods.

The Plexiglas™ disks were originally a bright fluorescent pink color. Depicted here in reflected light, their color has changed to a bright but less saturated yellow-orange.

**Treatment Decisions:** A decision was reached to improve the legibility of the sculpture as a whole and to stabilize the deterioration, but no attempt would be made to return its materials— the fluorescent Plexiglas™, steel, iron and lead— to their original state because the artist could not be consulted and documentation of the sculpture’s original state was not available.

**Treatment:** Broken disks were reattached, replacement disks were cast from a polyester resin and an aliphatic urethane, steel and iron were stabilized with passivating solvents, pressure-sensitive tape was partially removed.

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### Materials and Techniques of Casting Synthetic Polymer Replacements

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<th>Material</th>
<th>Chemistry</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<td>Silicone Rubber</td>
<td>Silicons are semiorganic polymers with various organic groups attached to the silicon atom. By varying the kind and number of organic groups, a variety of materials ranging from liquids through gels and elastomers to rigid solids can be produced.</td>
<td>Diversity of types: the primary qualities to consider when making a mold are elasticity of the rubber when applying it to the model (pourable or brushable), working time, and degree of flexibility of the finished mold.</td>
<td>The disadvantage of making a mold directly from the artifact is the need to coat the original with a sealant.</td>
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<td>Polyester Resin</td>
<td>Polyester resin is a thermosetting resin made by the reaction of an ester of dicyandiamide alcohol and terephthalic acid. The Castin’Craft resin used in these tests contained styrene as component.</td>
<td>They are affordable and easy to use: mixing of the base with the catalyst is a forgiving science. They are easily pigmented with liquid dyes or powder pigments.</td>
<td>With their relative ease of preparation comes the disadvantage that it is difficult to find the correct ratio of base to catalyst when adding a colorant. The solvents are toxic and therefore they should be mixed and cast in a fume hood.</td>
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<td>Aliphatic Urethanes</td>
<td>Part of a group of polymers in which the formation of the urethane group is an important step in the polymerization process. Because the urethane linkage is usually formed by the reaction of hydroxyl and isocyanate groups, urethanes chemistry is the chemistry of isocyanates.</td>
<td>Aliphatic urethanes provide a more durable product than the polyester resin. They have greater resistance to abrasion and deterioration caused by UV light. As with the polyester resins, they are easily mixed with colorants.</td>
<td>Preparation requires more careful mixing and the silicone rubber mold must be platinum-based (tin-based molds interfere with the curing of the urethane). The manufacturer also recommends curing the cast in a pressurized environment to offset the formation of air bubbles.</td>
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<td>Daylight Fluorescent Pigments</td>
<td>Daylight fluorescent pigments are made by dissolving a dye in a thermoplastic resin and then grinding it into a powder.</td>
<td>They can be used to match the original color of artifacts that incorporate such pigments.</td>
<td>When fluorescent pigments fade, two reactions occur: the ability of the pigment to fluoresce diminishes and the chromophores of the color fade. The cast replacements with new pigment will alter in color differently from the originals.</td>
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**Tips: Mold-making and Casting**

- Wear powder-free vinyl or nitrile gloves. The powder in latex gloves can interfere with the setting of the materials.
- Be sure that all materials are clean in each step of the process to prevent contamination and thereby inhibit curing of the mold or the cast.
- Read manufacturer’s instructions and MSDS. Incompatibilities between the casting medium and mold materials are included, especially for the urethane casting resin.
- Practice your method on an expendable model prior to making the mold from the artifact.

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