HAFE PKG. 643A/PMIS 27987
Paint/Plaster Interior Historic Building #38, Tearney Building 2002

Harpers Ferry National Historical Park
Building 38 Interior Plaster Stabilization
HAFE Package 634A/ PMIS 27987

Treatment Report

Naomi Kroll, Architectural Conservator
Northeast Cultural Resources Center, Building Conservation Branch

April 3, 2002

Introduction:

The two adjacent upper-floor apartments in Building 38, the Tearney Building (built 1844), have been abandoned since the devastating flood of 1936. Their interior plaster surfaces are now in visibly poor condition. In many rooms, the keys that originally held the plaster to the lath have failed, resulting in the plaster's detachment. In some areas the plaster has been lost completely; in other areas it is loose or hangs precariously in space. In some places the lath has become detached from its supporting studs or joists. In order to stabilize the plaster on the walls and ceiling and prevent further loss, loose lath was re- attached to its supports using finish screws, and loose plaster was re-adhered to its backing lath using an acrylic adhesive mixture developed for this purpose by the late conservator Morgan Phillips. Work was carried out as a joint BCB-HAFE endeavor.

The objective of the work was to stabilize all remaining material for future study and possible interpretation, preserving t e integrity of the rooms as they now stand.

Personnel and Schedule:

Naomi Kroll, Architectural Conservator for the Building Conservation Branch (BCB), planned and executed the project and wrote the final report. Richard Chilcoat, Project Manager, and Judy Jacob, Senior Architectural Conservator, both BCB, assisted in the project planning and execution. Allison Warner, Architectural Technician, BCB, and Chuck Anderson, General Laborer and Craftsman, HAFE, assisted in the project execution. Chuck Anderson also provided invaluable logistical support with supply acquisition, equipment troubleshooting, and site cleanup.

Work was carried out over the course of two ten-day site visits, October 9-18, and October 29-November 7, 2001.

Previous Intervention:

No plaster conservation measures have previously been taken on the upper floors of the building. The walls and ceilings show evidence of at least three campaigns of plaster repair and replacement, areas whose color and texture appear noticeably different: from the mixture (lime, hair, and sand) that is assumed to date from the building's nineteenth- century construction.

The cedar shingles and much of the roof structure were replaced in 1997. The roof was pressure washed and resealed in. October 2001.

Condition:

Note: In 1981, measured drawings (plans and sections) were made of Building 38. The room numbers used below are taken from the plans; the sections' room numbers are inconsistent with those on the plans.

There are two adjacent two-floor apartments of identical plan, with plaster and lath interior walls. In both apartments, the plaster surface is dusty and is covered with the fragmentary remains of paint and wallpaper campaigns. The plaster itself is generally sound except in areas of water damage where it is powdery and friable (e.g. on Room 302's ceiling, above and to the right of the door.)

In many of the rooms, the plaster and lath wall membranes are in poor structural condition. The keying that holds the plaster to the lath has failed in numerous areas, resulting in the loss or instability of the plaster layer. The unstable areas are often adjacent to areas of loss and are often found in association with cracks in the plaster. There are also some plaster cracks that appear to result from building settlement (e.g. the diagonal transverse ones in Rooms 305 and 306 and above the doorways) and are not associated with plaster instability.

Plaster damage is most severe on the second floor of the south apartment, Rooms 301, 302, and 303. The ceilings are in the worst condition, with large areas of loss adjacent to dangling plaster and many loose keys (apparent from the attic space above). There are also a number of unstable areas on the walls. In the same apartment, there is significant instability and loss in the ceiling, east wall, and northwest comer of Room 201. The wall areas in particular are fissured with cracks, resulting in many loose pieces of plaster. The plaster on the walls and ceiling of Room 202 and 203 is significantly better keyed, with only small areas of instability.

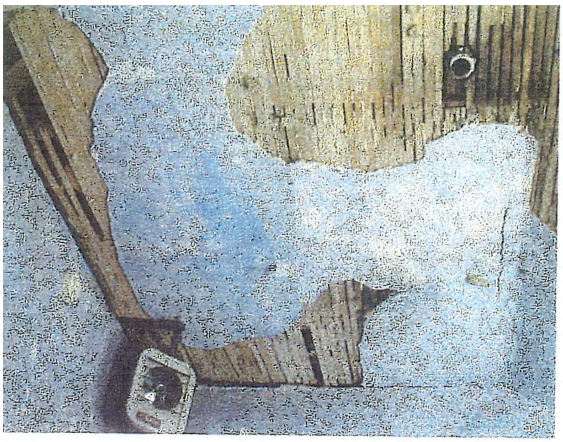


Figure 1 Rm. 303, Typical ceiling condition.

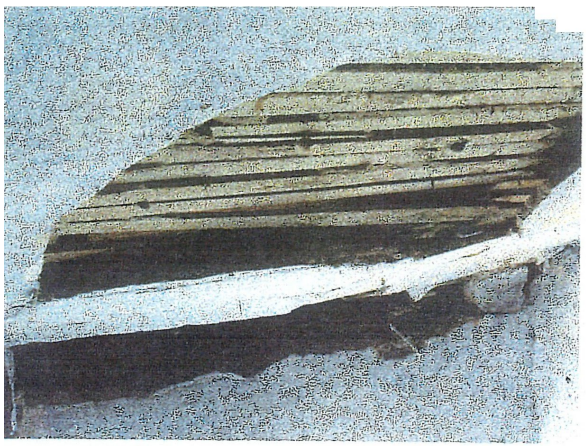


Figure 2 Rm. 303, Detail of detached plaster.

The plaster walls in the north apartment are generally in more stable condition. Only a few localized areas on the largely intact walls and ceiling of Rooms 205, 206, and 207 are unstable. On the upper floor, most of the plaster ceiling has been lost; the fragments that do remain along the south of Rooms 305 and 306 are unstable. The plaster walls on the third floor are unstable in several areas but are not unduly cracked or: fissured.

In a few areas throughout the apartments, the finish coat of plaster is cleaving from the brown coat. This appears to be more common in areas of replacement plaster.

In various places throughout the apartments the lath is broken or has become detached from its supporting studs or joists.

Treatment Methodology:

The challenge in stabilizing plasters whose keys have detached from their wood lath lies in uniting the disparate materials into a cohesive structure. Any treatment material must adhere well to both wood and plaster and must accommodate the former's flexibility and the latter's rigidity under live, gravitational, and thermal-expansion loads. Many traditional and contemporary methods of plaster stabilization fall short of this ideal in several respects. The practice of "rekeying" (spreading a layer of new plaster behind lath to adhere the broken keys of the loose plaster), is limited to areas where the lath is accessible from behind, is subject to failure at the original plane of failure and can add considerable weight to ceiling lath. Mechanical fasteners, such as screws with plaster washers, point-load the plaster by rigidly affixing it to the lath, and often fail around their perimeter as the lath expands, contracts, and deflects over time. Polymeric construction adhesives such as the Liquid Nails products, while flexible, can also result in uneven loading. Because these products do not spread out after injection but remain in a bead, loads are not evenly distributed between lath and plaster and eventually fail along the lines of their application. In addition, these adhesives cannot be used in gaps wider than 1/4".

To address deficiencies in the available plaster stabilization methods, Morgan Phillips

formulated an injectable acrylic adhesive that is flexible and strong, and that spreads like a grout under pressure. Ideally, the injection forms a layer rather than a bead of adhesive between the plaster and the lath, thus spreading loads over a maximum surface area. This formulation was published in the 1986 International Institute for Conservation conference proceedings, *Case Studies in the Conservation of Stone and Wall Paintings,* reproduced here in Appendix A. For this project, we modified the proportions of the filled adhesive slightly; the revised recipe is detailed in Appendix B. A list of supplies and suppliers is given in Appendix C, with MSDS sheets in Appendix D.

The adhesive consists of a mixture of water-based acrylic dispersions manufactured by Rohm and Haas, one stiff (Rhoplex MC-76) and one more flexible (Rhoplex 1950). A thickener is added to the mixture to limit: flow after injection. The thickened acrylic mixture was used in gaps of up to 1/8" between plaster brown coat and plaster finish coat and between plaster and lath. It was applied with 60 cc syringes and large-gauge needles. For larger gaps between plaster and lath (the majority of the plaster delamination), a filled version was used containing liquid fluid coke (a gas-releasing shrinkage compensator), lime, and glass microspheres. The filled adhesive was applied in a bulk- loading caulking guns with a 3/8" - 1/4" diameter tips made: from threaded plumbing fixtures or welded metal tubing.

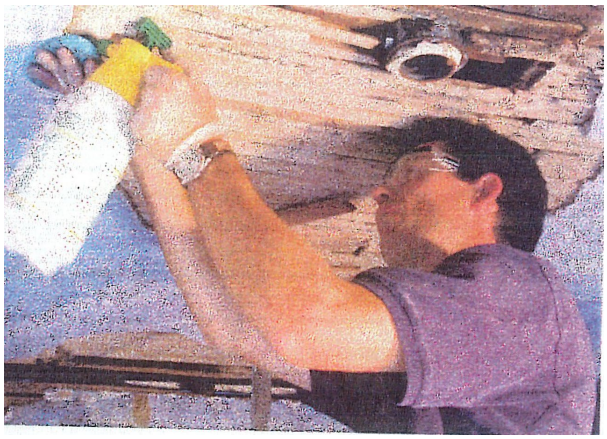


Figure 3 Injection of prewet solution.

All injection sites were first vacuumed out with a shop vacuum. The sites were then injected with a prewet solution of Rhoplex, water, and alcohol (applied with a hand-held pesticide sprayer or syringe, depending on the size of the void.)

On the ceiling of the upper floor, where the lath could be freely accessed in the attic space, the filled adhesive was injected from above through holes drilled in the lath. Holes were drilled approximately 5" apart wherever plaster keys were missing or loose.

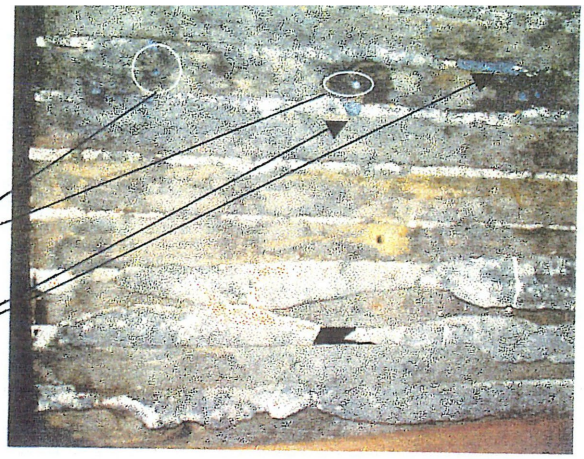


Figure 4 Injection of adhesive through holes in ceiling lath.



Figure 5 Injection of filled adhesive.

On the walls and second floor ceilings, the adhesive was injected from the front both through 1/4" diameter holes drilled for the purpose, and into gaps along the edges of lost plaster. Because the pressure required for the spreading of the adhesive could not be built up when injecting into the open space of the loss edges, small lengths of flexible rubber tubing were attached to the caulking gun tips so that the adhesive could be injected as far into the voids as possible.

Injection points of both the filled and unfilled adhesive (edges and holes) were cleaned of excess using small steel spatulas and damp rags and sponges. While wet, the adhesive cleans up easily with water. When dry, it is soluble in acetone but is considerably more tenacious.

In areas where the un-keyed plaster was slightly protruding from the wall, a gentle clamping force was applied to the system after adhesive injection by screwing plaster washers through the treated plaster and into the backing lath (these were removed after the adhesive had dried). In several areas, plaster was covered with pieces of Styrofoam and plywood and "jacked up" while drying with 2x4 struts shimmed from the floor.



Figure 6 Plaster washers used for support as adhesive dries.

It should be noted that, despite the impression that may be conveyed by the preceding text and by Phillips' article, this treatment is not particularly complicated. Mixing the component stock solutions at the beginning of the project, mixing the adhesive several times a day, the frequent loading of the caulking guns and the daily cleaning and maintenance of the guns, are all procedures that soon become routine. The extra time and care involved are well worth the considerable performance advantages conferred by this technique over other available techniques for plaster stabilization. The skills required can be quickly picked up by a restoration plasterer or carpenter working alongside someone who is familiar with the technique. In the case of flat plaster stabilization, specific conservation skills are not required.

Work Accomplished:

Where possible, loose lath was reattached to its supporting joists or studs with finish screws. All areas of unstable plaster on wood lath, original as well as replacement, were treated as described in "Treatment Methodology," above. Plaster was considered unstable if it was either visibly detached from its keys (when viewed from behind or through a loss edge), or if it moved with gentle hand pressure or sounded comparatively hollow when tapped.

Cracks in the plaster were not treated unless the adjacent plaster displayed instability as described above.

Plaster on brick or rubble masonry (found in the stairwell on the fireplaces and flues, on the east wall of Room 306, and on the north end wall) was not treated Most of the plaster in these areas was stable; in one unstable area (the stairwell leading from Room 304 to 205) the plaster was too bowed-out and filled with debris to be re-adhered to the wall. In another area of instability (the left of the Room 201 fireplace), the unstable plaster was slated for demolition as part of an upcoming, unrelated building improvement.

Localized areas of plaster exhibiting severe water damage from former roof leaks were not treated. An example of this condition exists in Room 302's ceiling plaster, above and to the right of the door. The damaged plaster is powdery and barely forms a cohesive layer; it was decided that these areas did not warrant consolidation.

The treated areas can be easily distinguished on-site by the injection holes and by the dark adhesive edges that are apparent along the plaster loss perimeter. A graphic summary of the areas treated is given in Figures 11 and 12.

All phases of the project (before, during, and after treatment in representative areas) were documented with digital photography and 35 mm color slide film.

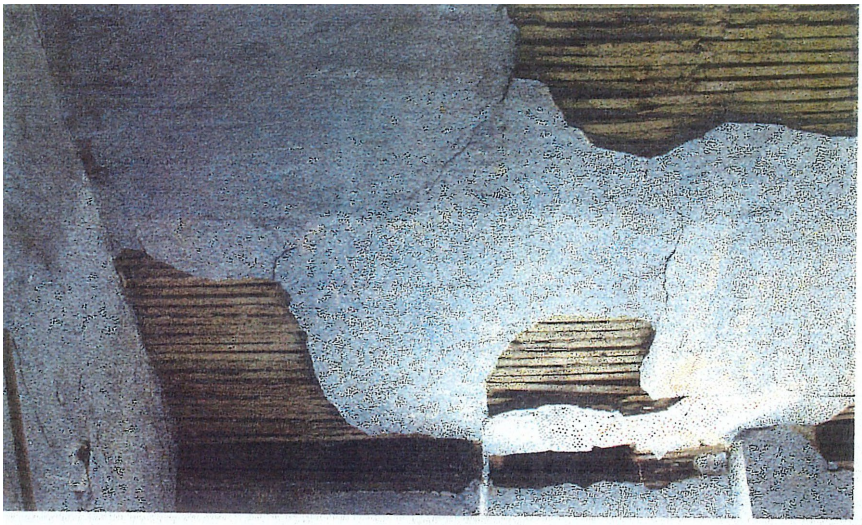


Figure 7 Rm. 303. N. side before treatment.

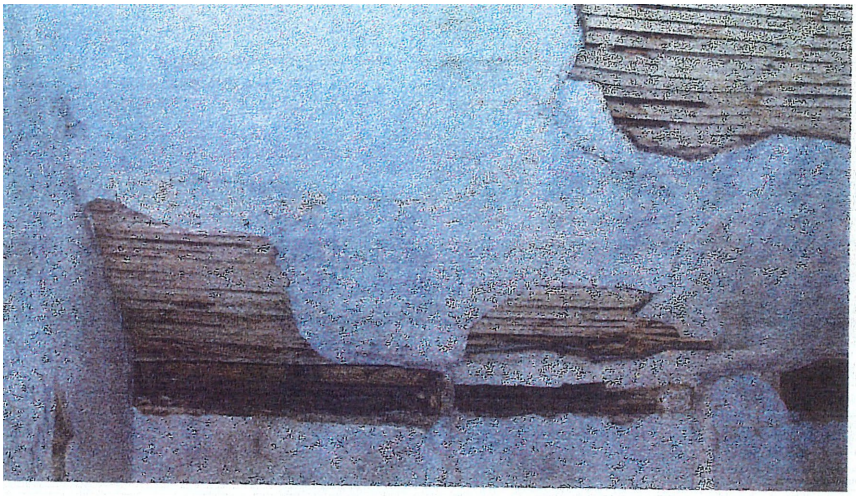


Figure 8 Rm. 303, N. side after treatment.

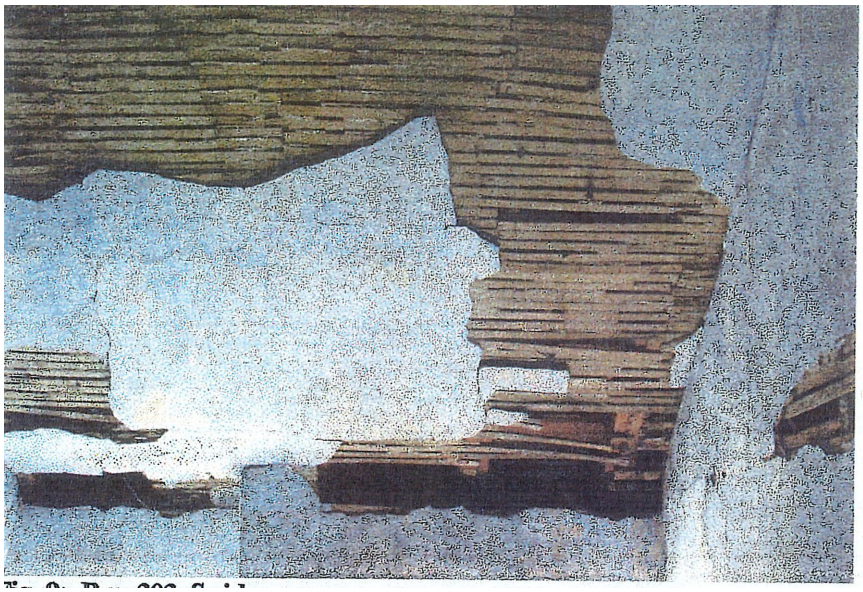


Figure 9 Rm. 303, S. side before treatment.

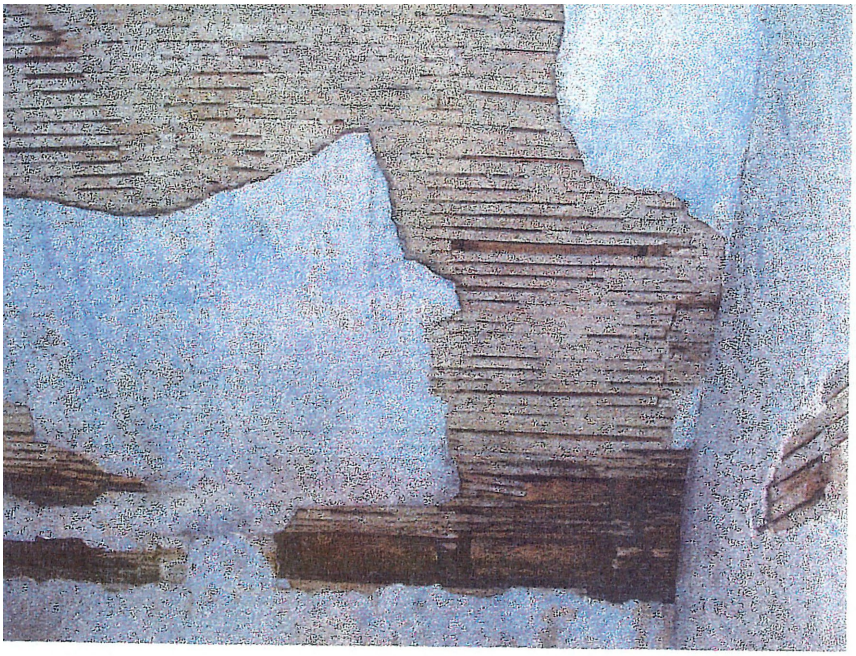


Figure 10 Rm. 303, S. side after treatment.

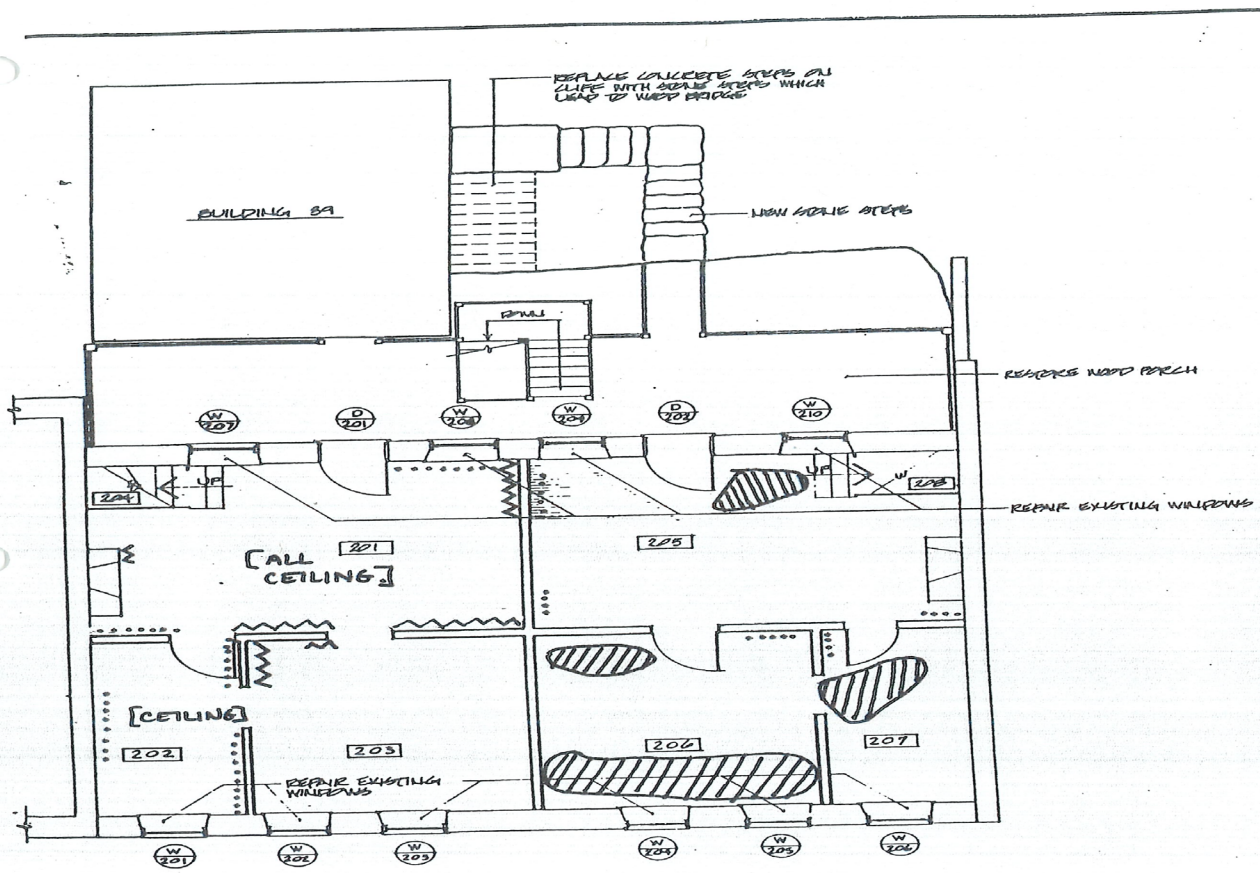


Fig.11: Plaster treated, Second floor

SECOND FLOOR PLAN
SCALE: 1/4" = 1'-0"

KEY:

~~~ = EXTENSIVE INJECTION IN WALLS

..... = LOCAL INJECTION IN WALLS

= LOCAL AREAS OF INJECTION IN CEILING

BUILDING 38
PROPOSED RESTORATION

FIRST & SECOND FLOOR PLANS

SCALE: 0 1' 2' 3' 4' 5' 10'

PREPARED
DESIGNED
RCC/SLS
DRAWN
DONALD
CHECKED
11/81
DATE

DRAWING NO.
385
2501D

SHEET
20
OF 23
~~~

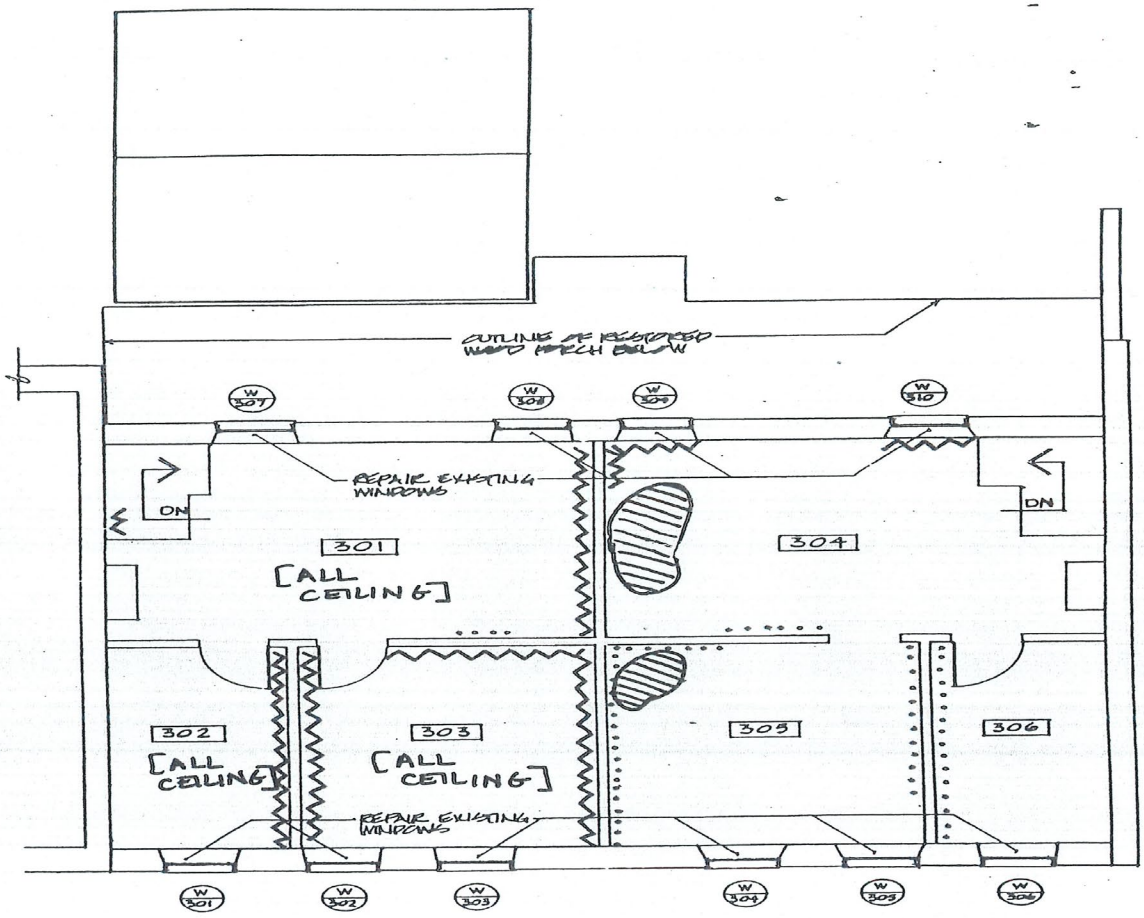


Fig.12: Plaster treated, Third floor

KEY:

~~~ = EXTENSIVE INJECTION IN WALLS

..... = LOCAL INJECTION IN WALLS

THIRD FLOOR PLAN

SCALE: 1/4" = 1'-0"
~~~

Future Work and Maintenance Recommendations:

To ensure the longevity of the stabilized plaster, it is essential that the now-intact roof be well maintained. Much of the past plaster damage appears to have been caused by water infiltration from above.

There are many paint and wallpaper remains on the stabilized plaster, some of which are flaking or delaminating. The Scope of Work for this project did not include finish stabilization, but this work could be incorporated in a future package. It is not known whether the current finishes are obscuring anything of particular historical interest, such as intact original finishes or Civil War-era graffiti.

Historical and technical analysis of the plaster was also beyond the scope of this project. The stabilization work performed, however, does not preclude future study of this sort.

On the walls and second-floor ceiling where the adhesive had to be injected from the front of the wall, the drilled injection holes were not filled after injection. This decision was made in consultation with the park; because of the somewhat fragmentary condition of the plaster, the holes generally do not appear visually distracting. If any of the rooms are opened to the public in the future (and room 201 is currently interpreted via a placard and viewed by the public through a door window), the park may wish to minimize the aesthetic impact of the holes. A conservator (or person with similar color mixing and matching skills) could fill them flush to the plaster surface with an interior vinyl spackling compound and paint them to blend with the surrounding finish.

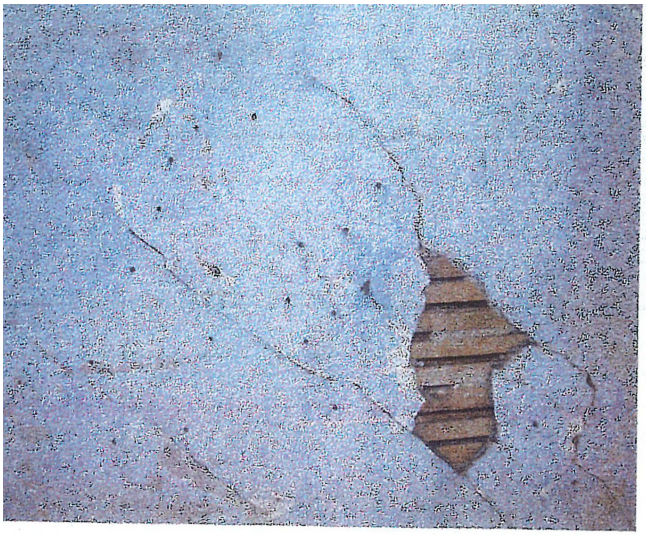


Figure 13 Rm. 302, Detail of injection holes.

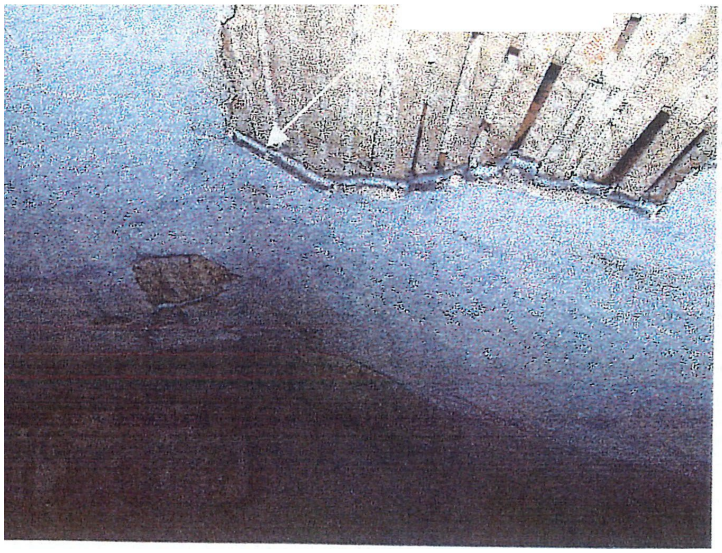


Figure 14 Rm. 301., Detail of adhesive bead between plaster and lath.

Appendix A:

Phillips, Morgan, "Experiences in the Use of Acrylic Plaster Adhesives," *Case Studies in the Conservation of Stone and Wall Paintings, Preprints of the Contributions to the Bologna Congress, 21-26 September 1986,* eds. N.S. Brommelle and Perry Smith, International Institute for Conservation, London, pp. 34-37.

(See attached.)

Appendix B: Modifications to Phillips' Recipes

Prewet Solution:
5 parts water (by volume)
1 part Isopropanol
2 parts Rhoplex MC 76

This is mixed ahead of time and stored in a covered 5-gallon container.

Adhesive:
Rhoplex LC-67 is no longer manufactured; Rhoplex 1950 is used as a replacement. A 3:2 mixture of Rhoplex MC-76 to Rhoplex 1950 was used for the plaster on lath. If plaster on a masonry substrate is being adhered, MC-76 alone can be used. The adhesives may be mixed ahead of time and stored indefinitely in a sealed container.

Thickener:
The gel thickener was mixed as directed by Phillips, using the following volumetric measurements:

2 ½ quarts water
2 cups Acrysol ASE 60
¼ cup ammonia hydroxide

This is mixed ahead of time and stored in a covered container; this makes enough to thicken about a week's worth of adhesive for three people. It is important that the ammonia be added in a well-ventilated area, preferably outdoors, and that the person mixing be wearing a respirator with ammonium fume cartridges. The thickener should be mixed by hand and not mechanically.

Unfilled adhesive:
Mixed as directed in article, with thickener added to adhesive mixture until a thick but injectable consistency is reached. This may be mixed ahead of time and stored indefinitely in a sealed container.

Filled adhesive:
4 cups Microballoons
4 cups lime
4 cups coke
8 cups Rhoplex mix (3:2 MC-76: 1950 for wood lath, MC-76 alone for masonry.) 1 cup water
~ ½ cup thickener (add until proper consistency is reached)

This is mixed immediately before use and lasts for several hours. It is important that Phillips' mixing directions and caveats (although not proportions) be carefully followed.

Appendix C: Supply List and Suppliers

Available from Conservators Emporium, 100 Standing Rock Circle, Reno, NV 89511 (775) 852-0404, FAX (775) 852-3737, www.consemp.com

Rhoplex MC-76*
Rhoplex 1950*
Acrysol ASE-60*
Fluid liquid coke*
Glass microspheres* *(Note: A respirator with HEPA filters must be worn when working with glass microspheres; they are lighter than air and are easily inhaled in1o the lungs.)*

Available from Fisher Chemical, 711 Forbes Avenue, Pittsburgh, PA, 15219; (800) 766-6000, FAX (800) 926-1166, www.fishersci.com

Isopropanol (laboratory grade)
Ammonium Hydroxide (28% NH3)* *(Note: A respirator with ammonia cartridges must be worn when working with this volatile chemical)*

Syringes, 60cc plastic disposable with Luer connection tips
Needles, 16 gauge

Available from Sculpture House, 100 Camp Meeting Avenue, Skillman, NJ 08558; (888) 374-8665, FAX (212) 645-3717, www.sculputrehouse.com

Steel plaster-modeling spatulas

Available from hardware, building supply, and housewares stores:

Type-S Lime
Plaster washers and screws
Finish screws

Bulk loading caulking guns with tip attachments
Flexible rubber tubing
Hand-held pesticide sprayers
Drill with 1/4" masonry and wood bits
Mixing propeller attachment (70 mm diameter)

Window screening on frame
WD-40

Utility knife
Latex gloves
Dust masks
Tyvek coveralls, or sacrificial clothes and hat

Small paint brushes
Measuring cups
Bamboo skewers
Drop cloths
Rags Sponges
Shop vacuum cleaner
Empty 5-gallon buckets

Pieces of thin foam insulation or sheets of packing foam, for padding
Pieces of plywood in various sizes and thicknesses, for bracing
Lengths of 2 x 4s and other lumber, for bracing from the floor
Wood shingles, for shimming the bracing

* = *Denotes MSDS attachment in Appendix D*

Appendix D: MSDSs (attached)

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

HEALTH EMERGENCY : 215-592-3000
SPILL EMERGENCY : 215-592-3000
CHEMTREC : 800-424-9300

82870

MATERIAL SAFETY DATA SHEET

RECEIVED
MAR 2 - 1995
CHEMCENTRAL
CHEMCENTRAL/San Francisco
31702 Hayman St.
Hayward, CA 94544
CHEMCENTRAL/S.F.

PRODUCT IDENTIFICATION

RHOPLEX® MC-76 Emulsion

Product code	:	63764
Key	:	904594-5
MSDS date	:	07/14/90
Supersedes	:	05/25/89

Rohm and Haas Hazard Rating		Scale
Toxicity	1	4=EXTREME
Fire	0	3=HIGH
Reactivity	0	2=MODERATE
Special	-	1=SLIGHT
		0=INSIGNIFICANT

COMPONENT INFORMATION

No.		CAS REG NO.	AMT.(%)
1	Acrylic polymer	Not Hazardous	46-48
2	Individual residual monomers	Not Required	<0.1
3	Ammonia	7664-41-7	0.2MAX
4	Water	7732-18-5	52-54

EMERGENCY RESPONSE INFORMATION

FIRST AID PROCEDURES

Inhalation

Move subject to fresh air.

Eye Contact

Flush eyes with a large amount of water for at least 15 minutes. Consult a physician if irritation persists.

Skin Contact

Wash affected skin areas thoroughly with soap and water. Consult a physician if irritation persists.

Ingestion

If swallowed, give 2 glasses of water to drink. Consult a physician. Never give anything by mouth to an unconscious person.

FIRE FIGHTING INFORMATION

Unusual Hazards

Material can splatter above 100C/212F. Polymer film can burn.

Extinguishing Agents

Use extinguishing media appropriate for surrounding fire.

Personal Protective Equipment

Wear self-contained breathing apparatus (pressure-demand MSHA/NIOSH approved or equivalent) and full protective gear.

SPILL OR LEAK HANDLING INFORMATION

Personal Protection

Appropriate protective equipment must be worn when handling a spill of this material. See the PERSONAL PROTECTION MEASURES Section for recommendations. If exposed to material during clean-up operations, see the FIRST AID PROCEDURES Section for actions to follow.

Procedures

Keep spectators away. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert materials (e.g. sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal.
CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

HAZARD INFORMATION

HEALTH EFFECTS FROM OVEREXPOSURE

Primary Routes of Exposure

Inhalation
Skin Contact

Inhalation

Inhalation of vapor or mist can cause the following:
- headache - nausea - irritation of nose, throat, and lungs

Eye Contact

Direct contact with material can cause the following:
- slight irritation

CONTINUED

CONTINUATION

Skin Contact

Prolonged or repeated skin contact can cause the following:
- slight skin irritation

FIRE AND EXPLOSIVE PROPERTIES

Flash Point	Noncombustible
Auto-Ignition temperature	Not Applicable
Lower explosive limit	Not Applicable
Upper explosive limit	Not Applicable

REACTIVITY INFORMATION

Instability

This material is considered stable. However, avoid temperatures above 177C/350F, the onset of polymer decomposition. Thermal decomposition is dependent on time and temperature.

Hazardous Decomposition Products

Thermal decomposition may yield acrylic monomers.

Hazardous Polymerization

Product will not undergo polymerization.

Incompatibility

There are no known materials which are incompatible with this product.

ACCIDENT PREVENTION INFORMATION

COMPONENT EXPOSURE INFORMATION

Component Information

No.		CAS REG NO.	AMT.(%)
1	Acrylic polymer	Not Hazardous	46-48
2	Individual residual monomers	Not Required	< 0.1
3	Ammonia	7664-41-7	0.2MAX
4	Water	7732-18-5	52-54

CONTINUED

Recycled and Recyclable

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

PRODUCT: RHOPLEX® MC-76 Emulsion
KEY: 904594-5
DATE: 07/14/90

CONTINUATION

Exposure Limit Information

Component No.	Units	ROHM AND HAAS TWA	ROHM AND HAAS STEL	OSHA TWA	OSHA STEL	ACGIH	ACGIH STEL
1		None	None	None	None	None	None
2		a	a	a	a	a	a
3	PPM	25	35	None	35	25	35
4		None	None	None	None	None	None

a Not Required

PERSONAL PROTECTION MEASURES

Respiratory Protection

None required if airborne concentrations are maintained below the TWA/TLV's listed in the COMPONENT EXPOSURE INFORMATION Section. For airborne concentrations up to 10 times the TWA/TLV's listed in the COMPONENT EXPOSURE INFORMATION Section wear a MSHA/NIOSH approved (or equivalent) half-mask, air-purifying respirator. Air-purifying respirators should be equipped with organic vapor cartridges.

Eye Protection

Use chemical splash goggles (ANSI Z87.1 or approved equivalent).

Hand Protection

The glove(s) listed below may provide protection against permeation. Gloves of other chemically resistant materials may not provide adequate protection:
- Neoprene

FACILITY CONTROL MEASURES

Ventilation

Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (30 m/min.) at the point of vapor evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Other Protective Equipment

Facilities storing or utilizing this material should be equipped with an eyewash facility.

STORAGE AND HANDLING INFORMATION

Storage Conditions

Keep from freezing; material may coagulate. The minimum recommended storage temperature for this material is 1C/34F. The maximum recommended storage temperature for this material is 49C/120F.

Handling Procedures

Monomer vapors can be evolved when material is heated during processing operations. See FACILITY CONTROL MEASURES Section for types of ventilation required.

SUPPLEMENTAL INFORMATION

TYPICAL PHYSICAL PROPERTIES

Appearance	Milky
Color	White
State	Liquid
Odor Characteristic	Ammonia odor
pH	9.5-10.0
Viscosity	50 CPS Maximum
Specific Gravity (Water = 1)	1-1.2
Vapor Density (Air = 1)	< 1 Water
Vapor Pressure	17 mm Hg @20°C/68°F Water
Melting point	0°C/32°F Water
Boiling point	100°C/212°F Water
Solubility in water	Dilutable
Percent Volatility	52-54 % Water
Evaporation rate (BAc = 1)	< 1 Water

TOXICITY INFORMATION

Acute Data

The information shown in the HEALTH EFFECTS FROM OVEREXPOSURE Section is based on the toxicity profiles for a number of acrylic emulsions that are compositionally similar to this product. Typical data are:
Oral LD50 - rat: >5000 mg/kg
Dermal LD50 - rabbit: >5000 mg/kg
Skin irritation - rabbit: practically non-irritating
Eye irritation - rabbit: inconsequential irritation

WASTE DISPOSAL

Procedure

Coagulate the emulsion by the stepwise addition of ferric chloride and lime. Remove the clear supernatant and flush to a chemical sewer. Incinerate liquid and contaminated solids in accordance with local, state, and federal regulations.

REGULATORY INFORMATION

WORKPLACE CLASSIFICATIONS

This product is considered non-hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

This product is not a 'controlled product' under the Canadian Workplace Hazardous Materials Information System (WHMIS).

TRANSPORTATION CLASSIFICATIONS

US DOT Hazard Class . . . . . NONREGULATED

EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW (SARA TITLE 3)

Section 311/312 Categorizations (40CFR 370)

This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA.

Section 313 Information (40CFR 372)

This product does not contain a chemical which is listed in Section 313 above de minimis concentrations.

CERCLA INFORMATION (40CFR 302.4)

Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

RCRA INFORMATION

When this product becomes a waste, it is classified as a non-hazardous waste under criteria of the Resource Conservation and Recovery Act (40 CFR 261).

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

CHEMICAL CONTROL LAW STATUS

All components of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

STATE RIGHT-TO-KNOW LAWS

Any material listed as "Not Hazardous" in the CAS REG NO column of the COMPONENT INFORMATION Section of this MSDS is trade secret under the provisions of the Pennsylvania Worker and Community Right-to-Know Act.

RHOPLEX® is a trademark of Rohm and Haas Company or one of its subsidiaries or affiliates.

ABBREVIATIONS:

ACGIH = American Conference of Governmental Industrial Hygienists
OSHA = Occupational Safety and Health Administration
TLV = Threshold Limit Value
PEL = Permissible Exposure Limit
TWA = Time Weighted Average exposure
STEL = Short-Term Exposure Limit
BAc = Butyl acetate
▮ Bar denotes a revision from previous MSDS in this area.

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Rohm and Haas Company assumes no responsibility for personal injury or property damage to vendees, users or third parties caused by the material. Such vendees or users assume all risks associated with the use of the material.

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100 INDEPENDENCE MALL WEST PHILADELPHIA, PA 19106-2399 U S A
TELEPHONE (215) 592-3000 CABLE ADDRESS: ROHMHAAS CENTRAL FAX (215) 592-3377

ROHM AND HAAS COMPANY

This is a facsimile of a MSDS

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

HEALTH EMERGENCY	: 215-592-3000
SPILL EMERGENCY	: 215-592-3000
CHEMTREC	: 800-424-9300

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

RHOPLEX(R) 1950 Emulsion

Product code	: 65028
Key	: 893619-1
MSDS date	: 07/03/90
Supersedes	: 12/21/88

Rohm and Haas Hazard Rating		Scale
Toxicity	1	4=EXTREME
Fire	0	3=HIGH
Reactivity	0	2=MODERATE
Special	-	1=SLIGHT
		0=INSIGNIFICANT

COMPONENT INFORMATION

No.		CAS REG NO.	AMT.(%)
1	Acrylic polymer	Not Hazardous	62-64
2	Individual residual monomers	Not Required	<0.1
3	Water	7732-18-5	36-38

EMERGENCY RESPONSE INFORMATION

FIRST AID PROCEDURES

Inhalation

Move subject to fresh air.

Eye Contact

Flush eyes with a large amount of water for at least 15 minutes. Consult a physician if irritation persists.

Skin Contact

Wash affected skin areas thoroughly with soap and water. Consult a physician if irritation persists.

Ingestion

If swallowed, give 2 glasses of water to drink. Consult a physician. Never give anything by mouth to an unconscious person.

FIRE FIGHTING INFORMATION

Unusual Hazards

Material can splatter above 100C/212F. Polymer film can burn.

Extinguishing Agents

Use extinguishing media appropriate for surrounding fire.

Personal Protective Equipment

Wear self-contained breathing apparatus (pressure-demand MSHA/NIOSH approved or equivalent) and full protective gear.

SPILL OR LEAK HANDLING INFORMATION

Personal Protection

Appropriate protective equipment must be worn when handling a spill of this material. See the PERSONAL PROTECTION MEASURES Section for recommendations. If exposed to material during clean-up operations, see the FIRST AID PROCEDURES Section for actions to follow.

Procedures

Keep spectators away. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert materials (e.g. sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal.

CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

HAZARD INFORMATION

HEALTH EFFECTS FROM OVEREXPOSURE

Primary Routes of Exposure

Inhalation
Skin Contact

Inhalation

Inhalation of vapor or mist can cause the following:
- headache - nausea - irritation of nose, throat, and lungs

Eye Contact

Direct contact with material can cause the following:
- slight irritation

Skin Contact

Prolonged or repeated skin contact can cause the following:
- slight skin irritation

FIRE AND EXPLOSIVE PROPERTIES

Flash Point	Noncombustible
Auto-ignition temperature	Not Applicable

Lower explosive limit . . Not Applicable
Upper explosive limit . . Not Applicable

REACTIVITY INFORMATION

Instability

This material is considered stable. However, avoid temperatures above 177C/350F, the onset of polymer decomposition. Thermal decomposition is dependent on time and temperature.

Hazardous Decomposition Products

Thermal decomposition may yield acrylic monomers.

Hazardous Polymerization

Product will not undergo polymerization.

Incompatibility

There are no known materials which are incompatible with this product.

ACCIDENT PREVENTION INFORMATION

COMPONENT EXPOSURE INFORMATION

Component Information

No.		CAS REG NO.	AMT.(%)
1	Acrylic polymer	Not Hazardous	62-64
2	Individual residual monomers . .	Not Required	<0.1
3	Water	7732-18-5	36-38

Exposure Limit Information

Comp		ROHM AND HAAS		OSHA		ACGIH	
No.	Units	TWA	STEL	TWA	STEL	TWA	STEL
1		None	None	None	None	None	None
2		a	a	a	a	a	a
3		None	None	None	None	None	None

a Not Required

PERSONAL PROTECTION MEASURES

Respiratory Protection

None required under normal operating conditions. When mist occurs during spraying operations, wear a MSHA/NIOSH-approved (or equivalent) disposable half-mask dust/mist respirator.

Eye Protection

Use chemical splash goggles (ANSI Z87.1 or approved equivalent).

Hand Protection

The glove(s) listed below may provide protection against permeation. Gloves of other chemically resistant materials may not provide adequate protection:

- Neoprene

Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (30 m/min.) at the point of vapor evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Other Protective Equipment

Facilities storing or utilizing this material should be equipped with an eyewash facility.

STORAGE AND HANDLING INFORMATION

Storage Conditions

Keep from freezing; material may coagulate. The minimum recommended storage temperature for this material is 1C/34F. The maximum recommended storage temperature for this material is 49C/120F.

Handling Procedures

Monomer vapors can be evolved when material is heated during processing operations. See FACILITY CONTROL MEASURES Section for types of ventilation required.

SUPPLEMENTAL INFORMATION

TYPICAL PHYSICAL PROPERTIES

Appearance	Milky
Color	White
State	Liquid
Odor Characteristic	Acrylic odor
pH	4.5-5.5
Viscosity	400 CPS Maximum
Specific Gravity (Water = 1)	1.0-1.2
Vapor Density (Air = 1)	< 1 Water
Vapor Pressure	17 mm Hg @20?C/68?F Water
Melting point	0?C/32?F Water
Boiling point	100?C/212?F Water
Solubility in water	Dilutable
Percent Volatility	36-38 % Water
Evaporation rate (BAc = 1)	< 1 Water

TOXICITY INFORMATION

Acute Data

The information shown in the HEALTH EFFECTS FROM OVEREXPOSURE Section is based on the toxicity profiles for a number of acrylic emulsions that are compositionally similar to this product. Typical data are:

Oral LD50 - rat: >5000 mg/kg

Dermal LD50 - rabbit: >5000 mg/kg

Skin irritation - rabbit: practically non-irritating

Eye irritation - rabbit: inconsequential irritation

WASTE DISPOSAL

Procedure

Coagulate the emulsion by the stepwise addition of ferric chloride and lime. Remove the clear supernatant and flush to a chemical sewer. Incinerate liquid and contaminated solids in accordance with local, state, and federal regulations.

REGULATORY INFORMATION

WORKPLACE CLASSIFICATIONS

This product is considered non-hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

This product is not a 'controlled product' under the Canadian Workplace Hazardous Materials Information System (WHMIS).

TRANSPORTATION CLASSIFICATIONS

US DOT Hazard Class . . . NONREGULATED

EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW (SARA TITLE 3)

Section 311/312 Categorizations (40CFR 370)

This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA.

Section 313 Information (40CFR 372)

This product does not contain a chemical which is listed in Section 313 above de minimis concentrations.

CERCLA INFORMATION (40CFR 302.4)

Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

RCRA INFORMATION

When this product becomes a waste, it is classified as a non-hazardous waste under criteria of the Resource Conservation and Recovery Act (40 CFR 261).

CHEMICAL CONTROL LAW STATUS

All components of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

STATE RIGHT-TO-KNOW LAWS

Any material listed as "Not Hazardous" in the CAS REG NO column of the COMPONENT INFORMATION Section of this MSDS is trade secret under the pro-

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

HEALTH EMERGENCY : 215-592-3000
SPILL EMERGENCY : 215-592-3000
CHEMTREC : 800-424-9300

8510

MATERIAL SAFETY DATA SHEET

WARNING
This product contains a chemical(s) known to the State of California to cause cancer.

PRODUCT IDENTIFICATION

ACRYSOL® ASE-60 Thickening Agent

Product Code	:	61611
Key	:	904168-1
MSDS Date	:	07/30/92
Supersedes	:	08/03/90

Rohm and Haas Hazard Rating		Scale
Toxicity	1	4=EXTREME
Fire	0	3=HIGH
Reactivity	0	2=MODERATE
Special	-	1=SLIGHT
		0=INSIGNIFICANT

COMPONENT INFORMATION

No.		CAS REG NO.	AMT.(%)
1	Acrylic copolymer	Not Hazardous	27-29
2	Individual residual monomers	Not Required	<0.1
3	Water	7732-18-5	71-73

EMERGENCY RESPONSE INFORMATION

FIRST AID PROCEDURES

RECEIVED
MAR 2 - 1995
CHEMCENTRAL/S.F.

Inhalation

Move subject to fresh air.

Eye Contact

Flush eyes with a large amount of water for at least 15 minutes. Consult a physician if irritation persists.

Skin Contact

Wash affected skin areas thoroughly with soap and water. Consult a physician if irritation persists.

Ingestion

If swallowed, give 2 glasses of water to drink. Consult a physician. Never give anything by mouth to an unconscious person.

FIRE FIGHTING INFORMATION

Unusual Hazards

Material can splatter above 100C/212F. Polymer film can burn.

CONTINUED

Rohm and Haas Company
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Philadelphia, PA 19106-2399

PRODUCT: ACRYSOL® ASE-60 Thickening Age
KEY: 904168-
DATE: 07/30/92

CONTINUATION

Extinguishing Agents

Use extinguishing media appropriate for surrounding fire.

Personal Protective Equipment

Wear self-contained breathing apparatus (pressure-demand MSHA/NIOSH approved or equivalent) and full protective gear.

SPILL OR LEAK HANDLING INFORMATION

Personal Protection

Appropriate protective equipment must be worn when handling a spill of this material. See the PERSONAL PROTECTION MEASURES Section for recommendations. If exposed to material during clean-up operations, see the FIRST AID PROCEDURES Section for actions to follow.

Procedures

Keep spectators away. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert materials (e.g. sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal.
CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

HAZARD INFORMATION

HEALTH EFFECTS FROM OVEREXPOSURE

Primary Routes of Exposure

Inhalation
Skin Contact

Inhalation

Inhalation of vapor or mist can cause the following:
- headache - nausea - irritation of nose, throat, and lungs

Eye Contact

Direct contact with material can cause the following:
- slight irritation

Skin Contact

Prolonged or repeated skin contact can cause the following:
- slight skin irritation

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PRODUCT: ACRYSOL® ASE-60 Thickening Agent
KEY: 904168-1
DATE: 07/30/92

FIRE AND EXPLOSIVE PROPERTIES

Flash Point	Noncombustible
Auto-ignition Temperature	Not Applicable
Lower Explosive Limit	Not Applicable
Upper Explosive Limit	Not Applicable

REACTIVITY INFORMATION

Instability

This material is considered stable. However, avoid temperatures above 177C/350F, the onset of polymer decomposition. Thermal decomposition is dependent on time and temperature.

Hazardous Decomposition Products

Thermal decomposition may yield acrylic monomers.

Hazardous Polymerization

Product will not undergo polymerization.

Incompatibility

There are no known materials which are incompatible with this product.

ENVIRONMENTAL IMPACT

Environmental Toxicity

Daphnia magna, 48 Hour LC50 Static: > 1000 mg/l
Fathead minnow (Pimephales promelas), 96 Hour LC50 Static: > 1000 mg/l

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Philadelphia, PA 19106-2399

PRODUCT: ACRYSOL® ASE-60 Thickening Agent
KEY: 904168-1
DATE: 07/30/92

ACCIDENT PREVENTION INFORMATION

COMPONENT EXPOSURE INFORMATION

Component Information

No.		CAS REG NO.	AMT.(%)
1	Acrylic copolymer	Not Hazardous	27-29
2	Individual residual monomers	Not Required	<0.1
3	Water	7732-18-5	71-73

Exposure Limit Information

Component No.	Units	ROHM AND HAAS TWA	ROHM AND HAAS STEL	OSHA TWA	OSHA STEL	ACGIH TLV	ACGIH STEL
1		None	None	None	None	None	None
2		a	a	a	a	a	a
3		None	None	None	None	None	None

a Not Required

PERSONAL PROTECTION MEASURES

Respiratory Protection

A respiratory protection program meeting OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. None required under normal operating conditions. When mist occurs during spraying operations, wear a MSHA/NIOSH-approved (or equivalent) disposable half-mask dust/mist respirator.

Eye Protection

Use chemical splash goggles (ANSI Z87.1 or approved equivalent).

Hand Protection

The glove(s) listed below may provide protection against permeation. Gloves of other chemically resistant materials may not provide adequate protection:
- Neoprene

FACILITY CONTROL MEASURES

Ventilation

Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (0.5 m/sec.) at the point of vapor evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Con-

CONTINUED

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

CONTINUATION

ference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Other Protective Equipment

Facilities storing or utilizing this material should be equipped with an eyewash facility.

STORAGE AND HANDLING INFORMATION

Storage Conditions

Keep from freezing; material may coagulate. The minimum recommended storage temperature for this material is 1C/34F. The maximum recommended storage temperature for this material is 49C/120F.

Handling Procedures

Monomer vapors can be evolved when material is heated during processing operations. See FACILITY CONTROL MEASURES Section for types of ventilation required.

SUPPLEMENTAL INFORMATION

TYPICAL PHYSICAL PROPERTIES

Appearance	Milky
Color	White
State	Liquid
Odor Characteristic	Acrylic odor
pH	2.1 to 4.0
Viscosity	5000 CPS Maximum
Specific Gravity (Water = 1)	1.0 to 1.2
Vapor Density (Air = 1)	< 1 Water
Vapor Pressure	17 mm Hg @ 20°C/68°F Water
Melting Point	0°C/32°F Water
Boiling Point	100°C/212°F Water
Solubility in Water	Dilutable
Percent Volatility	71 to 73 % Water
Evaporation Rate (BAc = 1)	< 1 Water

TOXICITY INFORMATION

Acute Data

Oral LD50 - rat: >5000 mg/kg
Dermal LD50 - rabbit: >5000 mg/kg
Skin Irritation - rabbit: slight irritation
Eye Irritation - rabbit: slight irritation

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

PRODUCT: ACRYSOL® ASE-60 Thickening Agent
KEY: 904168-1
DATE: 07/30/92

WASTE DISPOSAL

Procedure

Coagulate the emulsion by the stepwise addition of ferric chloride and lime. Remove the clear supernatant and flush to a chemical sewer. Incinerate liquid and contaminated solids in accordance with local, state, and federal regulations.

REGULATORY INFORMATION

WORKPLACE CLASSIFICATIONS

This product is considered non-hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

This product is not a 'controlled product' under the Canadian Workplace Hazardous Materials Information System (WHMIS).

TRANSPORTATION CLASSIFICATIONS

US DOT Hazard Class . . . . . NONREGULATED

EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW (SARA TITLE 3)

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CERCLA INFORMATION (40CFR 302.4)

Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

RCRA INFORMATION

When a decision is made to discard this material as supplied, it does not meet RCRA's characteristic definition of ignitability, corrosivity, or reactivity, and is not listed in 40 CFR 261.33. The toxicity characteristic (TC), however, has not been evaluated by the Toxicity Characteristic Leaching Procedure (TCLP).

Rohm and Haas Company
100 Independence Mall West
Philadelphia, PA 19106-2399

PRODUCT: ACRYSOL® ASE-60 Thickening Agent
KEY: 904168-1
DATE: 07/30/92

CHEMICAL CONTROL LAW STATUS

All components of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

STATE RIGHT-TO-KNOW LAWS

Any material listed as "Not Hazardous" in the CAS REG NO column of the COMPONENT INFORMATION Section of this MSDS is trade secret under the provisions of the Pennsylvania Worker and Community Right-to-Know Act.

CALIFORNIA PROPOSITION 65

This product contains trace levels of a component or components known to the state of California to cause cancer:
- Ethyl acrylate (140-88-5)

ACRYSOL® is a trademark of Rohm and Haas Company or one of its subsidiaries or affiliates.

ABBREVIATIONS:
ACGIH = American Conference of Governmental Industrial Hygienists
OSHA = Occupational Safety and Health Administration
TLV = Threshold Limit Value
PEL = Permissible Exposure Limit
TWA = Time Weighted Average
STEL = Short-Term Exposure Limit
BAc = Butyl acetate
Bar denotes a revision from previous MSDS in this area.

The information contained herein relates only to the specific material identified. Rohm and Haas Company believes that such information is accurate and reliable as of the date of this material safety data sheet, but no representation, guarantee or warranty, express or implied, is made as to the accuracy, reliability, or completeness of the information. Rohm and Haas Company urges persons receiving this information to make their own determination as to the information's suitability and completeness for their particular application.

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THE PQ CORPORATION

Document QCEL300.MSD

HMIS Rating: 1.0.0

MATERIAL SAFETY DATA SHEET

Q-CEL® 300 Hollow Microspheres

SECTION 1 IDENTIFICATION OF PRODUCT

MANUFACTURER	PQ Corporation
ADDRESS	Southpoint, P. O. Box 840, Valley Forge, PA 19482-0840
EMERGENCY TELEPHONE NUMBER	610/651-4200
SALES NAME	Q-CEL® 300 Hollow Microspheres
CHEMICAL NAME	Silicic acid, sodium salt, boric acid, sodium salt, amorphous silicon dioxide
TSCA CAS REGISTRY Nos.	This product is a mixture under TSCA. CAS Nos. for identification purposes: 1344-09-8; 7775-19-1; 7631-86-9
DOT HAZARD CLASS	N.A.
DOT SHIPPING NAME	N.A.

SECTION 2 CHEMICAL AND PHYSICAL DATA

APPEARANCE & ODOR	Dry white powder. Odorless.
SPECIFIC GRAVITY (liquids only)	N.A.
BULK DENSITY	0.12 g/cc
SOLUBILITY IN WATER	Negligible.
pH	N.A.

SECTION 3 FIRE, EXPLOSION AND REACTIVITY HAZARD DATA

FLASH POINT (°F)	Noncombustible
SPECIAL FIRE FIGHTING PROCEDURES	N.A.
STABILITY	Stable.
CONDITIONS TO AVOID	None known.
INCOMPATIBILITY (Materials to Avoid)	None known.
HAZARDOUS DECOMPOSITION PRODUCTS	None.

SECTION 4 SPILL AND DISPOSAL

ENVIRONMENTAL HAZARD	Borate content may cause damage to plants, particulary citrus crops. Not a listed toxic chemical under SARA Title III. §302, §304, or §313.
SPILLAGE	Sweep, scoop, or vacuum discharged material.
WASTE DISPOSAL METHOD	Landfill according to local, state, and federal regulations. Disposed material is not a RCRA hazardous waste.

N.A. = Not Applicable

SECTION 5 HEALTH HAZARD DATA

EYE CONTACT	Causes irritation.
SKIN CONTACT	May cause dehydration and irritation.
INHALATION	Causes irritation to respiratory tract.
INGESTION	No known hazard.
CHRONIC HAZARDS	No known chronic hazards. Not listed by OSHA, NTP or IARC as a carcinogen.
SIGNS AND SYMPTOMS OF EXPOSURE	Sneezing and dryness of mucous membranes (inhalation). Redness and tearing (eye exposure). Dryness, itching or burning (skin exposure).
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE	Asthma and lung diseases.
FIRST AID PROCEDURES	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists. If inhaled, remove to fresh air.

SECTION 6 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Use NIOSH-certified dust respirator where dust occurs. Observe OSHA regulations for respirator use (29 CFR 1910.134).
GLOVES	Cotton gloves are usually sufficient to protect hands from irritation arising from handling this product. If irritation occurs, use rubber gloves.
EYE PROTECTION	Use chemical goggles.
OTHER PROTECTIVE EQUIPMENT	Safety shower and eyewash fountain should be within direct access.
PERSONAL HYGIENE	Avoid breathing dust. Wash thoroughly after handling.
ENGINEERING CONTROL	Use with adequate ventilation.

SECTION 7 SUBSTANCES FOR WHICH STANDARDS HAVE BEEN SET

COMPONENT	Boron oxide (B_2O_3)
PERCENT	15%
OSHA PEL	15 mg/m^3
ACGIH TLV	10 mg/m^3

Note This product is a sodium borosilicate which contains no free boron oxide per se. Toxicological test data and industrial experience are consistent with the conclusion that it is appropriate to treat this material as an inert or nuisance dust.

EXPOSURE ANALYSIS METHODS..... NIOSH Manual of Analytical Methods, 3rd ed., Method 7501

SECTION 8 SOURCE OF INFORMATION

John G. Blumberg *Date: 04/20/94*

N.A. = Not Applicable

MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA'S Hazard Communication Standard 29 CFR 1910.1200. Standard must be consulted for specific requirements.

Section I PRODUCT IDENTIFICATION

MANUFACTURER:
ASBURY GRAPHITE INC. CALIF
2855 Franklin Canyon Road
Rodeo, CA 94572

MSDS #25cur: Rev. Date: 3-1-97
Emergency Telephone
800-424-9300 CHEMTREC

Grade Names: Carbon 230, 235, 237, 238, 239, 260, 261, 262, 263, 264, 265, 266, 267 Therm-o-Carb, 335, 250 series

Product Name: FLUID PETROLEUM COKE
Generic Name: CARBON
Chemical Family: PETROLEUM HYDROCARBON

Section II Hazardous Ingredients/Identity Information

Hazardous Components:
(Specific Chemical Identity: Common Names)

FLUID PETROLEUM COKE.....CAS NO. 64741-79-3
The exposure limit for fluid petroleum coke has not been specifically established. It is referenced as a nuisance dust.

NUISANCE DUST (Total & respirable and dust, if generated)

	Exposure Limit	Units	Agency	Type
CAS NO.: None	10.00	mg/m3	ACGIH	TWA-T-Dust
	5.00	mg/m3	ACGIH	TWA-R-Dust
	15.00	mg/m3	OSHA	TWA-T-Dust
	5.00	mg/m3	OSHA	TWA-R-Dust
	10.00	mg/m3	CAL OSHA	TWA-T-Dust
	5.00	mg/m3	CAL OSHA	TWA-R-Dust

This product contains no chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

FEB 17 '98 09:06AM ASBURY GRAPHITE P.1

Section III Physical/Chemical Characteristics

Boiling Point
N.A.

Specific Gravity (H2O = 1)
0.8 - 0.98 (Typical)

Vapor Pressure (mm Hg)
N.A.

Melting Point
N.A.

Vapor Density (Air - 1)
N.A.

Evaporation Rate (Butyl Acetate = 1)
0

Solubility in Water
Negligible

Appearance and Odor
Grey to Black - No odor

Section IV Fire and Explosion Hazard Data

Flash Point (method used)
N.A.

Extinguishing Media: Chemical Type preferred.
Dust Explosion Potential: Ventilation may be required.

Unusual Fire and Explosion Hazards:
None

NFPA HAZARD CLASS	Health Hazard:	0	Hazard Ranking:
	Flammability:	1	0 = Least
	Reactivity:	0	1 = Slight
	Other:		2 = Moderate
			3 = High
			4 = Extreme

Section V Reactivity Data

Stability
Stable

Conditions to Avoid
None

Incompatibility (Materials to avoid)
Incompatible with strong oxidizing agents such as Perchlorates, Peroxides and Nitric Acid, especially when heated.
Hazardous Decomposition or By-products:
Carbon Dioxide and/or Carbon Monoxide

Hazardous Polymerization Will not occur
Conditions to avoid None

FEB 17 '98 09:06AM RSBURY GRAPHITE P.2

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation ? Yes Skin ? Ingestion ?

EYE CONTACT: Contact with dust may be abrasive and irritating to the eyes and may cause stinging sensation and redness.

SKIN CONTACT: This material is a mild skin irritant, may cause redness, edema, or dry skin.

INHALATION: No harmful effects are expected from breathing dusts of this material. Prolonged or repeated overexposure to dust may result in chronic Bronchitis with other symptoms of respiratory irritation.

INGESTION: Gastrointestinal irritation, vomiting. If aspirated into lungs secondary to vomiting pneumonitis and pulmonary edema may result.

EMERGENCY AND FIRST AID PROCEDURES:

At first sign of breathing difficulties subject should be moved to fresh air. In case of respiratory distress, provide artificial respiration and/or oxygen.

Wash irritated skin with soap an water. Remove soiled clothes.

If ingested, do not induce vomiting. If vomiting occurs keep head below hips to prevent aspiration into lungs. Seek medical attention.

Wash eyes with water to wash out dust for 15 minutes. If irritation persists consult physician.

Section VII — Precautions for Safe Handling and Use

Steps to be taken in case material is released or spilled:

..... sweep or vacuum.....

Waste Disposal Method:

One or more constituents this product may be considered to be or may become after normal use, hazardous substances under Local, State or Federal Regulations; or when discarded, may be considered a hazardous waste under Local, State or Federal regulations. Disposer must comply with Federal, State and Local Disposal or Discharge Laws.

Precautions to be taken in Handling and Storing: NONE

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SECTION VIII CONTROL MEASURES

Respiratory Protection (Specify Type): If concentrations exceed OHSA PEL Use OSHA approved respiratory protective equipment.

Ventilation: Use adequate natural and mechanical ventilation to keep concentrations below the PEL.

Protective Gloves: Chemical resistant gloves required.

Eye Protection: Safety Glasses or Goggles

Other Protective Clothing or Equipment: Protective clothing such as coveralls, lab coats, ect. should be worn.

Work/Hygienic Practices: ... Keep work area clean

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date issued.

HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT OR THE HAZARDS RELATED TO ITS USE.

This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose and on the condition that he/she assumes the risk of use thereof.

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**** MATERIAL SAFETY DATA SHEET ****

Ammonium Hydroxide
01260

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Ammonium Hydroxide
Catalog Numbers:
A470-250, A512 500, A512-500, A512500, A564-200L, A564-20L, A564-212L, A564-500, A667 212, A667-212, A667212, A669 212, A669 500, A669 612GAL, A669-212, A669-385LB, A669-500, A669-612G, A669-612GAL, A669-612GL, A669212 A669385LB, A669500, A669612GAL, A669C 212, A669C-2.5, A669C-212, A669C212, A669S-500, A669S212, A669S 212, A669S 500, A669S-2.5, A669S-212, A699P500, S70663MF, S70665, S70665-1, S70665MF, SCH 1143, SCH1143
Synonyms:
Ammonium Hydrate; Ammonia Solution; Ammonia Water; Aqueous Ammonia.
Company Identification: Fisher Scientific
1 Reagent Lane
Fairlawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
1336-21-6	Ammonium hydroxide	57.0	215-647-6
7732-18-5	Water	43.0	231-791-2

Hazard Symbols: T C
Risk Phrases: 25 34

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: colourless.
Danger! Corrosive. Toxic. Lachrymator. Harmful if swallowed. Causes eye and skin burns. Causes digestive and respiratory tract burns.
Target Organs: No data found.

Potential Health Effects

Eye:
Contact with liquid or vapor causes severe burns and possible irreversible eye damage.

Skin:
Causes severe skin irritation. Causes skin burns. May cause deep, penetrating ulcers of the skin. Contact with the skin may cause staining, inflammation, and thickening of the skin.

Ingestion:
Harmful if swallowed. May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. Causes throat constriction, vomiting, convulsions, and shock.

Inhalation:
Effects may be delayed. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.

Chronic:
Chronic ingestion may cause effects similar to those of acute ingestion. Prolonged or repeated exposure may cause corneal damage and the development of cataracts and glaucoma.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation is required (at least 30 minutes).

Skin:
Get medical aid immediately. Discard contaminated clothing in a manner which limits further exposure. Rinse area with large amounts of water for at least 15 minutes.

Ingestion:
Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation:
Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician:
After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Extinguishing Media:
For small fires, use water spray, dry chemical, carbon dioxide or chemical foam. Do NOT get water inside containers. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spill with inert material, (e.g., vermiculite, dry sand or earth), then place into a chemical waste container. Do not use combustible materials such as saw dust. Neutralize spill with a weak acid such as vinegar or acetic acid. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Discard contaminated shoes.

Storage:
Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ammonium hydroxide	none listed	none listed	none listed
Water	none listed	none listed	none listed

OSHA Vacated PELs:
Ammonium hydroxide:
No OSHA Vacated PELs are listed for this chemical.
Water:
No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:
Wear appropriate protective gloves to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Liquid
Appearance:	colourless
Odor:	strong odor - ammonia-like
pH:	13.6 at 32F.
Vapor Pressure:	115 mm Hg @20C
Vapor Density:	1.2 (Air=1)
Evaporation Rate:	1 (Water=1)
Viscosity:	Not available.
Boiling Point:	36 deg C
Freezing/Melting Point:	-77 deg C
Autoignition Temperature:	1202 deg F (650.00 deg C)
Flash Point:	Not available.
NFPA Rating:	Not published.
Explosion Limits, Lower:	16.0
Upper:	27.0
Decomposition Temperature:	Not available.
Solubility:	Completely soluble in water.
Specific Gravity/Density:	0.9
Molecular Formula:	Not applicable.
Molecular Weight:	

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
High temperatures, incompatible materials.
Incompatibilities with Other Materials:
Acrolein, acrylic acid, chlorosulfonic acid, dimethyl sulfate, fluorine, gold + aqua regia, hydrochloric acid, hydrofluoric acid, iodine, nitric acid, oleum, propiolactone, propylene oxide, silver nitrate, silver oxide, silver oxide + ethyl alcohol, nitromethane, silver permanganate, sulfuric acid, halogens. Forms explosive compounds with many heavy metals and halide salts.
Hazardous Decomposition Products:
Nitric oxide (NOx) and ammonia (NH3) fumes.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 1336-21-6: BQ9625000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 1336-21-6: Oral, rat: LD50 = 350 mg/kg.
CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg.
Carcinogenicity:
Ammonium hydroxide -
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Water -
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology:
No information available.
Teratogenicity:
No information available.
Reproductive Effects:
No information available.
Neurotoxicity:
No information available.
Mutagenicity:
No information available.
Other Studies:
Standard Draize Test: Administration into the eye (rabbit) = 250 ug (Severe).

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:
Fish: Rainbow trout: LC50 = 0.008 mg/L; 24 Hr.; UnspecifiedFish:
Fathead Minnow: LC50 = 8.2 mg/L; 96 Hr.; UnspecifiedFish:
Bluegill/Sunfish: LC50 = 0.024-0.093 mg/L; 48 Hr.; UnspecifiedWater
flea Daphnia: EC50 =0.66 mg/L; 48 Hr.; 22 degrees CBluegill
LC50=0.024 to 0.093 mg/L/48H Goldfish TLm=2.0 to 2.5 mg/L/24-96H

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste.
US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT
Shipping Name: AMMONIA SOLUTIONS

Hazard Class: 8
UN Number: UN2672
Packing Group: III
Canadian TDG
Shipping Name: AMMONIUM HYDROXIDE
Hazard Class: 8(9.2)
UN Number: UN2672

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL
TSCA
CAS# 1336-21-6 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA
Section 302 (RQ)
CAS# 1336-21-6: final RQ = 1000 pounds (454 kg)
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 1336-21-6: acute, chronic.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 1336-21-6 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA
STATE
Ammonium hydroxide can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.
Water is not present on state lists from CA, PA, MN, MA, FL, or NJ.
California No Significant Risk Level:
None of the chemicals in this product are listed.
European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: T C
Risk Phrases:
R 25 Toxic if swallowed.
R 34 Causes burns.
Safety Phrases:
S 24/25 Avoid contact with skin and eyes.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
WGK (Water Danger/Protection)
CAS# 1336-21-6: 2
CAS# 7732-18-5: No information available.
United Kingdom Occupational Exposure Limits

Canada
CAS# 1336-21-6 is listed on Canada's DSL/NDSL List.
CAS# 7732-18-5 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of D1B, E.
CAS# 1336-21-6 is not listed on Canada's Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.
Exposure Limits

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 6/22/1999 Revision #2 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of

United States Department of the Interior

NATIONAL PARK SERVICE
NORTHEAST CULTURAL RESOURCES CENTER
BUILDING CONSERVATION BRANCH
NEW YORK FIELD OFFICE
26 WALL STREET
NEW YORK, NEW YORK 10005

April **11,** 2002

To: Architect, Harpers Ferry National Historical Park

From: Chief, Northeast Cultural Resources Center, Building Conservation Branch

Subject: Transmittal of treatment reports.

Please find the enclosed treatment reports: "Stabilization of Interior Flaking Paint in the Frederick A. Roeder House" and "Building 38 Interior Plaster Stabilization." There are twenty copies of each report and one set of color slides, documenting each project. Electronic versions of the reports have also been sent.

If you have any questions or comments, please call me.

Judith M Jacob
for

Stephen Spaulding

970-978-9127

enclosures

HAFE PKG. 118/PMIS 41556
Rehabilitate Buildings 5,7, 16 and 16A - Stabilize Roeder House Paint Layers

HAFE PKG. 643A/PMIS 27987
Paint/Plaster Interior Historic Building #38, Tearney Building

electronic cc:
D. Campbell, Supt., HAFE
R. Chilcoat, Proj. Mngr., NCRC/BCB
J. Jacob, Sr. Consv., NCRC/BCB
N. Kroll, Arch. Consv., NCRC/BCB