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## Conservation Treatment Evaluation

The Conservation Treatment Evaluation is designed for projects where masonry deterioration is advanced. The test program evaluates the effectiveness of conservation treatments in stabilizing conditions and preventing future deterioration. The test protocol is based on ASTM E2167 *Standard Guide for Selection and Use of Stone Consolidants*.

### Pre-Treatment Test Program

Pre-treatment tests are designed to measure chemical and physical properties of the substrate, assess the severity of deterioration and identify possible sources of decay.

1. **Petrographic Analysis:** Identification of the mineralogical composition of the masonry sample is determined through optical microscope evaluation and x-ray diffraction analysis.
2. **Water Solubility:** The percent water soluble component of the masonry sample is measured to identify contaminants and natural cements in the sample and to evaluate its vulnerability to water-related deterioration.
3. **Acid Solubility:** The percent acid soluble component of the masonry sample is measured to assess its vulnerability to deterioration by acidic precipitation.
4. **Water Absorption:** Water absorption is measured over a 24- hour period. The absorption rate and capacity are used to determine appropriate conservation treatment(s) and application procedures.
5. **Hygroscopic Uptake:** Absorption of hygroscopic moisture is measured over a 24-hour period. The percent absorption helps characterize natural cements and contaminants.
6. **Anionic Salt Analysis:** Chloride, sulfate and nitrate salts are measured. These data help identify sources of deterioration and are important in designing appropriate cleaning procedures.

### Post-Treatment Test Program

In addition to identifying sources of deterioration, the results of Pre-Treatment Tests help determine appropriate conservation treatments. Post-treatment tests measure the effectiveness of conservation treatments and rule out adverse effects.

1. **Absorption of the Conservation Treatment:** Deposition of the conservation treatment is measured immediately after application and following cure.
2. **Depth of Penetration:** The penetration depth of the conservation treatment is measured to rule out crust formation that is associated with accelerated deterioration.

## Post-Treatment Test Program (cont.)

3. **Water Absorption:** Water absorption over a 24-hour period is measured for treated samples. Percent effectiveness is determined by comparing these data with water absorption data measured for untreated samples.
4. **Color Change:** Changes in color and gloss are visually evaluated following conservation treatment.

### Additional Post-Treatment Tests:

**QUV Artificial Weathering:** Exposure in a QUV Weatherometer is designed to replicate exterior weathering conditions at an accelerated rate. Treated and untreated samples are exposed for 1000 hours to alternate cycles of ultraviolet light and 60°C temperatures and cooler, moist, and dark conditions at 20-30°C. Color change following artificial weathering is visually evaluated.

AMT Labs provides electronic and hard copies of the laboratory report. The report includes a description of test methods, test results, photographs, and treatment recommendations.

### Submitting Samples for Evaluation

Samples submitted to the laboratory must be representative of conditions affecting masonry. Since deterioration observed at one level or exposure of a building facade may differ dramatically from that occurring in other areas, extracting samples from a variety of locations is recommended.

Photographs documenting sample removal, and elevation drawings identifying the point and method of extraction should accompany all samples submitted to the laboratory. Any additional information about the microenvironment from which the samples were taken (i.e., prevailing winds, failed gutters or water deflecting devices, concentrated surface staining, etc.) should also be provided.

### Sample Size

As many samples as can practically be provided should be submitted for evaluation. It is always preferable to receive intact masonry units representative of deterioration. When large stone units are involved, two-inch slabs cut from the front of the stone surface should be submitted. When possible, include samples of the adjacent mortar, grout, patching/repair materials, surface coatings, etc.

### **Submitting Samples for Evaluation (cont.)**

When whole masonry units are not available, a minimum of three samples representative of each area and level of decay are requested. Two-inch (50 mm) diameter cores, four to eight inches in length (100-200 mm) are normally sufficient. Select locations that are representative of the level(s) of deterioration. If possible, remove the cores with a dry coring process. If wet coring is used, portions of the pre-treatment testing program such as hygroscopic uptake and anionic salt analysis may be compromised. Note the coring procedure used on the sample submittal form. When requested to do so, the laboratory will retain two-inch (50 mm) "facings" from the back of submitted drill cores for reinsertion in the drill holes upon completion of the laboratory investigation.

When removal of entire masonry units or two-inch drill cores is not possible—as in the case of statuary or carved stone relief—smaller drill cores may be submitted for Pre-Treatment testing.

### **Packing Samples for Shipment**

All masonry samples should be clearly identified, wrapped tightly in newspaper and enclosed in a plastic bag. The plastic bag should then be placed in a suitable cardboard box and packed tightly with more newspaper, Styrofoam or other suitable packing material.

Enclose signed Authorization Form, submittal form, photographs, drawings, and any additional background information. Shipping address for AMT Labs is below:

**AMT Laboratories  
3741 Greenway Circle  
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Contact Courtney Murdock, Director of Project Testing, with any questions. 785-830-7328 or [cmurdock@amt-labs.com](mailto:cmurdock@amt-labs.com).