



**Pyrrhotite & Crumbling Foundations**  
**Fee Schedule for Testing of Aggregates, and Cores from Existing Concrete Foundations**

Test #	Tests	Purpose	ASTM Designation	Unit Price (\$)	Sample Amount
<b>Aggregates</b>					
1A	Total Sulfur by Combustion IR (Leco Method)	Total sulfur from both sulfide and sulfate phases	ASTM D 4239	500	50 grams
1B	Total Sulfur by ED-XRF		ASTM C 114	350	
1C	Sulfur Speciation by WD-XRF	Amount of total sulfide phases	ASTM E 1621	1000	
1D	Sulfide mineralogy in aggregate by XRD (Qualitative ICDD-Jade Search/Match)	Detection of various iron sulfide phases and oxidation products	ASTM C 1365	500	
1E	Sulfide mineralogy in aggregate by XRD (Quantitative – Rietveld Analysis)		ASTM C 1365	1000	
2	Detection of pyrrhotite in aggregate by magnetic separation	Semi-quantitative estimation of pyrrhotite content in aggregate from its magnetic property	-	350	
3A	Accelerated oxidation test of pulverized aggregate from chemical analysis of filtrates by ion chromatography (IC)	Amount of sulfate released from oxidation of iron sulfide minerals in aggregate	ASTM D 4327	750	100 grams
3B	Mortar Bar Expansion Tests – Accelerated Method	Potential expansion of Iron sulfide bearing aggregates in mortar - Aggregate must be received in crushed size finer than No. 4 sieve	ASTM C 1260	1250	500 grams
3C	Mortar Bar Expansion Test – Length Change Measurements in Water		ASTM C 157	1250	
4	Micro-XRF on Drilled cores from quarry	Detection of depths at which sulfide minerals are present	-	2000	Drilled core
5	Petrographic Examinations of drilled rock cores from quarry		ASTM C 295	1750	
6	Petrographic Examinations of crushed aggregate	Detection of aggregate type, and potentially deleterious constituents including presence/absence/types of sulfide minerals	ASTM C 295	1750	5 pounds
<b>Cores from Existing Foundations</b>					
7	Comprehensive investigation, including: <ul style="list-style-type: none"> <li>Detailed Petrography</li> <li>Scanning Electron Microscopy &amp; X-ray Microanalysis</li> <li>Chemical (total sulfur)</li> <li>X-ray Fluorescence</li> <li>X-ray Diffraction</li> <li>Ion Chromatography</li> </ul>	<ul style="list-style-type: none"> <li>Detection of Pyrrhotite and Pyrite in Existing Foundations</li> <li>Amount of Iron Sulfide Minerals</li> <li>Concrete Composition, Condition &amp; Quality</li> <li>Mechanisms and Extent of Deterioration</li> <li>Service Life Assessment</li> </ul>	ASTM C 856, ASTM C 1723, ASTM C 114, ASTM D 4239, ASTM D 4327	2500	4-in. diameter core drilled from over cracked foundation

Note: Our prices are not necessarily competitive but based on our extensive experience on the subject, our in-house state-of-the-art laboratory facilities that can be seen in our website under various laboratories, and our extent of research and publications on this topic, which can be downloaded from the case studies and publication pages in our website.