



The Replacement of Deteriorated Architectural Terra Cotta

Available Substitute Materials

The Elevated Standard for Repair

The New York City (NYC) Department of Buildings (DOB) has become stricter regarding accepted repairs for architectural terra cotta and re repairs to existing architectural terra cotta. This elevated standard for terra cotta repair has resulted in more deteriorated material being replaced than retained on buildings through repair. Much of the terra cotta that we see has been in service for 100 - 125 years. While terra cotta itself is a durable material it is not waterproof. The concealed ferrous metal attachments that hold them in place are wetted over time and can be compromised by corrosion making them both engines of damage and vulnerable to failure. Expanding metal causes terra cotta to crack and fracture with the result that masonry units fall with no warning, causing injury and death to pedestrians. The DOB's increased scrutiny of repairs to terra cotta is intended to protect the public and save lives.

Stricter Landmarks Regulation of Material Replacement

In 2019, the Landmarks Preservation Commission's (LPC) rules regarding the replacement of terra cotta were tightened. Terra cotta must now be replaced in-kind below the 6th floor on designated landmarks. This requirement has increased the demand for new terra cotta.

Substitute materials can be utilized on many buildings but they should match the physical and visual characteristics of the historic materials in terms of design, detail, profile, dimension, texture, tooling, color, and finish, as applicable.

LPC Staff can approve replacing terra cotta (fired clay masonry) if it meets the following criteria:

- > **Replacement of terra cotta on buildings in Historic Districts** is in-kind at or below the sixth story of the primary facade. However, substitute materials can be used as replacement units at stories above, for various decorative and non-decorative elements within or independent of the cladding field.
- > **Above the sixth story of the primary facade,** substitute materials may also be used at projecting cornices and balconies with weight and/or attachment issues. This applies when a licensed engineer has determined that in-kind replacement has the potential to cause additional loss of surrounding material.
- > **At individual landmarks,** substitute materials cannot be used on primary or secondary facades, except for coping elements and in limited quantities for discrete elements that are not part of a cladding field of similar units, where physical and visual compatibility is critical.





Substitute Material Comparison

Basis	Cast Stone	Architectural Precast	Architectural GFRC
Definition	High quality masonry building material simulating natural cut stone.	Masonry building material produced in larger sizes; can be visually comparable to cast stone with special finishing, but without special finishing more like concrete.	Masonry product made with glass fiber for strength with a hollow back having appearance of cast stone or precast at the option of the specifier.
Design	Made from graded aggregates, white Portland Cement, additives, and color pigments	Consists of larger aggregates from 1" to fine sands, additives, and Portland cement.	Mix design same as precast with the addition of glass fiber for strength and face material visually the same as cast stone or precast.
Production Method	Usually produced by dry cast method with very little moisture; compacting mix densely into molds.	Wet Method used; mix is poured into molds. Product sets up in mold overnight	The product has a hollow underside, strength through glass fibers. A wet pour method.
Structural / Non Structural	This product is self-supporting but is not structural.	This product can be conventionally reinforced or pre-stressed to be structural.	Product is not structural but is self-supporting through attachments.
Weight	145 pounds per cubic foot	150 pounds per cubic foot	Approximately 50% or less weight for same area covered than cast stone or precast.
Specification	Defined under Masonry Division – Specification 047200 of the uniform building code.	Defined under Concrete Division – Specification 034500 of the uniform building codes.	Defined under Concrete Division – Specification 034900 of the uniform building codes.
Speed of Manufacture	Multiple pieces per day from mold; higher production output.	Usually, 1 piece per day per mold; limiting daily production output.	Usually, 1 piece per day; limiting daily production output.
Size	Usually less than 4' in length; depends on depth or cubic value.	Can be larger pieces up to 20' and can be structural.	Sizes can approximate both cast stone & precast.
Cost	Usually, the most cost effective.	More expensive due to finishing to create close visual to cast stone and daily production limitation.	Most expensive to produce; higher cost offset by less installation costs.

*This table references information from the website of Advanced Architectural Stone (TX and PA) with their permission.