



Buildings

NYC Buildings Department
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BUILDINGS BULLETIN 2016-005
OTCR

Supersedes: Buildings Bulletins 2015-018 and 2012-007

Issuer: Alan Price, P.E.
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Issuance Date: February 25, 2016

Purpose: This document establishes acceptance criteria for post-installed anchors in masonry in accordance with the NYC Construction Codes.

Related Code	AC 28-113.2.2	BC 1704.13	BC 109.3.6
Section(s):	BC 1604.2	BC 3314.4.3	BC 3314.3.1
	BC 3314.2		

Subject(s): Masonry, anchors, post-installed; Scaffolds, anchors; Post-installed anchors, expansion anchor; Post-installed anchors, adhesive anchor; Post-installed anchors, predrilled fasteners; Masonry anchors, field testing

Background: Section 1604.2 of the NYC Building Code requires loads and forces for occupancies and uses not covered in such chapter to be subject to the approval of the commissioner. Since the NYC Construction Codes do not reference criteria for post-installed anchors in masonry, this document establishes acceptance criteria for four types of post-installed anchors in masonry, including those used for securing scaffolds to buildings.

Description:

1. Expansion Anchor- See ICC-ES AC 01, Section 2.5 under "Evaluation Criteria"
2. Adhesive Anchor- See ICC-ES AC 58, Section 1.4.2 under "Evaluation Criteria"
3. Grouted Anchor- A device for transferring tension and shear loads to structural masonry, consisting of an anchor element embedded with a cementitious grout in a cylindrical hole drilled in a masonry member.
4. Predrilled Fasteners (screw anchors)- See ICC-ES AC 106, Section 1.4.3 under "Evaluation Criteria"

Uses: Post-installed anchors in masonry may be used to resist loads in accordance with this bulletin.

Restriction:
Adhesive anchors are not permitted to support fire-resistance rated construction unless the use of such anchors meets the conditions set forth in the ICC-ES Acceptance Criteria 58 for acceptable conditions where anchors are permitted in fire-resistance rated construction.

Evaluation Scope: NYC Construction Codes

- Evaluation Criteria:** Pursuant to section AC 28-113, the Office of Technical Certification and Research (OTCR) recognizes post-installed anchors in masonry elements designed and installed in accordance with:
1. ICC-ES AC01 “Acceptance criteria for expansion anchors in masonry elements”¹, or
 2. ICC-ES AC58 “Acceptance criteria for adhesive anchors in masonry elements”², or
 3. ICC-ES AC106 “Acceptance criteria for predrilled fasteners (screw anchor) in masonry”³, or
 4. Proof load testing performed in accordance with the Section C of the Conditions of Acceptance Section per this Bulletin.

Other alternative criteria for post-installed anchors in masonry shall be approved by the department.

Acceptable post-installed anchors in masonry elements shall comply with the conditions of this bulletin and shall have one of the following:

- An evaluation or code compliance report issued in accordance with one of the applicable Acceptance Criteria listed above (Evaluation Criteria #1, 2 or 3 from above) published by an agency accredited to ISO 17065, or
- Proof load test report issued in accordance with Section C of this bulletin.

Conditions of Acceptance: Post-installed anchors in masonry shall be designed, installed, tested and inspected in accordance with the NYC Construction Codes and other applicable provisions including but not limited to the following:

A. Design

1. Post-installed anchors in masonry shall be designed in accordance with the NYC Construction Codes including section BC 3314.3, the applicable evaluation or code compliance report, or test report as defined above, and the conditions of this bulletin.
2. Plans prepared for the masonry anchors shall include the following notes:
 - a. Description of masonry substrate including type and general condition.
 - b. Pull test sample size for each condition listed in Conditions of Acceptance Section (C)(2). This note is only required for anchors subject to pull load testing in accordance with Conditions of Acceptance Section (C).

B. Installation

Installation of post-installed anchors in masonry shall be in accordance with the Manufacturer’s Published Installation Instructions (MPII), the NYC Construction Codes, the applicable evaluation or code compliance report, test report as defined above, and the conditions of this bulletin.

C. Proof load testing (Field testing)

Proof load testing shall be performed in the absence of applicable performance loading tables for identical substrate material conditions established in accordance with ICC-ES Acceptance Criteria identified above. Proof load testing shall be used to verify proper installation of anchors in the field.

1. Testing personnel. Proof load testing shall be performed by an independent testing agency employed by the owner or owner’s representative. Proof load testing shall be witnessed by a special inspector as defined in section (D) (2) of this Bulletin. Special inspections shall be performed in accordance with the NYC Building Code and 1 RCNY 101-06.
2. Sample size. A minimum of 20% or three tests, whichever is greater, shall be randomly selected and tested for each of the following conditions:
 - i. Anchor size.
 - ii. Embedment depth
3. Applied proof loading. The following shall be required for all testing:
 - i. Testing shall only be performed on post-installed anchoring systems installed in accordance with the Manufacturer’s Published Installation Instructions (MPII).
 - ii. Anchors shall be subjected to confined tension tests.
 - iii. Anchors proof loads shall be established by doubling the allowable load listed in the applicable evaluation or code compliance report, or test report as defined above. For anchors located close to edges, proof loads shall be adjusted as appropriate to avoid masonry failure.

4. Acceptance criteria
 - i. Anchors shall resist the applied proof load (Section (C)(3)(iii)) for duration of one minute without visual movement of the anchor or reduction of applied load as measured by test gauges.
 - ii. The registered design professional or the individual responsible for design as applicable shall be notified immediately if an anchor fails to satisfy the criteria in section (C)(4)(i) of this bulletin. In such case, anchors represented in the subject sample size shall not be loaded until authorized by the registered design professional of record or the individual responsible for design as applicable.
5. Test report. Each field test report shall include the following:
 - i. Test date, time and location shall be clearly identified for each anchor.
 - ii. The masonry wall condition shall be documented. Include such details as approximate age of the masonry wall, type of masonry (i.e., solid brick, hollow CMU, etc.), conditions of the mortar joints, etc.
 - iii. Installation conditions including ambient air temperature and hole cleaning method.
 - iv. The power tool (brand, model number and size), drill-bit (type and diameter), and the drilling mode (e.g. rotation only or hammering with rotation)
 - v. Anchorage geometry including diameter, embedment, spacing between tested anchors (if closer than 4x embedment depth), and edge distances (if closer than 2x embedment depth).
 - vi. Applied load and expected proof load as established per this Bulletin (section (C)(3)(iii)).
 - vii. Field test reports shall be prepared by the testing agency and signed by the special inspection agency. The special inspection agency shall forward the report to the registered design professional or the individual responsible for design as applicable, within 3 days of the test. The special inspector shall maintain test reports for at least 6 years as required by 1 RCNY 101-06 (b) (4).

D. Inspection

1. Inspection of masonry anchors shall be required when the project requires a permit to be filed with the department (i.e., section BC 3314.2):
2. The installation of post-installed anchors in masonry shall be subject to special inspections in accordance with BC Section 1704.32.
3. Inspection of masonry anchors supporting scaffolding shall be performed in accordance with section BC 3314.4.3.

Referenced Standards:

1. AC01-2010 "Acceptance criteria for expansion anchors in masonry elements". www.icc-es.org
2. AC58-2011 "Acceptance criteria for adhesive anchors in masonry elements". www.icc-es.org
3. AC106-2010 "Acceptance criteria for predrilled fasteners (Screw anchor) in masonry". www.icc-es.org