

HECKMANN BUILDING PRODUCTS

Division of Mechanical Plastics Corp.

1501 N. 31st Avenue

Melrose Park, IL 60160-2911

800-621-4140 FAX: 708-865-2640

www.heckmannanchors.com

#189 L-TYPE COLUMN ANCHORS – TEST REPORT

TEST 1: FAILURE OF NOTCH ONLY

SIZE: Anchors are 1/8" (3.175mm) x 2" (50.8mm) wide x 7" (177.8mm) long with a 1-1/2" (38.1mm) bend. Anchors with two slot sizes were tested: 5/8" (15.875mm) x 1" (25.4mm) and 3/4" (19.05mm) x 1" (25.4mm). The slots started 1" (25.4mm) from the flat end of each anchor. The metal conformed to ASTM A-586 G90 Mill-Galvanized Steel.

APPLICATION: Used to tie masonry walls to steel columns with the column flanges parallel to the wall. Installed in pairs 24" (609.6mm) o.c. on each side of the column.

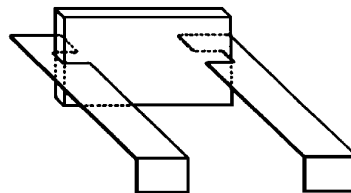
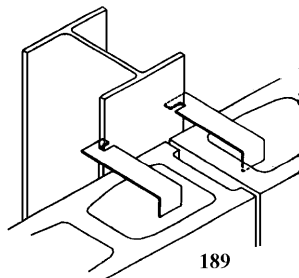
TEST CONDITIONS: Anchors were tested in pairs, one left and one right. A holding fixture of 1/2" (12.7mm) thick x 4" (101.6mm) wide flat stock was fabricated to simulate a WF Steel Beam. The load was applied to the fixture through an eye bolt attached to a holding bracket designed to allow approximately 1/2" (12.7mm) of straightening of the bend on the anchors, and then brace the bend section to allow failure to occur at the slots. The anchors were tested to failure at a rate of 0.75"/minute (19.05mm/minute).

TEST RESULTS: One sample of each was tested.

5/8" x 1" (15.875mm x 25.4mm) Slot: Load increased to 6,150 lbs. The left bracket slot spread and cracked, causing it to slide off the holding fixture. The right bracket slot had a visible spread.

3/4" x 1" (19.05mm x 25.4mm) Slot: Load increased to 6,350 lbs. Same failure as above with a slight crack on the right slot also.

(Visible straightening was noted at the bend section on both samples at approximately 1,500 to 2,000 lbs.)



#189 L-Type Column Anchors (Continued)

TEST 2: TESTED IN PAIRS WITH COLUMN AND CMU WALL

SIZE: Anchors tested were 1/8" (3.175mm) x 2" (50.8mm) wide with a 2-1/4" (57.15mm) o.d. bend.

APPLICATION: Used to tie masonry walls to steel columns with the column flanges parallel to the wall. Installed in pairs 24" (609.6mm) o.c. on each side of the column.

TEST CONDITIONS: Four CMU units conforming to ASTM C90 were assembled to form a wall 2 units wide x 2 units high (15-5/8" (396.88mm) high x 31-5/8" (803.28mm) wide x 7-5/8" (193.68mm) thick). The Column Anchors were positioned between the two units at an equal distance each side of the centerline of the wall. The mortar joints were 3/8" (9.525mm) to 1/2" (12.7mm) and the cores were completely mortar filled. Type N mortar was used which had a compressive strength of 2,200 psi. Testing was conducted by The Engineering Research Institute Iowa State University.

TEST RESULTS	TENSION	COMPRESSION 1" CAVITY (25.4mm)	COMPRESSION 4" CAVITY (101.6mm)	SHEAR
R.E.E.L. Loads deflection	2,697 lbs .031 in. (.787mm)	9,863 lbs .061 in. (1.549mm)	6,373 lbs .086 in. (2.184mm)	1,030 lbs .046 in. (1.168mm)
R.E.M. Loads deflection	3,242 lbs .095 in. (2.413mm)	9,863 lbs .061 in. (1.549mm)	6,373 lbs .086 in. (2.184mm)	1,584 lbs .081 in. (2.057mm)
Peak Loads deflection	3,242 lbs .095 in. (2.413mm)	9,863 lbs .061 in. (1.549mm)	6,373 lbs .086 in. (2.184mm)	1,584 lbs .081 in. (2.057mm)

R.E.E.L. values indicate the end of the elastic region (initial straight line portion of the graph) and the start of the inelastic region. (REEL loads are those recommended to which the appropriate safety factors should be applied for the design values based upon elastic behavior.)

R.E.M. values indicate the load achieved at the end of the ductile (somewhat plastic) region of the load-deflection behavior, beyond which much larger deflections occur. The R.E.M is the load that the researchers felt was the appropriate "interpreted maximum" load. In most cases the peak loads beyond R.E.M were due to highly inelastic behavior, rotations, contact bearing, or exaggerated deflections that one would not want to count as part of the correct specimen peak capacity. (R.E.M loads are those recommended to which the appropriate safety factors should be applied to arrive at the manufacturer's recommended design value based upon strength or limit states design.)

Peak Load were taken from the graphs prior to a significant decrease in load or at an abrupt failure point.

#189 L-Type Column Anchors (Continued)

TENSION TEST: The Column Anchors failure in tension occurred as a combination of tensile and shear failure at the notch.

COMPRESSION TEST: The primary failure occurred as a global buckling of the anchor while the secondary mode was a block and mortar failure. The peak load occurred at the primary failure.

SHEAR TEST: The primary failure was a failure of the mortar joint and the secondary failure was CMU cracking. In all shear cases the structural integrity of the anchor was not threatened.