

HECKMANN BUILDING PRODUCTS

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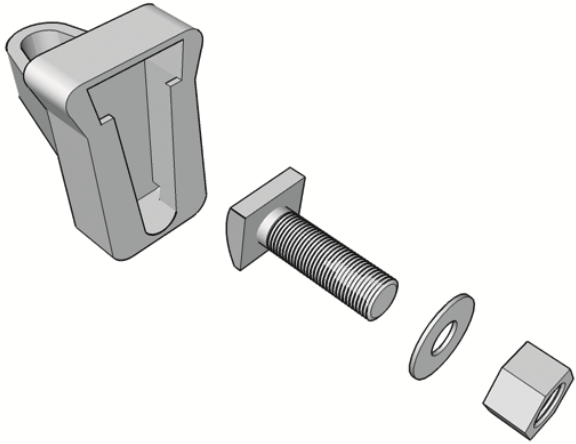
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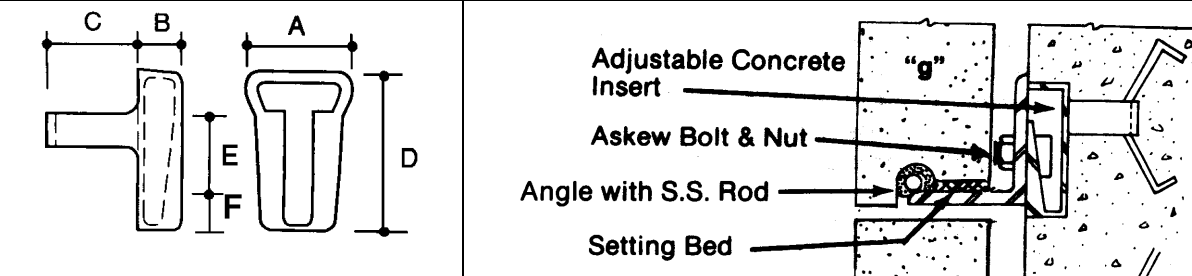
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#425 Shelf Angle Wedge Inserts

#427 Askew Head Bolts



Standard Sizes:
Inserts: 3/4", and 3/4" Long.
 Available in Plain Malleable Iron or Hotdip Galvanized After Fabrication.
Bolts: 3/4" x 1-1/2", 2", 2-1/2", 3", and 3-1/2".
 Available Hotdip Galvanized After Fabrication.
 Bolts come with a nut and washer.
 Bolts extend 1/4" less than above lengths when installed in inserts.



Bolt Dia	Cat No	A	B	C	D	E
3/4"	425-6H	2-5/16"	1-3/16"	2-1/2"	3-7/8"	1-3/4"
3/4" Long	425-6L	2-1/4"	1-1/4"	2-3/8"	5-1/2"	3"

TEST DATA TEST 1

Method of Test: Two inserts of each kind were cast in concrete blocks intended to be of 3,000 psi compressive strength. Companion 6" x 12" cylinders tested at the time the inserts were tested showed an actual compressive strength of 3,010 and 3,280 psi. The inserts were cast flush with the 16" x 16" surface of blocks having a thickness of 10". A short length of 1/2" reinforcing bar was placed thru the insert loop in the concrete. Blocks were allowed to cure under room conditions for 28 days. Tests were made loading the bolts in two different directions, directly outward (perpendicular to the surface in which the inserts were cast Pullout), and also downward (parallel to the same surface Shear).

PULLOUT TEST: Bolts were loaded in a direction perpendicular to the surface with the bolts at the midpoint of the slots in the inserts.

Insert	Max Load Lbs.	Failure
3/4"	9,830 lbs	Concrete broke around insert body and cracked at reinforcing steel bar. Insert did not break.
3/4 Long	12,860 lbs	Lips along slot of insert broke. Concrete broke alongside of body. Insert did not pull out of concrete.

SHEAR TEST: The tests pulling in a direction parallel to the surface of the concrete were made with a heavy angle block bolted at the mid point of the slot of the insert. The load was applied 2" out from the surface of the concrete. This would place some tension on the bolt, but would primarily tend to force the bolt to slip downward in the slot. The following Results were obtained:

Insert	Max Load Lbs	Failure
3/4"	7,600 lbs 10,500 lbs 10,960 lbs	Bolt slipped in slot 1/16" Bolt slipped in slot 3/16" Bolt slipped in slot 3/8". No failure in insert or in concrete, but bolt was bending slightly.
3/4" Long	5,660 lbs 7,140 lbs 7,840 lbs 19,150 lbs	Bolt slipped in slot 1/16" Bolt slipped in slot 3/16" Bolt slipped in slot 3/8". No failure in insert or in concrete, but bolt was bending slightly. Maximum Load. Bolt had slipped to bottom of slot and head sheared

TEST 2

Shear Test: METHOD OF TEST: ASTM E 488-76 Shear Strength of Anchor in Concrete. Parallel to Concrete Face from top of Anchor.

Insert Size	1	2	3	Average
$\frac{3}{4}$ "	7,040	7,580	7,230	2,230
$\frac{3}{4}$ " Long	9,050	8,550	8,580	8,727

Concrete Fractured in all specimens, but insert did not fail. Compressive strength of concrete used at 28 days was 5,860 psi.

Test 3

Pullout Test: METHOD OF TEST: ASTM E 488-76 Test for Strength of Anchors in Concrete.

Insert Size	1	2	3	Average
$\frac{3}{4}$ "	5,400b	5,800b	5,700a	5,633 lbs
$\frac{3}{4}$ " Long	6,900c	8,300c	7,100c	7,433 lbs

a: Snapped Hood - Cracked Insert Slot

b: Pulled Out - Insert Intact

c: Broke Concrete - Insert Intact. Concrete Strength 6,040 psi

Test 4 – $\frac{3}{4}$ " Long Insert Only

Concrete was poured into molds measuring 11-1/2" x 20" x 20". One insert was imbedded in the center of each mold. The inserts were malleable iron to the ASTM A-47 Grade 32510 specifications. No additional reinforcement, such as hairpins or rebar, were used in the concrete or inserts. The concrete used was 5,000 psi high early mix with the following proportions:

Cement	830 lbs	Sand 1,168 lbs SSD
Stone 1/2"	1,802 lbs SSD	Water 2,75 lbs
Daracem 100	66 ounces	

Pullout tests were performed 6 days later when the concrete had reached a compressive strength of 4,758 psi as recorded from laboratory testing of 6" x 12" cylinders.

A Pair of I-Beams were used to span the concrete molds with a steel channel acting as a bridge. The channel held a 30 ton hydraulic jack powered by a manual pump. A hardened 3/4-10 NC threaded rod ran through the jack and bridge threading into the nut in the insert. Pressure readings were obtained using a certified calibrated gauge connected to the pump. The inserts were pulled to failure: **Specimen 1 11,030 lbs**

Specimen 2 10,140 lbs

Malleable Iron Specifications: ASTM A47-B4 Ferritic Malleable Iron Castings

Class/Grade 32510 Min Tensile Strength - PSI 50,000

Min. Yield Strength - psi 32,500 Elongation in tension 10%

Microstructure is Temper carbon and ferrite

For additional information on Specifications of Shelf Angle Inserts refer to the following:

NCMA TEK 93 - National Concrete Masonry Institute - Curtain and Panel walls of Concrete Masonry. 1977

BIA TECH NOTE 28B - Brick Institute of America - Brick Veneer Panel and Curtain Walls. February 1980

ANSI B18.2.1 1965 revised 1970 - Askew Head Bolts - American National Standards Institute.