EMI Construction Products
Anchor Bolt Specification

This letter is to certify that the anchor bolts supplied by EMI Construction Products will meet the minimum physical requirements of ASTM A-307 Grade C.

All hot dipped galvanized anchor bolts are plated according to ASTM A-153 specifications.

11-24-2004

526 E 84TH ST
HOLLAND MICHIGAN 49423
TOLL FREE: 1 800-603 9965
PHONE: 616 392 7218
FAX: 616 392 7464

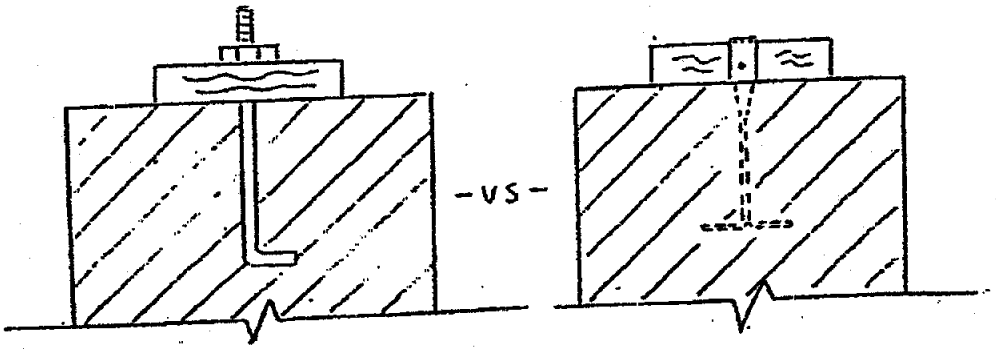
Progressive Engineering Inc.
Goshen Indiana

Edmar Mfg.
Anchor Bolt Comparison

Page 1 of 3
Job No. 2000-1177
By LCO Date 05-19-2000
revised 06-02-2000
revised 10-03-2001
REVISED 10-18-2001 jw

Compare the design values values for the 1/2" dia. A307 condition versus the EMI test results from PEI report 2000-542 and 2000-569

½"ø A307 — EMI 14" and EMI 22"



Tension	230 lbs	747 lbs
Perpendicular Shear	669 lbs	1024 lbs
Ma. O.C. Spacing	6'-0" ***	6'-0" ****

Tension	230 lbs	727 lbs
Perpendicular Shear	669 lbs	1020 lbs
Ma. O.C. Spacing	6'-0" ***	6'-0" ****

STATE OF MICHIGAN
JEFFREY R. WALTON, JR
ENGINEER
No. 43799
LICENSED PROFESSIONAL ENGINEER

notes:
* *Per design values in report derived from 1997NDS.*
** *From test values in PEI report(00-542 and 00-569 The test values have been reduced by a safety factor of 2.5 per BOCA 1710.3.1.*
*** *Determined by the ratio of the allowable perpendicular shear (The maximum O.C. spacing is the 6'-0" code standard multiplied by the ratio of either the tension, or the perpendicular shear value for the 1/2" dia. A307 and the EMI anchors).*
**** *Code standard.*

PI-1588

Determine Approximate Normal Force of Sill Against Footing

$F_{c\perp 0.02} = 0.73\ F_{c\perp}$ (97 NDS Eq 4.2-6)

$F_{c\perp 0.02} = 0.73\ (425\ psi)$

$F_{c\perp 0.02} = 310\ psi$

$N = F_{c\perp 0.02}\ (C_b)\ A_{nut} = 310\ psi\ (1.44)\ (0.375\ in^2) = 168\ lb$

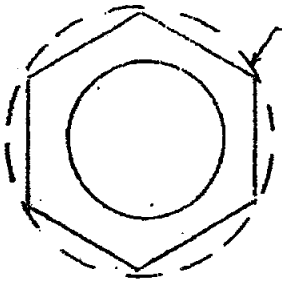
The calculated force results in a deformation of the sill of 0.02 inches approximated. This is assumed to be the approximate normal force between the sill and footing.

$f = \mu N = 0.6\ (168\ lb) = 101\ lb$

$P_{tot} = P + f = 558\ lb + 101\ lb = 669\ lb$

Fastener Specification: (Per Machinery Handbook, 19th Edition)

½" Ø Nut:



0.853 Ave Ø

$A = \frac{\pi}{4}(D^2 - d^2)$

$A = \frac{\pi}{4}[(0.853\ in)^2 - (0.5\ in)^2]$

$A = 0.375\ in^2$

Material Specifications: (Per 1997 NDS Values)

Spruce Pine Fir Stud Grade (Wood grade used in test)

	2X4	2X6
$F_{c\perp}$	425 psi	425psi
F_c	7975psi	725 psi
F_t	385 psi.	350 psi
E	1.2×10^6 psi	1.2×10^6 psi

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Jeffrey R. Walton Jr.

Methodology

By observation, the tension control value is the bolt head bearing on the 2x sill plate. Calculate that value and compare to tested tension value of strap.

For shear comparison, use bearing of bolt on 2x sill plus friction to the tested values.

For comparison purposes, identical wood species (Stud Grade SPF) was used in both the bolt and tie down conditions

Tension

Area:

½" Ø Nut Head = Ø.84" min / Ø.866" max

Ave. Dia. = $\frac{Ø.84" + Ø.866"}{2} = Ø.853"$ $A_{nut} = \pi \frac{(0.853")^2}{4} = 0.571\ in^2$

$C_b = \frac{\ell_b + Ø.375}{\ell_b} = \frac{Ø.853" + Ø.375"}{Ø.853"} = 1.44$ (NDS Eq. 2.3-1)

$T = F_{c\perp} (C_b) A_{nut} = 425\ psi\ (1.44)(Ø.375\ in^2) = 230\ lb$

Shear

Area:

$A = Ø.5"(1.5") = Ø.75\ in^2$

Table 2.3.10 - for $\ell_b = 0.5$, $C_b = 1.75$

$P = F_{c\perp} (C_b) A = 425 psi\ (1.75)(Ø.75 in^2) = 558\ lb$

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