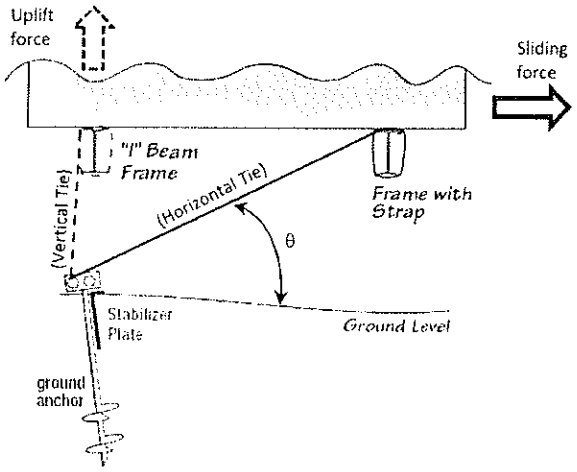
Project No.	M17029		
Project Name	Classroom Building		
Subject	27.33x70 Gable, Lees Summit, MO		
Engineer	Yurianto Yurianto, PE	Date	6/21/2017
Reviewer		Date	

FRAME TIE TO ANCHOR

[(Ref): Manuf. Housing Anchor Installation Info. by Tie Down Engineering, July 2012]



1. Anchoring Allowable Working Load Limit (WLL)

Tie Anchor WLL	T_{WLL} =	3150	lbs		[Ref (above), pg. 4]
Horizontal Tie Angle	θ =	45.0	degrees	.	
Horizontal Resistant, T_{WLL} Cos θ	H_{WLL} =	2227	lbs		
Minimum tie anchor spacing	s =	6.00	ft		

2. Building Forces

A. Transverse direction				
Total Sliding force	$H_{A\ trans}$ =	8794	lbs	
Total Uplift force	$V_{A\ trans}$ =	0	lbs	(No Uplift)
B. Longitudinal direction				
Total Sliding force	$H_{A\ longt}$ =	3422.72	lbs	
Total Uplift force	$V_{A\ longt}$ =	0	lbs	(No Uplift)

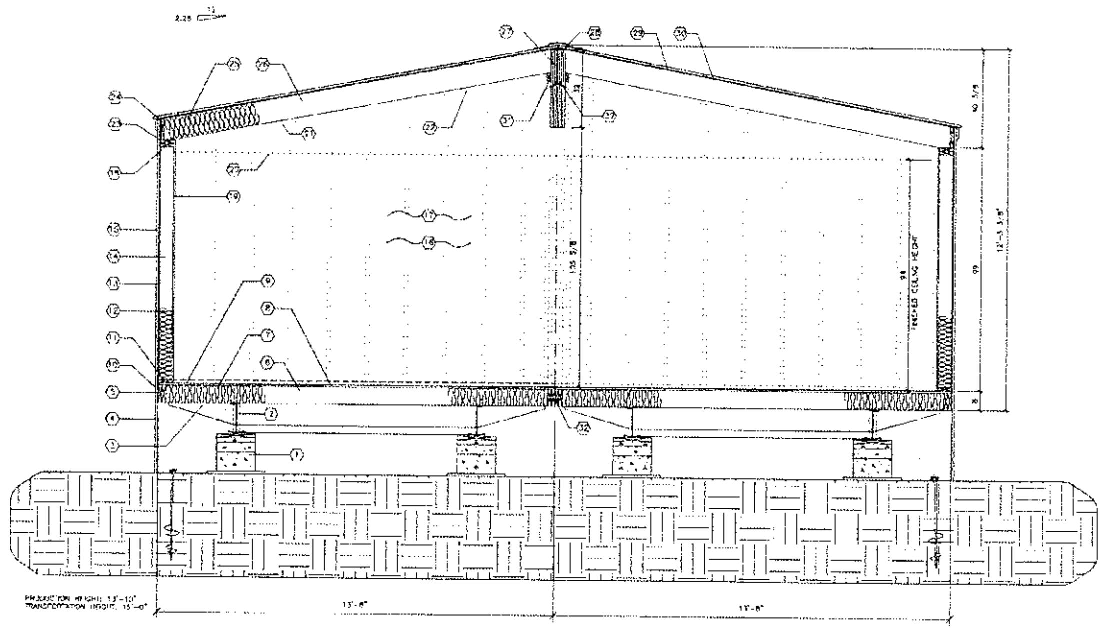
3. Building Frame Tie Down

A. Transverse direction	B =	70.00	ft			
1) Number of horizontal ties	$N_{horz\ tie}$ =	4		B / N =	17.50	ft o.c.
Sliding force, $H_{A\ trans}$ / $N_{horz\ tie}$	$H_{1\ trans}$ =	2198.38	lbs / tie			
Horz. tie capacity ratio	$H_{1\ trans}$ / H_{WLL} =	**0.987**	**< 1.00. O.K.**			
2) Number of vertical ties	$N_{vert\ tie}$ =	0	No vertical tie is required!			
Uplift force, $V_{A\ trans}$ / $N_{vert\ tie}$	$V_{1\ trans}$ =	0	lbs / tie			
Vert. tie capacity ratio	$V_{1\ trans}$ / T_{WLL} =	**0.000**	**< 1.00. O.K.**			
B. Longitudinal direction	L =	27.33	ft			
1) Number of horizontal ties	$N_{horz\ tie}$ =	2		L / N =	13.67	ft o.c.
Sliding force, $H_{A\ trans}$ / $N_{horz\ tie}$	$H_{1\ longt}$ =	1711.36	lbs / tie			
Horz. tie capacity ratio	$H_{1\ longt}$ / H_{WLL} =	**0.768**	**< 1.00. O.K.**			
2) Number of vertical ties	$N_{vert\ tie}$ =	0	No vertical tie is required!			
Uplift force, $V_{A\ trans}$ / $N_{vert\ tie}$	$V_{1\ longt}$ =	0	lbs / tie			
Vert. tie capacity ratio	$V_{1\ longt}$ / T_{WLL} =	**0.000**	**< 1.00. O.K.**			

1. STANDARD PAD ON GRADE, AND BASE WITH CMU BLOCK
2. M12x11.8 FRAME RAILS CONFORMING TO ASTM A529-50
3. WOVEN POLYETHELYENE BOTTOM BOARD
4. SKIRTING INSTALLED ON SITE AFTER UNIT ASSEMBLY
5. 2-2x8 #3 SYP MIN. FLOOR RIM JOISTS
6. 2x8 # 2 SYP MIN. FLOOR JOISTS AT 16"o.c.
7. R-22 INSULATION IN FLOOR CAVITY
8. 3/4" T&G ADVANTECH DECKING
9. VINYL COMPOSITION FLOOR TILE
10. SIDEWALL STRAPPED TO FLOOR WITH 1 1/2" x 20ga GALV. STRAPS AT 48"o.c. FASTENED WITH 6-15ga STAPLES EACH END OF EACH STRAP
11. 2x6 #3 SYP MIN BOTTOM PLATE
12. R-21 INSULATION IN EXTERIOR WALLS
13. 7/16" RATED SHEATHING OSB UNDER A WEATHER-RESISTIVE BARRIER CONFORMING TO 1404.2 OF THE 2009 IBC, FASTENED WITH 8d NAILS AT 6"o.c. AT EDGES AND 12"o.c. IN THE FIELD
14. 2x6 #2 SYP MIN. STUDS AT 16"o.c.
15. STEEL SIDING PANELS CONFORMING TO TABLE 1405.2 OF THE 2009 IBC
16. R-11 INSULATION IN INTERIOR WALLS
17. 2x4 #2 SYP MIN. AT 16"o.c. INTERIOR WALLS
18. 2-2x6 #2 SYP MIN. EXTERIOR WALL TOP PLATES
19. VINYL CLAD 5/8" TYPE 'X' GYPSUM WALLBOARD
20. SUSPENDED GRID ACOUSTIC CEILING
21. POLY NETTING ON BOTTOM OF RAFTERS
22. 2-2x4 #3 SYP MIN. INTERIOR WALL TOP PLATES
23. ROOF STRAPPED TO SIDEWALL WITH 1 1/2" x 20ga GALV. STRAPS AT 48"o.c. FASTENED WITH 6-14ga STAPLES EACH END OF EACH STRAP
24. 2x10 #2 SYP MIN. ROOF RIM JOIST
25. R-30 INSULATION IN RAFTER CAVITY
26. 2x10 #2 SYP MIN RAFTERS AT 24"o.c.
27. FOUR LAYER SOLID PLYWOOD RIDGE BEAM. EACH LAYER OF 3/4", 5-LAYER, 5-PLY GROUP 1 SPECIES PLYWOOD. BEAM IS CONSTRUCTED PER THE APA "DESIGN AND FABRICATION OF ALL-PLYWOOD BEAMS" SUPPLEMENT 5
28. RAFTERS STRAPPED TO RIDGE BEAM WITH 1 1/2" x 20ga STRAP FASTENED WITH 5-16ga STAPLES EACH END OF EACH STRAP
29. 7/16" SHEATHING RATED OSB WITH H-CLIPS, FASTENED W/ 8d NAILS AT 4"o.c. EDGES AND 8"o.c. FIELD, OVER 15# FELT PAPER
30. 29 Ga. GALVALUME ROOFING PANELS CONFORMING TO ASTM A 792 AZ50 PER TABLES 1507.4.3(1)
31. 2x4 LEDGER FASTENED TO RIDGE BEAM W/3-16d NAILS EACH RAFTER LOCATION OR SIMPSON HU-26 JOIST HANGER FASTENED WITH 4-1 1/2" x 8d NAILS TO BEAM AND 2-1 1/2" x 8d NAILS TO RAFTER
32. UNITS FASTENED TOGETHER AT FLOOR AND RIDGE BEAM WITH 5/8" x 6" LAG BOLTS AT 32"o.c. STAGGERED

NOTES:

1. CRAWL SPACE TO BE VENTILATED IN ACCORDANCE WITH 2009 INTERNATIONAL BUILDING CODE SECT. 1203.3.2. INSTALL SO AS TO PROVIDE CROSS-VENTILATION OF CRAWL SPACE. INSTALL MINIMUM 18" x 24" ACCESS PANEL IN SKIRTING.
2. BLOCK HEIGHTS SHOWN ARE TYPICAL. ANY BLOCK STACKS, OTHER THAN AT MATELINES, REQUIRING MORE THAN TRIPLE 8" x 8" x 16" BLOCKS MUST BE DOUBLED. THIS DOES NOT CHANGE ANCHORING LOCATIONS OR QUANTITIES.
3. FRONT CROSS-MEMBER IS FULL DEPTH I-BEAM (SAME AS CHASSIS). HITCH / COUPLER IS 2 5/16" OR EQUIVALENT 30,000# MIN. RATED. TIRES ARE 8 x 14.5, 8 PLY OR BETTER, 2805# MIN LOAD RATING. FRAME PAINT IS EMULSION BASE PAINT. OUTRIGGERS AND U CHANNEL CROSS MEMBERS ARE 14ga MINIMUM. OUTRIGGER SIZE IS 5" x 28"
4. METAL ROOF AND WALL PANELS TO BE FASTENED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE APPROPRIATE WIND SPEED FOR THE BUILDING INSTALLATION LOCATION.



STATE OF MISSOURI
YURIANTO YURIANTO
NUMBER PE-2016009131
PROFESSIONAL ENGINEER

06/23/17

MISSOURI PUBLIC SERVICE COMMISSION
APPROVED
07/24/2017
MANUFACTURED HOUSING

PFS APPROVED
DATE 6/28/17
PFS CORPORATION
Cottage Grove WI

1 CROSS SECTION
scale: 1/4" = 1'-0"

No.	DESCRIPTION	BY	DATE

DATE: 06/16/2017
SCALE: 1/4" = 1'-0"
PLOT SCALE: 1:1
DRAWN BY: SGD
CHECKED BY:

CLASSROOM BUILDING
LEE'S SUMMIT, MISSOURI
CROSS SECTION
FILE: 2870 Lees Summit ISD
SERIAL #: 1/30-32

SHEET No.
A-4

PALOMAR
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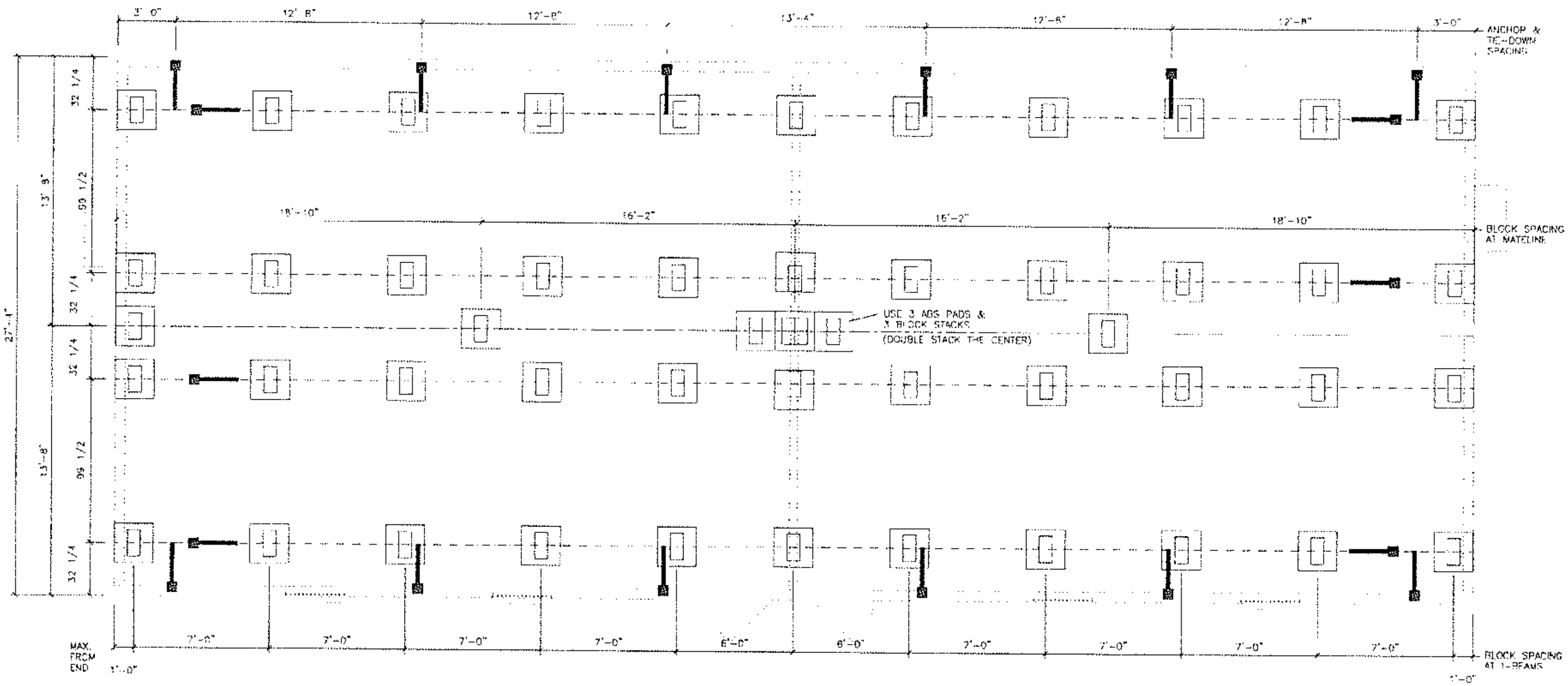
MODULAR STRUCTURAL CONSULTANTS LLC
9720 COIT RD. STE. 220-150
PLANO, TEXAS 75025-5833
PHONE: 972-896-5373
TX. REGISTRATION # F-15892



MISSOURI
PUBLIC SERVICE
COMMISSION
APPROVED
07/24/2017
MANUFACTURED
HOUSING

PFS **APPROVED**
DATE 6/28/17
PFS CORPORATION
Cottage Grove, WI

NOTES

1. BLOCK SPACING MAY VARY DUE TO AXLE HANGERS OR OTHER STRUCTURAL OBSTRUCTIONS.
2. BASE PADS ARE TO BE 24" x 24" ABS PADS. 16" x 18" ABS BASE PADS MAY BE USED AT EXTERIOR DOOR LOCATIONS FOR DOOR ADJUSTMENT WHERE NECESSARY.
3. SINGLE BLOCK STACKS ARE LIMITED TO THREE BLOCKS HIGH. ANY BLOCK STACK REQUIRING MORE THAN THREE 8" x 8" x 16" BLOCKS MUST BE DOUBLED AND CROSS-STACKED. THIS DOES NOT CHANGE ANCHORING LOCATIONS OR QUANTITIES.
4. ASSUMED SOIL BEARING CAPACITY IS 2000 PSF. SITE SPECIFIC SOIL CONDITIONS ARE TO BE VERIFIED BY OWNER, OR OWNER'S AGENT.

STATE OF MISSOURI
YURIANTO YURIANTO
NUMBER PE-2016009131
PROFESSIONAL ENGINEER
06/23/17

(1) BLOCKING & TIE-DOWN LAYOUT
Scale: 1/8" = 1'-0"

MODULAR STRUCTURAL CONSULTANTS LLC
5720 COIT RD. STE. 220-150
PLANO, TEXAS 75025-5833
PHONE: 972-858-5373
TX. REGISTRATION # F-13692

PALOMAR
MODULAR BUILDINGS LLC
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300 N. I-35E
DESOTO, TEXAS 75115
PH: 469-771-0727

NO.	DESCRIPTION	BY	DATE

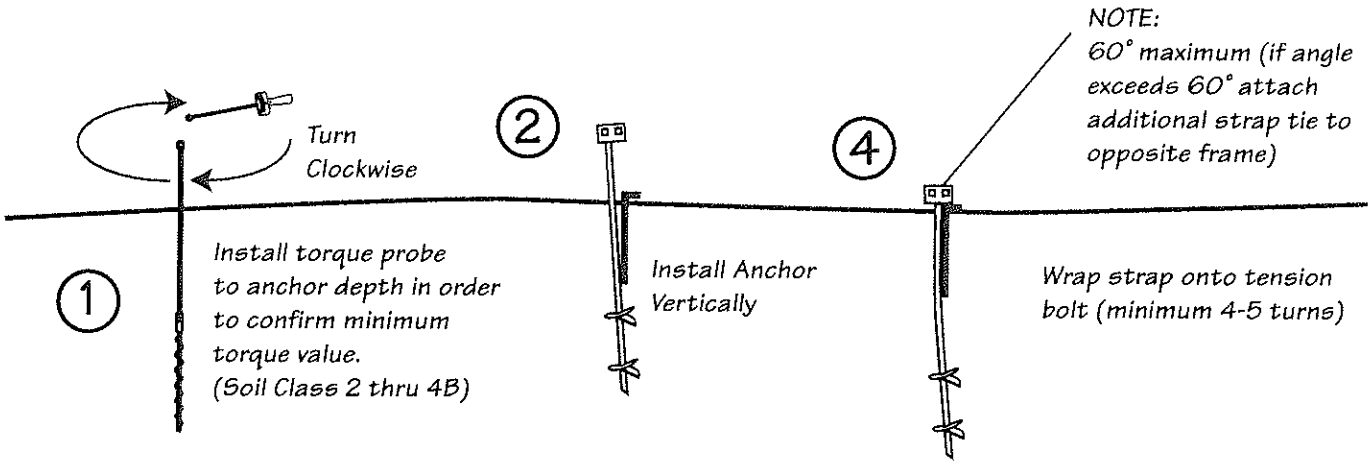
DATE: 06/16/2017
SCALE: 3/16" = 1'-0"
PLOT SCALE: 1:1
DRAWN BY: SGD
CHECKED BY:

CLASSROOM BUILDING
LEE'S SUMMIT, MISSOURI
BLOCKING & TIE-DOWN LAYOUT
FILE: 2870 Lees Summit ISD
SERIAL #: 1730-32

SHEET No.
S-1

Ground Anchor Installation Instructions

1. Confirm soil classification using standard torque probe at required depth below ground surface, make certain readings meet or exceed required soil class for anchor being installed.
2. Install anchor to its approximate half depth. Install stabilizer plate vertically to its full depth before installing ground anchor to its fullest depth.
3. Pull strap past anchor head and cut strap so that there is 15" of strap.
4. Insert strap into anchor bolt flush with opposite side of bolt. Wrap strap onto tension bolt a minimum of 4-5 turns continuing until anchor shaft is pulled snug against stabilizer plate before tightening hex nut onto tension bolt.



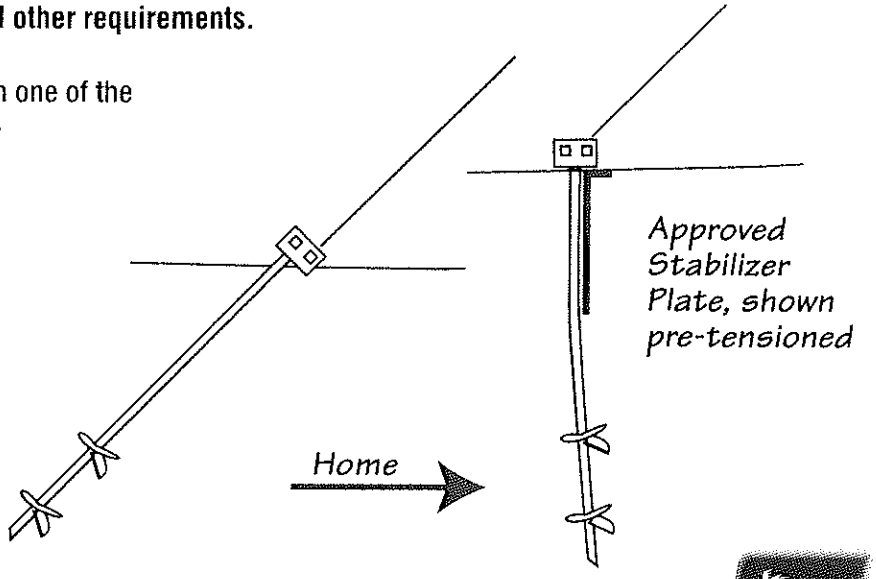
WARNING: Do not use torque probe or install anchors until you are certain there are no power lines, phone lines, cable lines, etc. beneath surface or installation area.

WARNING: Anchors will not provide adequate wind storm protection unless installed as per installation instructions.

NOTE: Local codes, state laws, and federal regulation may vary. Installer is responsible for compliance with all ordinances, codes, laws and other requirements.

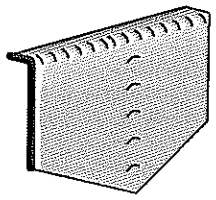
Frame tie anchor must be stabilized in one of the following ways in order to prevent the anchor from slicing through the soil. Vertical (uplift) anchorage does not require stabilizer plates.

Anchors must be installed to their full depth, making certain the ground anchor tension head is flush with ground surface and ground anchor shaft is pulled snug against the stabilizer plate.

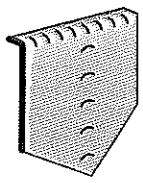


Anchor Stabilizers

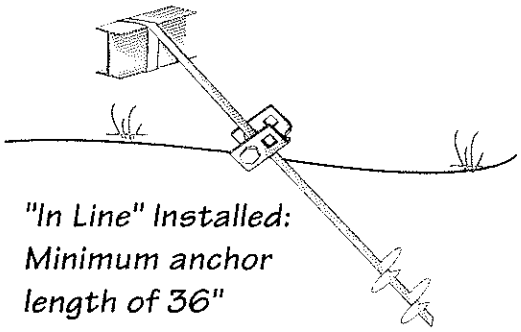
In order to prevent lateral movement of manufactured homes subjected to high wind loads and to comply with HUD's Wind Zone I, II, & III requirements, all lateral frame ties must be attached to a properly stabilized ground anchor. (Two approved methods illustrated below.)

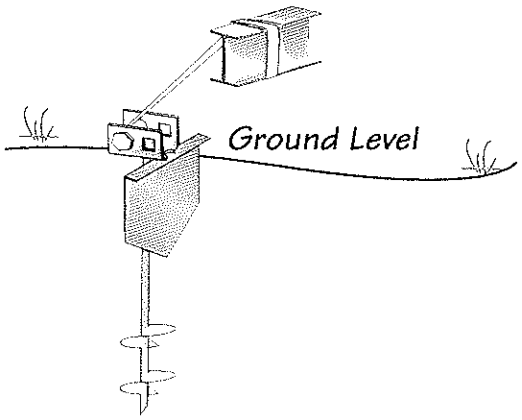


Class 4B Stabilizer Plate
17-1/2" x 13-1/2"
(Part #59286)



12" wide Stabilizer Plate
(Part #59292 &#59292G)

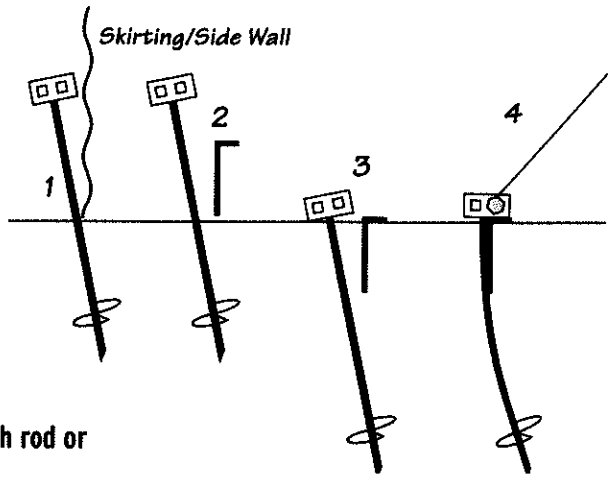




Stabilizer Plate Installation

1. Refer to any and all local, state and federal regulations.
2. Use the Soil Test Probe at the anchor location in order to match soil class with the anchor/stabilizer.
3. Partially install anchor to allow 14" to 16" remaining above ground level.
4. Utilizing oversized hammer, vertically install stabilizer plate,nesting anchor rod in between formed channels on outside of stabilizer plate (between anchor and frame).
5. Fully install anchor so that head is at the surface of the soil (1" tolerance, if necessary) and pretension anchor until touching stabilizer plate.

Frame Tie Anchor Installation



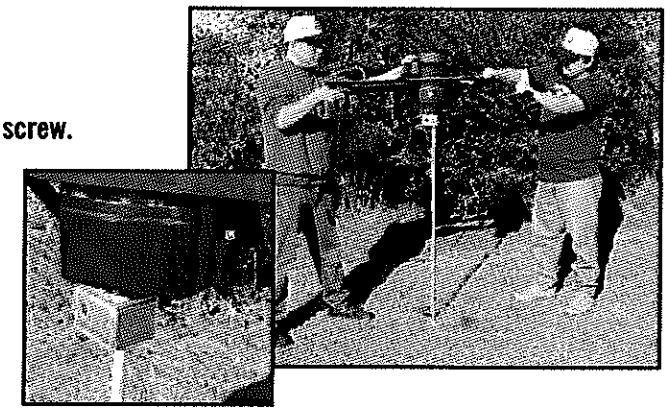
1. Position anchor at a slight back angle (10°) so that when fully installed, the anchor head will be inside any skirting or side wall.
2. Install anchor to +/- 2/3 depth, then install stabilizer vertically, within 3"- 4" of anchor shaft, parallel to wall of home.
3. Fully drive anchor, attach strap (see proper strap tensioning), and pretension strap to pull anchor rod against the stabilizer plate.

Manual Anchor Installation

1. Dig holes to a depth of 2/3 of the anchor length. Install anchor with rod or length of pipe for leverage.
2. Replace earth in hole after anchor/plate is installed at full depth. Pack dirt with a tamping rod every 6 inches of fill.
3. Testing may be required in loose soil conditions to check that anchor has proper holding power.

IMPORTANT!
Anchor must be installed to full depth. Anchor head must be at ground level or at the top of the stabilizer plate which is fully installed to ground level.

Electric Drive Machine Installation



Operating Instructions:

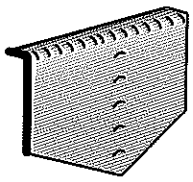
1. Attach adapter head to shaft of the EDM motor, tighten set screw.
2. Place extension handle in the end of the EDM if needed.
3. Place anchor head into adapter, line up anchor shaft with EDM shaft, for easier installation.
4. Flip forward/reverse switch to forward.
5. Place anchor tip in location where anchor is to be buried. Hold on/off switch to install.

Electric Drive Machine Cautions and Warnings:

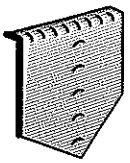
- Before installation of any ground anchor, determine that the ground anchors to be installed will not be near any underground electrical cables, phone lines, water lines, sewer pipes, or gas lines. Failure to do so may result in serious injury or death
- The EDM is designed for operation by two people.
- Do not allow the EDM to be wedged against the home or other solid objects, when operating the EDM.
- Electrical cord must be a minimum of 12-2 wire size w/ground up to 50'. Longer cords should be 10-2 wire size with ground.
- Never operate the EDM in wet or rainy conditions.
- Frayed or patched electrical cords should never be used with the EDM.
- Care should be taken to keep electrical cords away from anchors.
- Never operate drive machine without the GFI power cord. Damage to motor and injury to operator can result from by passing the GFI.
- The GFI will shut off power when a ground fault is detected. The GFI will also shut off power when it detects low voltage improper amps required to drive the motor. Many times the problem will be the use of an extension cord that is too long or is too light in gauge.

Anchor Stabilizers

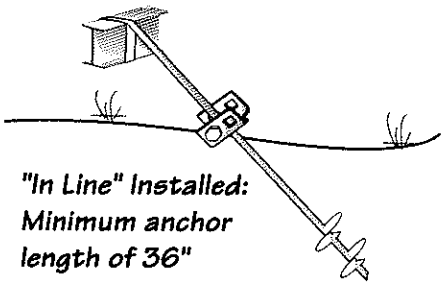
In order to prevent lateral movement of manufactured homes subjected to high wind loads and to comply with HUD's Wind Zone I, II, & III requirements, all lateral frame ties must be attached to a properly stabilized ground anchor. (Two approved methods illustrated below.)



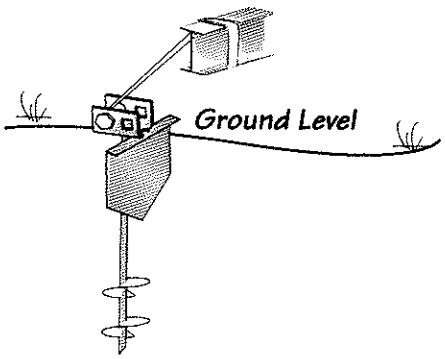
Class 4B Stabilizer Plate 17-1/2" x 13-1/2" (Part #59286)



12" wide Stabilizer Plate (Part #59292 &#59292G)



"In Line" Installed: Minimum anchor length of 36"

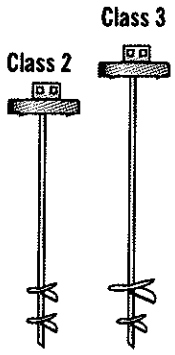


Stabilizer Plate Installation

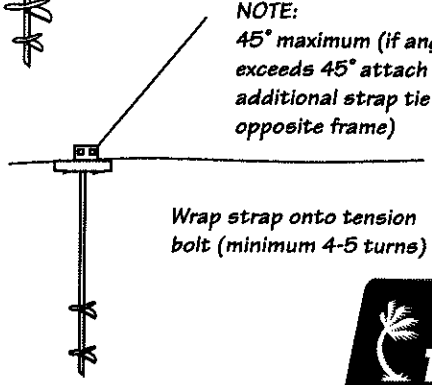
1. **Refer to any and all local, state and federal regulations.**
2. **Use the Soil Test Probe at the anchor location in order to match soil class with the anchor/stabilizer (see page 16).**
3. **Partially install anchor to allow 14" to 16" remaining above ground level.**
4. **Utilizing oversized hammer, vertically install stabilizer plate, nesting anchor rod in between formed channels on outside of stabilizer plate (between anchor and frame).**
5. **Fully install anchor so that head is at the surface of the soil (1" tolerance, if necessary) and pretension anchor until touching stabilizer plate.**

Deep Set Anchor/Stabilizer Instructions

1. **Confirm soil classification using standard torque probe at proper depth below ground surface, make certain readings meet or exceed torque readings for Class 2 and 3 soils at the depths of 12" & 36".**
2. **Clear loose vegetation where anchor will be installed. Install anchor vertically to its' full depth. Stabilizer plate at the top of anchor must be fully embedded into soil.**
3. **Pull strap past anchor head and cut strap so that there is 12" to 15" of strap to wrap onto anchor bolt insuring 4 to 5 wraps minimum.**
4. **Insert strap into anchor bolt flush with opposite side of bolt. Tighten bolt/strap until tight. Secure anchor bolt with nut.**

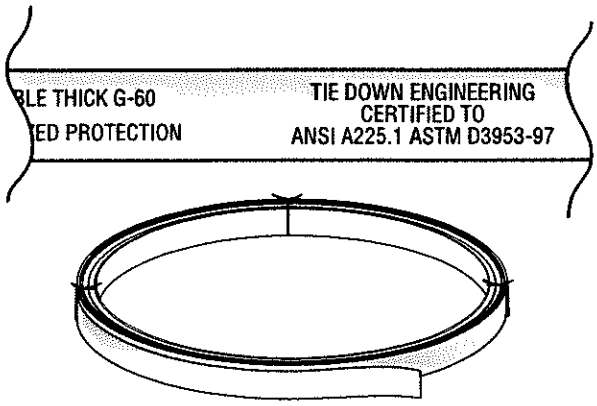


Deep Set Anchor/Stabilizer
30" Black Paint: #59091
30" Galvanized: #59091G
36" Black Paint: #59092
36" Galvanized: #59092G



Certified Galvanized Strapping*

The steel strapping by Tie Down Engineering for the manufactured housing industry has been tested to, and conforms to, the HUD Code as referenced in Part 3280 of the Manufactured Home Construction and Safety Standards and Part 3285 of the installation standards; Final Rule.



* Available with G60 or G120 galvanized coatings

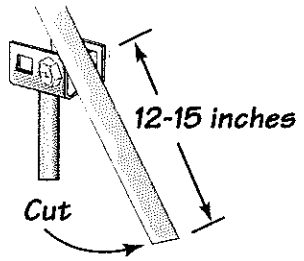
3280.306(f), 3285.402(b2) Anchoring Equipment – Load Resistance. Anchoring equipment shall be capable of resisting an allowable working load equal to or exceeding 3,150 pounds and shall be capable of withstanding a 50 percent overload (4,725 pounds total) without failure of either the anchoring equipment or the attachment point on the manufactured home.

3280.306(g), 3285.402(b2) Anchoring Equipment – Weatherization
Anchoring equipment exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coated, and in accordance with the following:

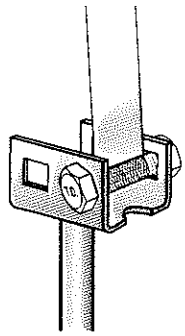
(1) Slit or cut edges of zinc-coated steel strapping do not need to be zinc coated.
(2) Type 1, Finish B, Grade 1 steel strapping, 1-1/4 inches wide and 0.035 inches in thickness, certified by a registered professional engineer or architect as conforming with ASTM Standard Specification D3953-97, Standard Specification for Strapping, Flat Steel, and Seals.

The above specification of a minimum coating of 0.30 ounces per square foot equates to a designation of "G30." Tie Down strapping exceeds this minimum requirement with a coating of 0.60 (G60) or 1.20 (G120) ounces as per above. Similarly, Tie Down strapping exceeds, in testing, the minimum load requirements of 3,150 pounds design (working) load and 4,725 pounds (ultimate) overload.

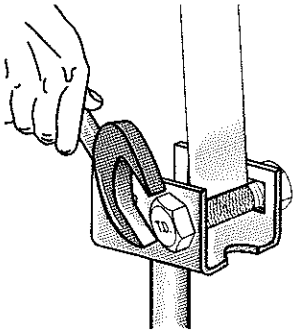
Proper Strap Tensioning



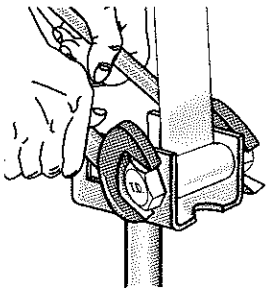
Step 1
Insert slotted bolt into anchor head, attach loosely. Pull strap past bolt head and cut strap so that 12-15 inches of strap are available to wrap onto the slotted bolt.



Step 2
Insert the strap end into the slot in bolt until flush with opposite side of bolt.



Step 3
Using 15/16" wrench or socket, turn the bolt, winding the strap so that a minimum of four to five complete turns are made, and the strap is adequately tensioned.

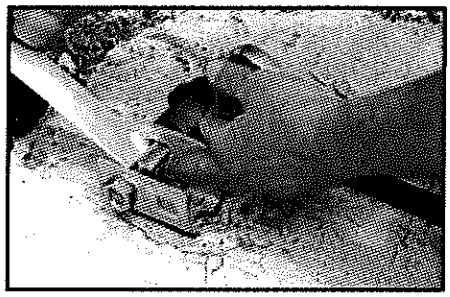


Step 4
Hold the bolt under tension while tightening the nut, drawing the head of the bolt into the recess. After the bolt is within the recess, continue to tighten the nut until securely fastened.

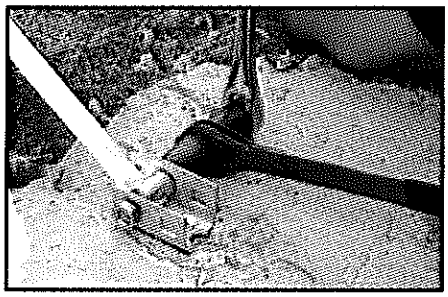
Tip: TIE DOWN'S SPEED WRENCH cuts time required to tension strap in half!

Strap Tensioning - Speed Wrench, Part #48900

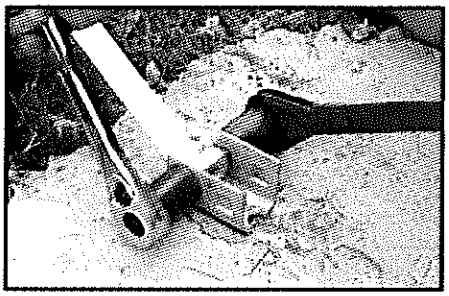
Tie Down's SPEED WRENCH simplifies anchor installation with a design that allows for one handed operation for installing slotted bolts and tensioning strap. The SPEED WRENCH has a 15/16" impact socket on one side and a 15/16" "nut" on the other. Combine this with your own ratchet and 15/16" socket and you have the fastest way to tighten slotted bolts!



Step 1
Place Speed Wrench over the bolt head. Insert the strap end into the slot in bolt until flush with opposite side of bolt.



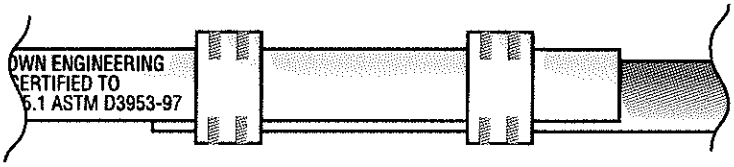
Step 2
Hold Speed Wrench in place, tighten bolt with socket wrench on outside of Speed Wrench (bolt head side).



Step 3
Move socket to the opposite (nut) side. Hold Speed Wrench in place. Use socket wrench to tighten nut.

Strap Splice

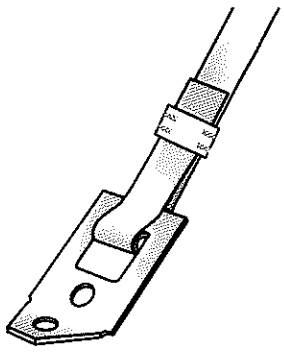
To lengthen strap in the field, a double crimp seal splice is required. Overlap strap approximately 12 inches and use two crimp seals evenly spaced, with 2 crimps per seal.



2 Seals - 2 Crimps Per Seal

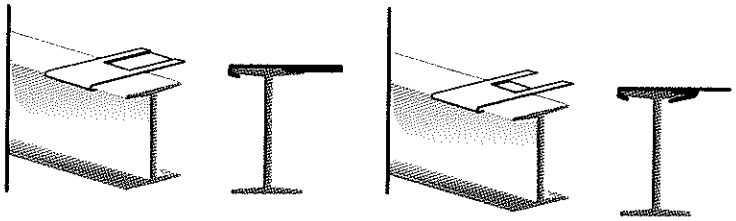
Strap Attachment

One crimp seal is used when strap is attached to a sidewall bracket or a strap connector. If the bracket does not have a radius edge, a radius clip (short "U" shaped piece of strap) must be placed between the strap and contact point to protect the strap from sharp edges. Verify state requirements for number of crimp seals required.

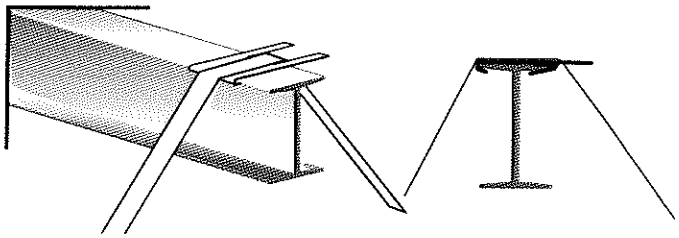


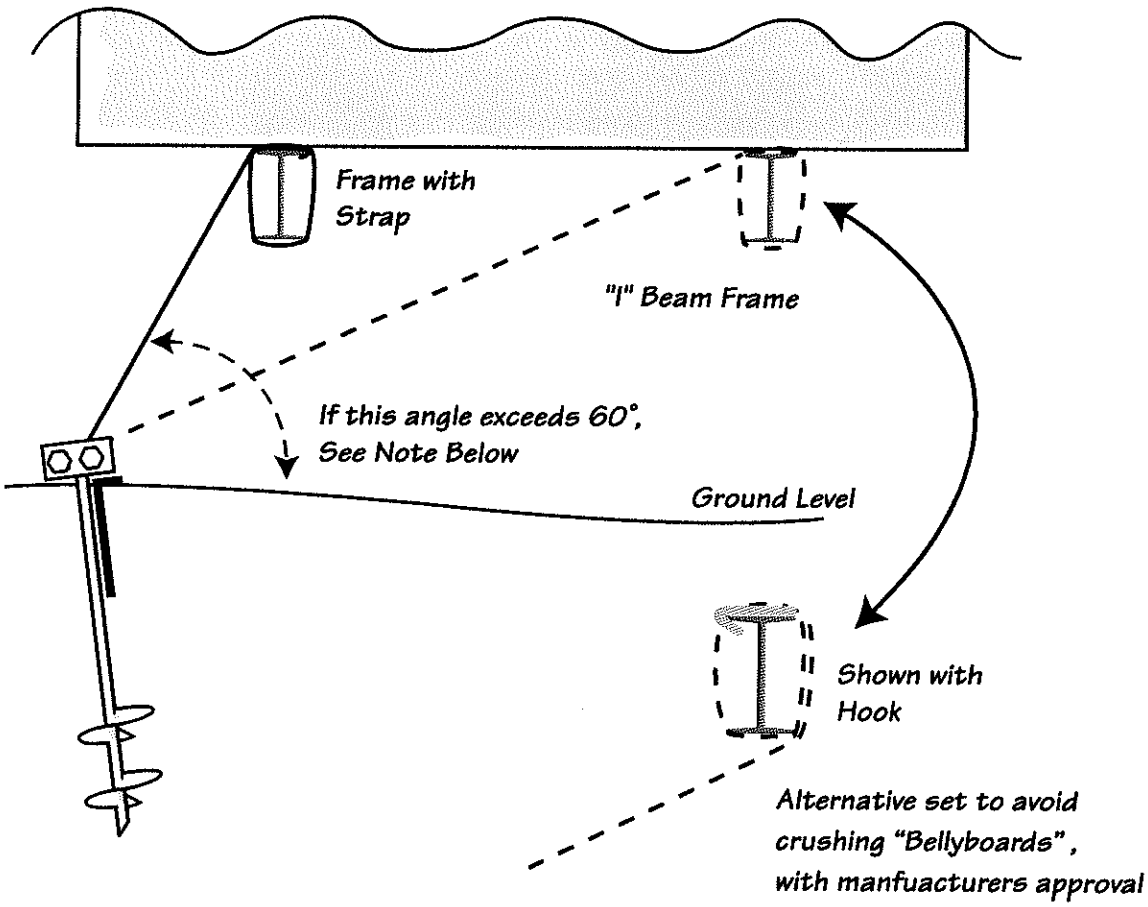
Strap Protectors

For protecting Vertical and Diagonal Strapping at sharp corners when wrapping the top and bottom of the beam.



Attach hook between strap and I-beam and fold perforated lip around the beam leaving 2 legs to guide the strap into position.





Frame Tie to Anchor

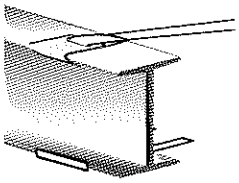
If this angle exceeds 60°, an additional frame tie must be attached to the opposite beam as indicated by the dotted line.

A Stabilizer Plate must be installed on all frame Ties. (or alternate method of stabilizing ground anchor.)

Select proper anchor for soil conditions using the Soil Test Probe, or other approved method of determining soil classification.

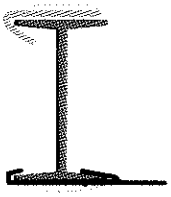
NOTE: Make sure you have strap protection against sharp edges for the applications on this page.

Frame Tie with Hook

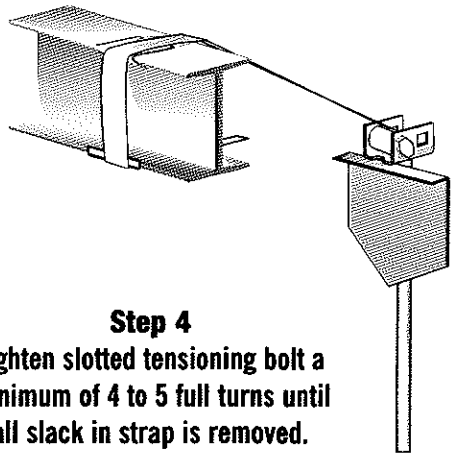


Step 1
Attach frame hook to top inboard location of "I" beam.

Step 2
Keeping in line with the hook, wrap galvanized strap completely around "I" beam.

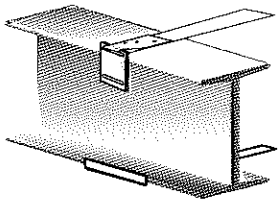


Step 3
Thread loose end of strap through slotted tensioning bolt attached to tension head of anchor. (Anchor must be properly installed into the ground before proceeding with step #4.)



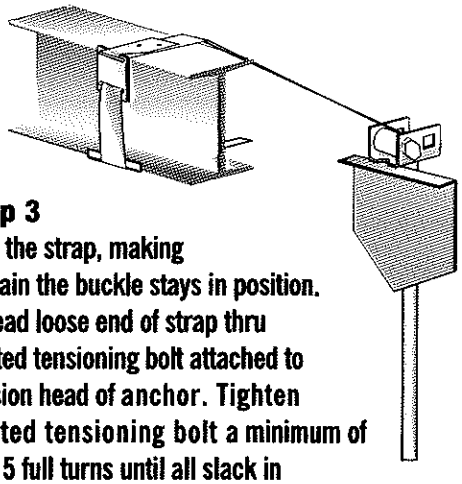
Step 4
Tighten slotted tensioning bolt a minimum of 4 to 5 full turns until all slack in strap is removed.

Frame Tie with Buckle



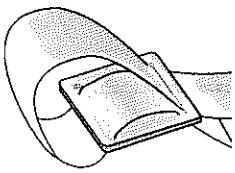
Step 1
Install strap by pushing the end between the inside of the frame "I" beam and the floor.

Step 2
Position the buckle at upper end of the "I" beam frame. Wrap the end of the strap around the "I" beam. Thread the end of the strap through the slot in the buckle as shown. Push the end of strap in-between "I" beam and floor.

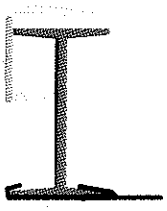


Step 3
Pull the strap, making certain the buckle stays in position. Thread loose end of strap thru slotted tensioning bolt attached to tension head of anchor. Tighten slotted tensioning bolt a minimum of 4 to 5 full turns until all slack in strap is removed.

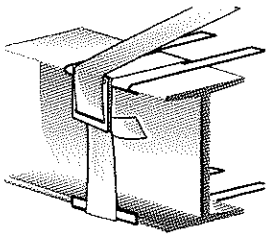
Strap Buckle - MBU



Step 1
Thread length of frame tie strap through strap buckle as shown.



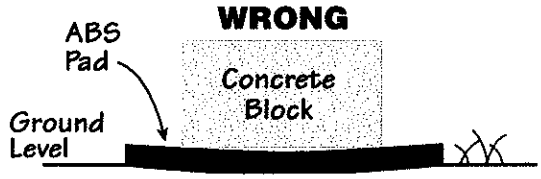
Step 3
Diagram shows strap in position around frame and through buckle. It is important to remove all slack from system.

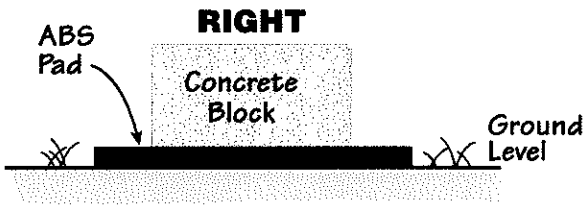


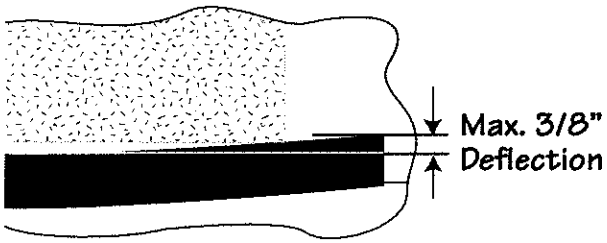
Step 2
Next, thread long end of strap between frame and floor of home. Bring strap through buckle as shown in diagram and fasten to anchor head.

Installation Instructions for ABS Pads

1. Pier spacing must be in accordance with the Manufacturers Installation Manual and/or State or local requirements.
2. Clear all vegetation and debris from area where pads are to be placed.
3. The ground under the pads must be leveled and evenly compacted or undisturbed soil.
4. Determine pad size by testing for the soil bearing capacity, if soil testing not available, use the 1000 PSF soil column of the instructions.
5. Place ABS pad with grid side up, smooth side down. Center blocks or pier on pad and complete Installation.







IMPORTANT
If pad deflects more than 3/8" when installed correctly with home's dead load applied, then the pier spacing is incorrect for soil conditions

General Notes:

1. Any configuration from the chart may be used to replace a concrete or wood base pad per 3282.312(A)(3).
2. The maximum load at any intermediate soil value may be interpolated between the next lower and next higher soil values given in the pad bearing capacity chart.
3. Pad sizes are shown in nominal dimensions and may vary slightly.
4. Maximum deflection 3/8", measured from the highest point to the lowest point of the top side of pad.
5. In areas susceptible to frost heave, the pad must be at the frost line or otherwise protected from the effects of frost. Refer to NCSBCS/ANSI A225.1 "Manufactured Home Installations" Homes set to Standard 24 CFR 3285 should not be susceptible to frost heave.

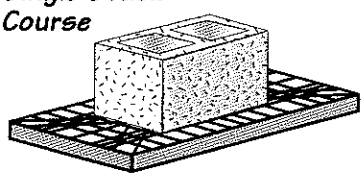
Pad Bearing Capacity

ABS Pad Size	Part#	1000 lbs. Soil	1500 lbs. Soil	2000 lbs. Soil	3000 lbs. Soil
16" x 18"- 2 Sq. Ft. 288 Sq. In.	59300	2,000 lbs.	3,000 lbs.	4,000 lbs.	6,000 lbs.
16" x 22.5" - 2.5 Sq. Ft. 360 Sq. In.	59301	2,500 lbs.	3,750 lbs.	5,000 lbs.	7,500 lbs.
17" x 25"- 3 Sq. Ft. 432 Sq. In.	59302	3,000 lbs.	4,500 lbs.	6,000 lbs.	N/A
24" x 24" - 4 Sq. Ft. 576 Sq. In.	59303	4,000 lbs.	6,000 lbs.	8,000 lbs.	N/A
Multi Pad Layout					
32" X 22.5" (See 1 below) 5 Sq. Ft. - 720 Sq. In.	3 X 59301	5,000 Lbs.	7,500 lbs.	10,000 Lbs.*	
34.4 X 25.2 (See 2 below) 6 Sq. Ft. - 864 Sq. In.	3 X 59302	6,000 Lbs.	9,000 lbs.	12,000 Lbs.*	

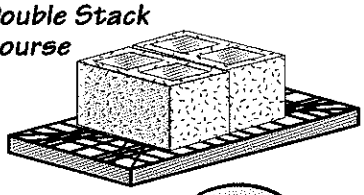
* Concrete Block rated @ 8000 lbs. Double block any higher loads.

1. The 32 X 22.5 Pyramid configuration uses 2 - 16 X 22.5 pads placed side by side with 1 – 16 X 22.5 pad on top in the opposite direction.
2. The 34.4 X 25.4 Pyramid configuration uses 2 – 17.2 X 25.2 placed side by side with 1 – 17.2 X 25.2 Pad on top in the opposite direction.

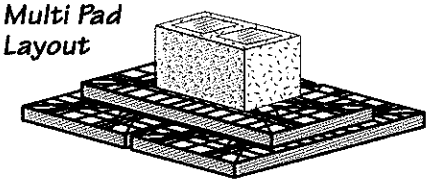
Single Stack Course



Double Stack Course



Multi Pad Layout



RADCO
A TWINING COMPANY

LISTING & TESTING DIVISION

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DESIGN LISTING # 1345

PRODUCT: ABS & Steel FOUNDATION PADS

Renewed: Jan 2018
Revised: Jan 2018

LISTEE: TIE DOWN ENGINEERING, INC.
5901 Wheaton Drive
Atlanta, GA 30336

Subject to Review:
Feb 2019

CATEGORY: DESIGN - FOUNDATION

APPLICATION: MANUFACTURED HOME - FOUNDATION

SECTION 1: INTRODUCTION
At the request of Tiedown Engineering, Inc., **RADCO** has examined their ABS Foundation Pads and Steel Pads to determine the design load capacity in accordance with Section 3280.401(b) of The Federal Manufactured Home Construction and Safety Standards.

SECTION 2: DESCRIPTION
ABS pads are molded pads having continuous ribs running parallel and diagonal with the pad sides. The Steel pads are made of 12 gage galvanized steel. The pads may be used to distribute concentrated pier loads to underlying soil for manufactured housing constructed in accordance with The Federal Manufactured Home Construction and Safety Standards 24 CFR Part 3280. The ABS pads are available in various sizes as noted in Table 1.

SECTION 3: APPLICATION
The pads shall be installed in accordance with the manufacturer's installation instructions. The maximum design concentrated loads are provided in Table 1.

SECTION 4: EVIDENCE SUBMITTED
a) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #99-MH01-TDE, January 1999.
b) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #99-MH05-TDE, May 1999.
c) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #99-MH06-TDE, May 1999.
d) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #99-MH07-TDE, May, 1999.
e) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #99-MH09-TDE, September, 1999.
f) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #00-MH15-TDE, September, 2000.
g) Test report of "Full Scale ABS Footer Test: by K2 Engineering, Inc. Test Report #01-MH17-TDE, August 2001.
h) Test report of "Vector-Xi Foundation Pad: by RADCO TestReport # RAD-3849, May 2006

SECTION 5: RECOMMENDATIONS
RADCO recommends that these pads be accepted for use of pads in bearing capacity of soils listed in Table 1 for support of concrete masonry unit piers, provided that:

a) Each pad shall be fabricated, identified and installed in accordance with this listing, the manufacturer's published installation instructions, and the applicable code(s). In the event of a conflict between the manufacturer's published installation instructions and this listing, this listing shall govern. The installation instructions shall be available at the point of installation.

b) Each pads shall be marked with manufacturer name and address, product name, RADCO name/logo and Listing #1345.

c) The ABS pads are of the same quality and size as tested by K2 Engineering, Inc. The steel pad is the same quality and size as tested by RADCO.

d) Piers are limited to steel piers or single or double stacked concrete masonry unit blocks of this listing.

e) The design pier load does not exceed the lesser of the pad capacity, soil capacity or pier capacity.

f) The home installer is responsible for the foundation design of each home.

g) RADCO's follow-up audits be continued at the prescribed frequency.

SECTION 6: APPROVAL
This listing is subject to approval on an annual basis by **RADCO**. Updating of data and further information will be submitted as necessary.