

# INSTALLATION MANUAL & DETAILS

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## CERTIFICATIONS

### A. HUD COMPLIANCE:

All design calculations and drawings are in compliance with and/ or exceed the vertical and lateral load requirements of the;  
**U. S. HOUSING and URBAN DEVELOPMENT (HUD) HANDBOOK 7584-7487,  
PERMANENT FOUNDATION GUIDE FOR MANUFACTURED HOUSING,  
SEPTEMBER 1996.**

*Compliance with that handbook is required by The Federal Housing Administration (FHA) and The Veterans Administration (VA), to qualify for loans insured by their organizations.*

### B. BUILDING CODE COMPLIANCE:

All design calculations and drawings are in compliance with and/or exceed the vertical and lateral load requirements of the following Building Codes;

- HUD CODE: U. S. Department of Urban Development
- ICBO-UBC: International Council of Building Officials- Uniform Building Code- 1997
- CABO: Council of American Building Officials
- BOCA: Building Officials and Code Administrators International
- SBCCI: Southern Building Code Congress International
- ASCE-7 Latest: American Society of Civil Engineers
- MPS: Minimum Property Standards
- FEMA: Federal Emergency Management Agency

*Note: all wind and overturning loads are transferred into the ground through the mainframe support piers/ footings. Additional anchors or tie downs are not required with the SURE SAFE® support system.*

### C. LENDERS SPECIFIC REQUIREMENTS:

For installations, where there is a loan to be insured by The Federal Housing Administration (FHA) or the Veterans Administration (VA), the HUD Guide requirements must be met in entirety.

For installations, where there is no loan to be insured, or the lenders requirements are different than outlined in these instructions, some components may not need to be installed as a part of this support system.

If HUD/FHA/VA compliance is not required, some of the following existing components, may not be required to be replaced with SURE SAFE® products as a part of this installation.

- Mate line supports
- Perimeter and or mate line blocking
- Perimeter enclosure wall
- Frost protected shallow foundation enclosure wall

Refer to the SURE SAFE® DESIGN site specific calculation design documents, for the components that are required to be included in this installation.

## GENERAL CONDITIONS

### A. CONDITIONS FOR USE:

The SURE SAFE® STEEL BUTTRESS™ SYSTEM and its engineering services are sold exclusively through authorized distributors, dealers and certified installers. The support system is intended for both off site and site built structures with crawl spaces.

This system is custom designed for each and every installation and must be accompanied by a set of site specific calculations obtained from SURE SAFE® DESIGN. Each design is sealed by a professional engineer, registered in the state where the system is to be installed. The engineer assumes responsibility only for the site specific design presented in those calculations and in this manual.

### B. PRODUCTS REQUIRED FOR THIS

**INSTALLATION:** Refer to the site specific calculations for the products that are required for this installation. Products generally include;

- Mainframe (Chassis) support piers
- Mate line support piers under column loads
- Mate line blocking, where perimeter blocking is required
- Marriage locks, for more than one section
- Perimeter side wall and door and wide opening blocking
- Perimeter enclosure wall

**C. INSTALLER RESPONSIBILITIES:** The installer shall insure that all components used are SURE SAFE® INDUSTRIES INTERNATIONAL, U. S. Patented products, labeled with the patent number or as follows;

- SURE® FORM BAGS, #5664377
- SAFETY JACKS: #4886797
- MARRIAGE LOCKS: #4937989
- PIERS: as manufactured by SEDCO
- CONCRETE: F'c = 2500 psi @ 28 days. Min.

Insure that all frost depth and other requirements are met with the installation of the system.

Install all products and components as required by the calculation set and this manual.

### D. SOIL CONDITIONS AND PREPARATION:

All concrete footings must be placed on undisturbed soil (organic matter and sod removed), or engineered fill that has been compacted to a minimum density of 95% to achieve a minimum bearing pressure of 1000PSF.

Any existing ground vapor barrier must be cut and removed from below each support pier to be installed.

The engineer can not be responsible for the ultimate Performance of the SURE SAFE® support system on a site having expansive clay, fill or other adverse conditions, whenever a soils report has not been provided to the engineer, prior to design.

### E. RESPONSIBILITIES OF OTHERS:

General delivery and installation of the building, including temporary supports, floor leveling, and insuring proper height clearances.

Site conditions and improvements, and utilities compliance with local zoning regulations and building codes.

Site is properly graded to drain water away from the building foundations.

Finished grade level beneath the building is above the required 100 year return frequency flood elevation.

Hitch and running gear (wheels and axle) removal.

Perimeter enclosure wall, when the design is not provided by SURE SAFE® DESIGN.

Removal of temporary supporting piers, if desired, after the concrete in the SURE SAFE® support system has cured a minimum of 28 days.

# INSTALLATION INSTRUCTIONS

## THE SUPPORT SYSTEM: Vertical and Lateral Loads

**1. MAINFRAME SUPPORT PIERS:** Mainframe support piers must be spaced not further apart than the maximum spacing indicated in the site specific calculation summary. *However, the distance between any two adjacent piers may deviate from the maximum spacing by 10%, as long as the overall average distance between piers does not exceed the maximum spacing required.* For single - wide homes, 1/2 of the total number of supports must be installed under each mainframe. For double - wide homes, 1/4 of the total number of supports must be installed under each mainframe. When additional support piers are required for vertical and/or lateral loads, the additional piers must be divided equally along the two extreme outside mainframes, and placed between the maximum spaced piers

**1.1 LOCATIONS:** Using the maximum spacing and the maximum (2'-0") dimension from the end to the first support, place a mark (a lumber crayon works well) on the bottom of the mainframes where each pier is to be installed. Measure the distance from the bottom of the mainframe and the ground at each pier location. Using those dimensions, refer to Table 1, for the pier height needed for that location.

**1.2 ASSEMBLY and INSTALLATION:**

Assemble the appropriate safety jack as shown in the Safety Jack Assembly instructions and details. *Make sure to leave the nuts on the (2) 3/8" bolts loose enough to be able to attach the safety jack to the mainframe.* Place a Sure® Form bag or Combo® Form bag over the bottom of the steel pier.

**1.2.1** Refer to Detail 1. 2. Attach the safety jack, pier and bag assembly to the mainframe at the proper location. Tighten the nuts on the (2) 3/8" bolts, to secure the safety jack to the mainframe. The bottom of the steel pier must be between 5 and 7" above the ground, adjust the top and bottom nuts on the safety jacks 1" bolt, up or down if required.

**1.2.2** Using the drawstring on the bag, tighten And knot the drawstring around the steel pier so that the top of the bag is at least 10" above the ground level and the bottom is flat on the ground.

**1.2.3** Fill the bag with concrete. The concrete should be fluid enough to completely fill the entire bag.

<b>TABLE 1. MAINFRAME SUPPORTS</b>	
Bottom of mainframe to ground dimension	SURE SAFE® Pier height required
15" - 19"	8"
19" - 23"	12"
23" - 27"	16"
27" - 31"	20"
31" - 35"	24"
35" - 39"	28"
39" - 43"	32"
43" - 47"	36"

*NOTE: If ground to mainframe dimensions exceed the heights given in this table, contact SURE SAFE® DESIGN.*

**2. MATE LINE SUPPORT PIERS** are required by the buildings manufacturer to support roof loads transferred to vertical columns and parallel walls along the mate line. Mate line supports should have been installed during the homes initial installation. Existing supports must be replaced by SURE SAFE® products. The total number of mate line column support or blocking piers required will be noted in the SURE SAFE® DESIGN document.

**2.1 LOCATIONS:** Using the locations indicated on the manufacturers floor plan, measure and mark, on the underside of the floor, where each pier is to be installed. On existing homes, and where the manufacturers floor plan is not available, you need to replace each temporary existing support along the mate line. *If there are no supports currently along the mate line, contact SURE SAFE® DESIGN for further instructions.*

Measure the distance from the bottom of the floor to the ground in each location where a pier is to be installed. Using those dimensions, refer to Table 2, for the pier height needed for that location.

**2.2 ASSEMBLY and INSTALLATION:** Assemble the wood beam safety jack as per the Safety Jack Assembly instructions and details. Place a SURE® FORM bag over the bottom of the steel pier.

**2.2.1** Refer to detail 2. 2.

Attach the wood 2 x 4 (with 4 x 4 for heights over 45") to the floors rim joists as shown in marked locations. Attach the safety jack and pier assembly to the wood 4 x 4 or 2 x 4, using (2) 1 1/2" long deck screws each side. The bottom of the steel pier should be between 5 and 7" above the ground, adjusting the top and bottom nuts on the safety jacks 1" bolt up or down as required.

**2. 2. 2** Using the drawstring on the bag, tighten and knot the drawstring around the base of the steel pier so that the top of the bag is at least 10" above the ground level, and the bottom is flat on the ground.

**2. 2. 3** Fill the bag with concrete. The concrete should be fluid enough to completely fill the entire bag.

Bottom of floor to ground dimension	SURE SAFE® Pier height required
17" - 21"	8"
21" - 25"	12"
25" - 29"	16"
29" - 33"	20"
33" - 37"	24"
37" - 41"	28"
41" - 45"	32"
Over 45"	36"

**3. SURE® FORM BAGS and COMBO® FORM BAGS:** for all mainframe and mate line support piers. Unless otherwise noted in the calculations, use (1) standard 30" x 30" SURE® FORM bag for each mainframe and mate line support pier. COMBO® FORM bags may be required for all or some piers. These longer bags are designed to support (2) piers, one at each end of the bag. The distance between the mainframes of a unit, determine the size (length) of the COMBO® FORM bag required. *Refer to details 1.2 and 1.2.A.*

**4. MARRIAGE LOCKS:** The number of marriage locks required, is noted in the design document. The marriage lock assembly has adjustable eyebolts on each end. (2) stub safety jacks are required for each marriage lock. Stub safety jacks are the same as other safety jacks, except for shorter 1" bolts.

**4.1 LOCATIONS:** *Refer to the foundation plan.* Marriage locks must not be more than 15' apart and 15' from each end of the home. Measure to determine locations. Place marks on the mainframes where the marriage locks are to be installed.

Marriage locks should be installed at 90 degree angles to the mainframe on either side of the mate line, and the safety jacks should be directly across from one another.

**4. 2 ASSEMBLY & INSTALLATION.** *See detail 4. 1.* Assemble as per Safety Jack Assembly instructions and details, leaving the 3/8" bolt nuts loose, until attached to the mainframe. Tighten those nuts. Leave the bottom nut off the 1" diameter bolt, until the marriage lock is in place.

**4. 2. 1** Measure the distance between the centerlines of the 1" bolts on the (2) safety jacks. Insert the eyebolts into the ends of the marriage lock and screw inward until the distance between the two eyebolt centers matches that measured between the safety jack bolts.

**4. 2. 2** Slip the marriage locks eyebolts, up and onto the safety jacks 1" diameter bolts, attach and tighten bottom nuts to the safety jack bolt. *Do not attempt to tighten or change length of the marriage lock after attaching to the safety jacks.*

**5. PERIMETER POST PIERS:** For blocking at exterior doors and wide openings, and perimeter blocking along the side walls. When the perimeter wall is not designed to be load bearing, use SURE SAFE® Post piers. Where a load bearing perimeter enclosure wall is used, all of the perimeter blocking loads can be placed on that wall.

**5. 1 LOCATION:** Required locations and spacing for perimeter blocking are noted in the design documents. *Refer to the foundation plan and building manufacturers plan when available.*

**5. 2. ASSEMBLY & INSTALLATION:** *See detail 5. 2.* Fasten the wood 2 x 4 to (with the wood 4 x 4 beam, continuous under doors and wide openings) the bottom of the floor joists using wood screws. Attach the safety jack with nut to the wood beam with wood screws.

**5. 2. 1** Measure the distance from the top of the concrete footing to the bottom of the wood beam assembly. If necessary, cut the open end of the steel tube pier with a metal saw, so the length of the pier is 2- 3 inches less than the measured height.

**5. 2. 1** Slide the open end of the pier up over the bolt of the safety jack. Fasten the bottom plate of the pier to the concrete footing, using concrete nails or other suitable anchors. Then adjust the nut on the safety jack bolt, up or down, until it is snug against the top of the pier.

## **6. PERIMETER ENCLOSURE WALL:**

The SURE SAFE® support system does not require a perimeter enclosure wall to carry any vertical or lateral loads.

However, to fully comply with HUD/FHA/VA requirements, as a permanent foundation system, a perimeter enclosure wall, whether load bearing or non-load bearing, must be installed in addition to the SURE SAFE® STEEL BUTTRESS™ support system.

***WHERE THERE IS A FROST DEPTH REQUIREMENT,*** the enclosure wall must have a continuous concrete footing supporting that wall. This enclosure wall assembly and footing must be insulated from the underside of the floor to the bottom of the footing. The insulation is to be placed on the exterior face of the wall and footing. This insulated wall assembly effectively raises the air temperature inside the crawl space and ground beneath it, thus raising the frost depth level around the perimeter of the home, while protecting the top of grade interior supports from ground frost upheaval.

SURE SAFE® DESIGN uses performance based criteria for "Frost Protected Shallow Foundation" designs for perimeter enclosure walls, requiring footing depths of only 12 - 16" below finished grade, instead of below the extreme frost penetration depth as required with conventional wall design methods.

Details of the insulated (for areas with frost), or non-insulated (for areas with no frost) perimeter enclosure wall, if requested from SURE SAFE® DESIGN are included with the calculation design documents. *When the perimeter enclosure wall details are to be provided by a third party, they must be attached to the calculation design documents.*

The enclosure wall must have a min. 32" access panel, screened ventilation (1sf. of ventilation for each 150sf. of floor area) and keep out vermin and water.