

Rules  
Of  
Department of Highway Safety and Motor Vehicles  
Division of Motor Vehicles  
Chapter 15C-1  
General

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15C-1.0101 Definitions.

For the purpose of Rules 15C-1.0102, 15C-1.0103, 15C-1.01031, 15C-1.0104, 15C-1.0105, 15C-1.0106, 15C-1.0107, 15C-1.0108 and 15C-1.0109, the following words have the meaning indicated:

- (1) "Department" means the Department of Highway Safety and Motor Vehicles.
- (2) "Dealer Installer" means any licensed mobile/manufactured home dealer who is authorized by the department to install mobile/manufactured homes.
- (3) "Licensed Installer" means any person, other than direct employees of licensed dealers or manufacturers, who engages in mobile home installation and has obtained a license to do so from the department.
- (4) "Manufacturer Installer" means any licensed mobile/manufactured home manufacturer who is authorized by the department to install mobile/manufactured homes.
- (5) "Exposure D" means flat, unobstructed areas exposed to wind flowing over large bodies of water. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure "D" extends inland from the shoreline a distance of 1500 feet or 10 times the height of the building or structure, whichever is greater.
- (6) "Frame Tie or Tie Down" means any device or method approved by the department and used for the purpose of securing the mobile/manufactured home or park trailer to ground anchors in order to resist wind forces.
- (7) "Ground Anchor" means any device approved by the department and used for the purpose of securing a mobile/manufactured home or park trailer to the ground in order to resist

wind forces. Ground anchors are rated by working load, which is the maximum load for design purposes. The ultimate load is the working or design load multiplied by the safety factor of 1.5.

(8) "Mobile/Manufactured Home" means a structure, transportable in one (1) or more sections, which is eight body feet (8') or more in width, greater than four hundred (400) square feet and which is built on an integral chassis and designed to be used as a dwelling when connected to the required utilities and includes the plumbing, heating, air conditioning and electrical systems contained herein.

(9) "Over-Roof Tie" means any device approved by the mobile/manufactured home manufacturer or listed by the department and used for the purpose of securing the mobile/manufactured home systems to ground anchors in order to resist wind forces. Ties may be installed over or under roof material.

(10) "Park Trailer" means a transportable unit which has a body width not exceeding fourteen feet (14') and which is built on a single chassis and is designed to provide seasonal or temporary living quarters when connected to utilities necessary for operation of installed fixtures and appliances.

(11) "Set-Up" means the operations performed by a licensed installer, dealer installer or manufacturer installer, at the occupancy site which render a mobile/manufactured home or park trailer fit for habitation. Such operations include, but are not limited to, transporting, positioning, blocking, leveling, supporting, tying down, making minor adjustments, assembling multiple or expandable units and connecting utility systems as defined in Rule 15C-2.0072.

(12) "Stabilizer Device" means a device approved by the department that is installed with the ground anchor to resist lateral movement of the mobile/manufactured home and anchor.

(13) "Vertical Tie" means any device or method approved by the department and used for the purpose of securing the mobile/manufactured home or park trailer to ground anchors in order to resist vertical or uplift forces caused by the wind.

(14) "Longitudinal Tie Downs" means anchor system or longitudinal stabilizing devices (system), designed to resist horizontal wind loads in the long direction of the home (i.e.: wind load applied to each end of the home).

Specific Authority 320.011, 320.8249, 320.8325(2), F.S. Law Implemented 320.01(1)(b) 7, 320.01(2), 320.822(12), 320.8249, F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.0102 Installation Standards for Mobile/Manufactured Homes and Park Trailers. The standards set forth herein are requirements for all mobile/manufactured home and park trailer installations, unless otherwise specified in this rule. All installations of mobile/manufactured homes shall be performed by either a licensed installer, dealer installer or manufacturer installer.

(1) Installation standards for the set-up of new or used manufactured homes and park trailers shall be in compliance with the manufacturer's installation instructions unless otherwise specified in this rule. In the absence of the manufacturer's installation instructions, used mobile/manufactured homes and park trailers shall comply with the provisions of this rule. The park trailer manufacturer shall make built-in provisions for a minimum of three (3) vertical tie-down straps and three (3) frame tie-down straps on each side of the unit. All used park trailers shall have at least three (3) vertical and three (3) frame tie-down straps installed. Exception: The center vertical tie-down strap on used units may be exempt when it is structurally prohibitive to install.

(2) All anchors, piers and tie-down components used in the installation of a mobile/manufactured home or park trailer shall be tested, listed and approved by the Florida Department of Highway Safety and Motor Vehicles, Bureau of Mobile Home and Recreational Vehicle Construction. If tests are conducted out of the State of Florida, the anchor or component manufacturer shall pay the expenses (per diem and travel) incurred by this out-of-state travel. Installation of such anchors, piers and tie-down components shall be in accordance with the manufacturer's instructions used during the testing procedure.

(3) Site Preparation: The under-home grade (ground) shall be cleaned of all vegetation and organic material; i.e., stumps, roots, etc., except grass not exceeding three inches (3") in height. The area beneath and around the home shall be graded, sloped for proper drainage so that water will not accumulate under the home. All grass and organic material shall be removed and the pier foundation placed on stable soil or compacted fill. When the soil compaction or soil bearing capacity is not known, assume one thousand (1,000) psf or consult with the local building authority. Soil shall be removed from an area of at least 16" x 16" to a depth equal to the height of the pier base. Exception: When being installed on fresh, clean, compacted fill the pier base may be placed on top of the soil. The bottom of the footer(s) shall be placed on stable soil. The pier foundation shall be a minimum of 4" x 16" x 16" solid concrete pad, precast or poured eight inch (8") minimum in place, or other material approved and listed by the department. Where the manufacturer's specifications have additional requirements than the above, the more stringent shall apply.

(4) Auger Anchors: All mobile/manufactured homes and park trailers shall be anchored with approved auger anchors, which shall be coated with hot-dipped zinc galvanizing (ASTM Standard #123-89A, which is hereby incorporated by reference); .60 ounces per square foot.

Auger anchors shall be installed to the manufacturers installation instructions with special emphasis on soil classification and placed in undisturbed or compacted soil. Piers are to be installed off center of the anchors so as not to interfere with the proper alignment of the strapping. Anchors may be installed in predrilled holes provided the anchor penetrates a minimum of two feet (2') into undisturbed soil beyond the predrilled hole. When the anchor manufacturer's installation instructions permit, the hole is then backfilled with soil compacted in layers not exceeding six inches (6"). For manufactured homes produced after July 13, 1994, refer to the manufacturer's set-up manual for the working load requirements for anchors at the different tie points on the manufactured home. For used manufactured homes manufactured after July 13, 1994, and the manufacturer's set-up manual is not available, all anchor points at side walls, shear walls, end walls, center line and other points as identified by the manufacturer, shall be certified for a working load of four thousand (4,000) pounds, with an ultimate load of six thousand (6,000) pounds. Anchors are required one at each end of shear walls; one on each end of each I-beam; one frame tie at each vertical tie point; one on each end of each marriage wall (center line); and on each ridge beam support post. Note: Coral anchors are not designed to meet Zone II and Zone III wind requirements.

(5) Stabilizing Devices: All ground anchors shall have approved stabilizing devices approved by the department, each of which shall have a minimum surface area of 180 square inches and shall be coated with hot-dipped zinc galvanizing (ASTM Standard 123-89A, which is hereby incorporated by reference); .60 ounces per square foot or zinc coated to ASTM (A 929/A 929M-96, which is hereby incorporated by reference). The stabilizing device shall be installed with the top of the stabilizing device installed flush with the soil to prevent the anchor from

deflecting. Exception: Stabilizer devices are not required at center line or marriage wall locations unless required by the manufacturer's set-up manual.

(6) Foundations, piers or other load bearing supports or devices shall be installed and constructed to evenly distribute the load. Steel piers with mechanical adjustments shall be securely attached to the frame of all mobile/manufactured homes or park trailers. (See Figure C in Rule 15C-1.0103) Manufactured load-bearing supports or devices shall be listed and approved for the use in which it was applied or piers shall be constructed as outlined in this rule. Concrete products shall comply with the following specifications: Minimum dimensional and structural requirements for load-bearing solid and cell concrete blocks shall be to the Standard Specification for Load-Bearing Concrete Masonry Units, ASTM C-90, 1996 edition. Concrete foundations and cap blocks must have a minimum of two thousand two hundred (2,200) pound flexural strength as measured by Standard Test Method for Sampling and Testing Concrete Masonry Units, ASTM C140-96. Solid 4" concrete blocks are the minimum thickness of blocks that will meet this test. Poured concrete shall be a minimum of  $f_{cl} = 2500$  PSI. All plastic products shall be conditioned to ASTM D 618-61, reapproved 1990, Standard Practice for Conditioning Plastics and Electrical Insulating Materials for Testing. Plastics shall be tested to the following standards: ASTM D 790-92, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; ASTM D 732-85, Standard Test Method for Shear Strength of Plastics by Punch Tool and ASTM G 53-88, Standard Practice for Operating Light and Water Exposure Apparatus for Exposure of Nonmetallic Materials. All of the above ASTM Standards in paragraph 6 are hereby incorporated by reference.

Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2) F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.0103 Foundations and Piers.

These guidelines shall be used when the installation of foundations and piers is not specified in the manufacturer's instructions or when the manufacturer's installation instructions are not available.

(1) Piers:

(a) Piers shall be centered under the I-beam and installed in accordance with Table A.

The maximum spacing of piers shall be eight feet (8'). First pier shall be within two feet (2') of either end of the home. The pier foundation shall be a minimum of 4" x 16" x 16" solid concrete pad precast or poured eight inch (8") minimum in place or other material approved and listed by the department.

(b) Piers may be constructed of regular 8" x 8" x 16" concrete blocks, open cells (with open cells vertical), centered on the footing or foundation. A 2" x 8" x 16" pressure treated or other material approved and listed by the department, pursuant to rules 15C-1.0105 and 15C-1.0106, shall completely cover the top of the pier with pressure treated shims (¼" minimum and 1½" maximum thickness x 3½" minimum width x 6" minimum length) centered and driven tight from both sides of the I-beam between the wood plate or cap and the main frame. Single tiered block piers shall be installed perpendicular to the main I-beam. Exception: When a pier has been capped with at least a four inch (4") solid concrete block or other material approved and listed by the department, pursuant to rules 15C-1.0105 and 15C-1.0106, one-fourth inch (¼") of wood stock or wood shims or other material approved and listed by the department, pursuant to rules



15C-1.0105 and 15C-1.0106, shall be installed between the pier and steel I-beam. (See Figures A, B and D)

(c) Center Line and Perimeter Piers: Center line piers shall be located at each end of center line and eight feet (8') on center, except where openings of four feet (4') or greater occur, piers shall be located on each end of the opening within six inches (6") of jamb studs or ridge beam posts. (See Figures A, B, C and D) Any openings fifteen feet (15') or larger in the exterior sidewall and/or marriage wall shall require blocking at each end of the opening with three (3) 4" x 16" x 16" pads (See Figure D). Piers shall also be installed on each side of any perimeter door or fireplace. Bay windows or any opening forty-eight inches (48") or more shall require blocking at each end. Fourteen feet (14') or wider units with I-beam spread of less than eighty-two inches (82") and twelve feet (12') wide units with an I-beam spread of less than seventy-five and one-half inches (75½") shall have perimeter blocking installed at a minimum of eight foot (8') on center. Piers shall not be required under the clear (open) spans between ridge beam posts.

(d) All piers over thirty-six inches (36") and corner piers over twenty-four inches (24") in height shall be double tiered with blocks interlocked and capped with two (2) 4" x 8" x 16" solid concrete blocks side by side and perpendicular to the I-beam or other material approved and listed by the department pursuant to rules 15C-1.0105 and 15C-1.0106, and cushioned with wood shims or pressure treated plate. Pier height is measured from top of footer or foundation to top of cement block stack, including 4" cap block(s). (See Figures B and D)

(e) All piers over fifty-two inches (52") shall comply with local requirements.

(f) Metal and/or precast support piers shall be installed on a base or footer of a minimum size of 4" x 16" x 16" solid concrete or other material approved and listed by the department.

(See Figure C)

(g) Metal and/or precast support piers shall be restricted to a maximum four inch (4") locking mechanical height adjustment and shall be restricted to a maximum height of not more than twenty-four inches (24") measured from the ground base or footer. This twenty-four inch (24") maximum shall not include the four inch (4") mechanical extension or adjustment.

Exception: Center line or perimeter supports are permitted to exceed the twenty-four inch (24") maximum. (See Figure C)

(h) The minimum distance between the finished grade under all new and used mobile/manufactured homes and the bottom of the I-beam shall be eighteen inches (18"). Where the grade is sloped, twenty-five (25%) of the lowest member of the main frame may be set below eighteen inches (18"); however, under no circumstances may the bottom of the I-beam be set below twelve inches (12") from the finished grade.

(2) Foundations:

(a) Concrete pads or foundations shall be a minimum of two thousand five hundred (2,500) pounds per square inch (psi).

(b) Plastic pads or foundations shall be tested in the lower fifty percent (50%) of each soil class.

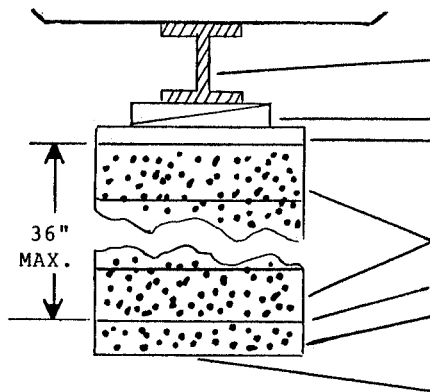
Table A:

**PIER SPACING TABLE**

Soil Load Bearing Capacity \ Footer Size	16" x 16"	18½" x 18½"	20" x 20"	26" x 26"
1000 psf	3'	4'	5'	8'
1500 psf	4'6"	6'	7'	
2000 psf	6'			
2500 psf	7'6"			
3000 psf				
3500 psf				

Shaded areas are at the maximum eight feet spacing.

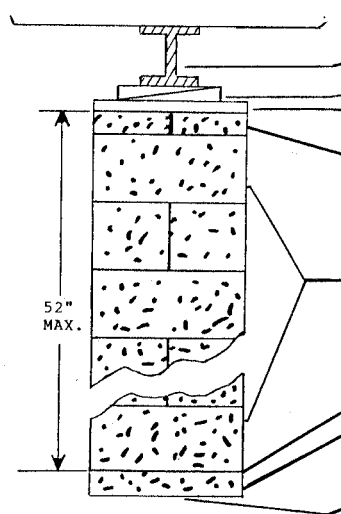
**FIGURE A**



**BLOCKING (Single Tiered)**

- I-Beam (Frame)
- Wood Shims or other material approved and listed by the department pursuant to rules 15C-1.0105 and 15C-1.0106 (1½" Maximum)
- Cap – 2" x 8" x 16" Pressure Treated Wood or other material approved and listed by the department
- Celled Concrete Block
- Ground Level
- Footer or Pier Foundation  
4" x 16" x 16" Solid (One Piece) or other material approved and listed by the department
- Sod and Organic Material Removed

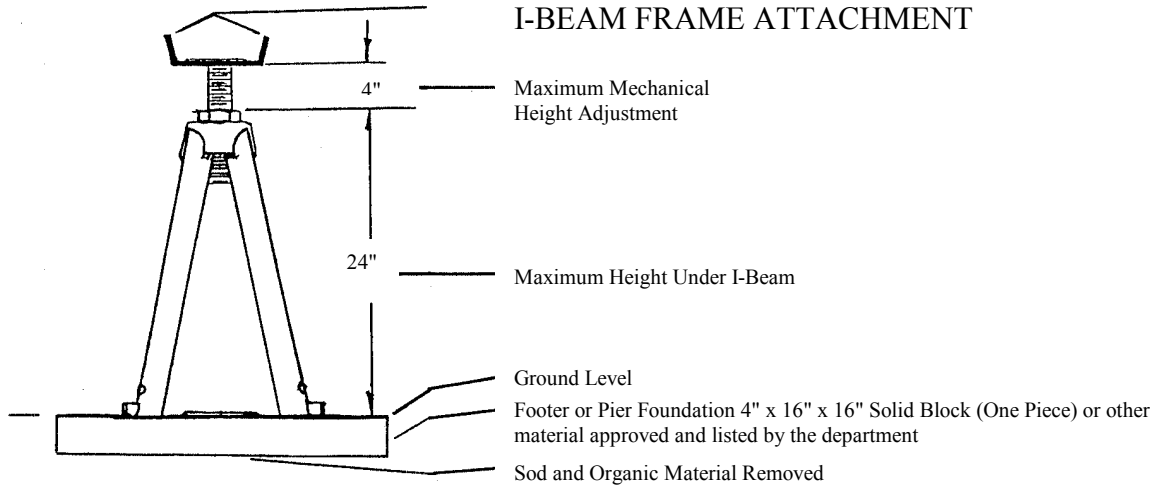
**FIGURE B**



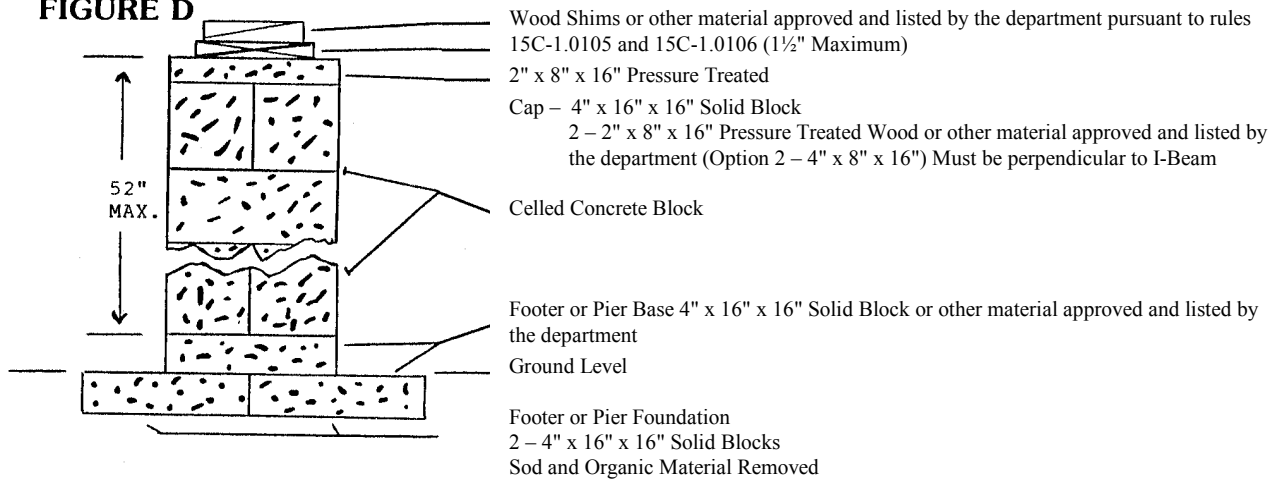
**BLOCKING (Double Tiered and Blocks Interlocked)**

- I-Beam (Frame)
- Wood Shims or other material approved and listed by the department pursuant to rules 15C-1.0105 and 15C-1.0106 (1½" Maximum)
- (Option) Pressure Treated Plate (1" x 8" x 16" Minimum)
- Cap – 4" x 16" x 16" Solid Block  
2 – 2" x 8" x 16" Pressure Treated Wood or other material approved and listed by the department  
(Option 2 – 4" x 8" x 16") Must be perpendicular to I-Beam
- Celled Concrete Block
- Ground Level
- Footer or Pier Foundation  
4" x 16" x 16" Solid Block (One Piece) or other material approved and listed by the department
- Sod and Organic Material Removed

**FIGURE C**



**FIGURE D**



Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.01031 Installation Standards for HUD Manufactured Homes and Park Trailers in Exposure "D" Areas.

All HUD manufactured homes and park trailers constructed after July 13, 1994, that are located in Exposure "D", Wind Zone II or Wind Zone III, shall have a data plate affixed in the home by the manufacturer as proof that the home meets the design standards. In flood prone areas the foundation shall comply with the requirements set forth in the manual, Manufactured Home Installation in Flood Hazard Areas, FEMA 85/September 1985, published by the Federal Emergency Management Agency (FEMA) and hereby incorporated by reference. All installations of mobile/manufactured homes shall be performed by either a licensed installer, dealer installer or manufacturer installer.

(1) All new and used mobile/manufactured homes shall have support and anchoring at the locations specified in the manufacturer's installation manual for installation in Exposure "D".

(2) In absence of the original manufacturer's installation instructions, the anchoring system shall be designed by a professional engineer or architect, licensed in the State of Florida, to comply with Manufactured Home Installation in Flood Hazard Areas, FEMA 85/September 1985, incorporated by reference above. The foundation and piers shall comply with the requirements in 15C-1.0102 and 15C-1.0103.

Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.01(1)(b)7, 320.01(2)(b), 320.77(10), 320.8249, 320.822(12), 320.8285, 320.8325, 320.835(2)(b), F.S. History - New 10-02-95. Amended 10-01-96.

15C-1.0104 Installation Standards for Anchors and Tie-downs.

These specifications are standards set by the Department of Highway Safety and Motor Vehicles for new and used mobile/manufactured homes or park trailers.

(1) Anchors:

(a) Type I anchor holding power for homes manufactured before July 13, 1994, shall be tested to a working load of three thousand one hundred and fifty (3,150) pounds, with an ultimate load of four thousand seven hundred twenty-five (4,725) pounds.

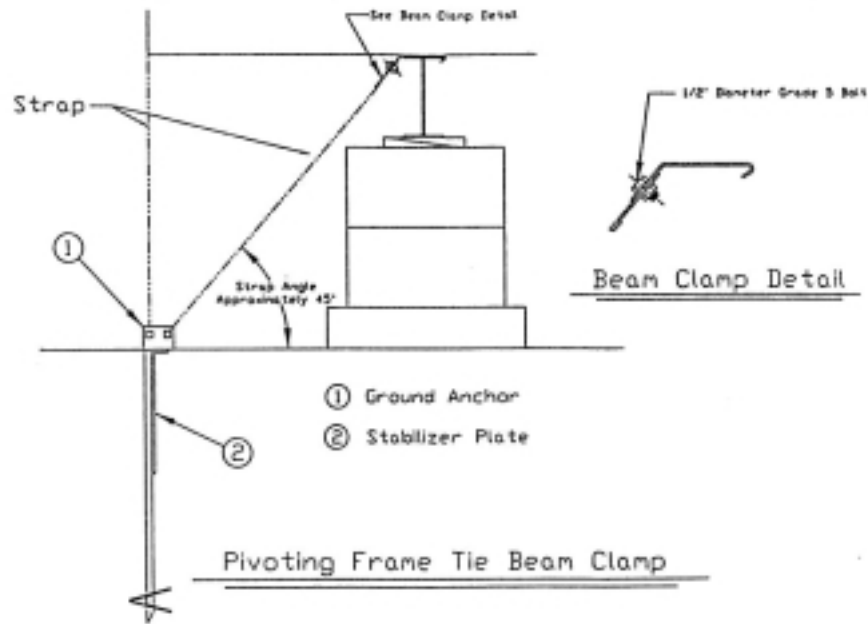
(b) Type II anchor holding power for homes manufactured after July 13, 1994, shall be tested to a working load of four thousand (4,000) pounds, with an ultimate load of six thousand (6,000) pounds.

(2) Frame Ties:

(a) All frame ties for new and used mobile/manufactured homes must have a factory fabricated strap connected at the top of the I-beam to an I-beam clamp approved by the department pursuant to rules 15C-1.0105 and 15C-1.0107.

(b) Diagonal tie-downs for new and used mobile/manufactured homes, in all wind zones, shall be spaced no farther apart than five feet four inches (5'4") on center with anchors placed within two feet (2') of each end. Note: Where sidewall strap separation is greater, they must be tied individually. Each frame tie shall be installed to the component manufacturer's instructions.

(Refer to below drawing)



(3) Longitudinal Tie-downs. All new and used mobile/manufactured homes, installed sixty (60) days after the effective date of this rule, must have longitudinal tie-downs or other approved longitudinal stabilizing systems meeting the specifications of rules 15C-1.0105, 15C-1.0107 and 15C-1.0108 and designed to resist horizontal wind loads in the long direction of the home (i.e.: wind load applied to each end of the home). The longitudinal tie-downs are in addition to the anchoring systems required along the exterior side walls and/or marriage walls of the mobile/manufactured home.

(a) When anchors and straps are used for stabilizing the home in the longitudinal direction the strap must connect to a clip welded onto the I-beam or other device connected mechanically. Unless factory installed, the connection device must be approved by the department pursuant to rules 15C-1.0105 and 15C-1.0107. At least four (4) anchors and straps are required (i.e., 16 per double-wide home) at the end of each section of the mobile/manufactured home.





manufactured bent/formed radius protective tab. Note: Bracket lacing or field threading shall not be used.

(5) Roof Ties:

(a) Homes manufactured after June 15, 1976, without over-the-roof ties, but designated "Hurricane Resistant" per the Federal Manufactured Home Construction and Safety Standards, section 3280.305(c)(2), as hereby incorporated by reference, shall not require roof ties. All manufactured homes manufactured after July 13, 1994, shall require vertical and frame tie points.

(b) Homes manufactured before July 13, 1994, where factory installed roof ties are not evident and it cannot be determined that the mobile/manufactured home is "Hurricane Resistant" without such ties, then the number of roof ties, as required by the table below, shall be installed so as to not contact with the structure, except at adequately reinforced areas, where additional load will not damage the structure.

1. Single-wide homes less than or equal to sixty feet (60') - three (3) roof ties.
2. Single-wide homes greater than or equal to sixty-one feet (61') - four (4) roof ties.
3. Double-wide homes - roof ties required only if installed by the manufacturer.

(c) All new park trailers manufactured after January 2, 1995, shall have at least three (3) factory installed vertical tie points in addition to the required frame ties.

(d) End roof ties or vertical ties shall be installed at not more than twenty-four inches (24") from the end of the structure or at the first stud and truss and attached to the same anchor as the frame tie. If the frame does not extend to the back end wall, then the roof tie shall be installed within six inches (6") of the end of the chassis.

(e) Intermediate roof ties or vertical ties shall then be located at midway or equally spaced between the end roof ties, as feasible.

(f) Double-wide homes manufactured before July 13, 1994, may not require roof ties, unless such ties are installed or provided by the manufacturer. However, additions or canopies may require such ties depending on the type of construction. All are subject to the same frame tie requirements as single-wide homes.

(g) Over-the-roof tie-down straps or tie points shall be connected to a ground anchor. If a strap has been damaged, cut off or removed, a replacement strap shall be installed or spliced using two (2) listed strap seals affixed to twelve inch (12") overlap of strap with two (2) crimps evenly spaced on the seal.

(h) Used homes designed and requiring over-the-roof tie-downs and having a permanent type structure adequate to provide structural rigidity and stability, meeting the design loads as required by the Standard Building Code, as hereby incorporated by reference, shall not be required to have over-the-roof ties in the area of the addition, but shall require one at each end.

(6) Center Line Fastening: Multiple section homes shall be mechanically fastened every twenty-four inches (24") at the bottom, end walls and roof. A minimum thirty (30) gauge, eight inches (8") wide, galvanized strip shall be centered over the peak and fastened with galvanized roofing nails at two inches (2") on center at both sides of center line.

Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.0105 Testing Specifications for Straps, Piers, Anchors and All Components.

(1) To secure approval of their products, manufacturers and/or producers shall have their products tested and certified by a registered engineer registered in the state of the product manufacturer or State of Florida. The engineer and testing laboratory shall be independent from the product manufacturer and the product manufacturer's affiliates. Testing shall be conducted

under the supervision of personnel of the Bureau of Mobile Home and Recreational Vehicle Construction with the laboratory cost being paid by the anchor or component manufacturer or producer.

(2) Each different model or component shall be tested (three (3) consecutive tests without a failure) and certified to their required force with tests continuing on to total destruction or ten percent (10%) overload.

(3) In-laboratory tests shall be conducted with the used of a Baldwin Press, or equivalent.

(4) The testing laboratory shall supply a current copy (within 12 months) of proof of calibration of test equipment.

(5) Force required for test: Force shall be applied in increments of five hundred (500) pounds with five (5) seconds hold time between each five hundred (500) increment to the requirement and then increase force to total destruction or ten percent (10%) overload.

(6) Destruction test shall show the following:

(a) Point of failure.

(b) Method of testing.

(7) Each manufacturer or producer must submit to the State of Florida, Department of Highway Safety and Motor Vehicles, Division of Motor Vehicles, Bureau of Mobile Home and Recreational Vehicle Construction, the following data:

(a) Detailed drawings of each type product submitted for approval. Each drawing shall bear the seal of a registered engineer registered in the state of the product manufacturer or the State of Florida.

(b) Certified engineering drawings and specifications of each product includes:

1. Dimensions and specifications on all welds and fasteners.

2. Dimensions and specifications of all metal or material.

(c) Model number and location.

(d) Test data and results.

(e) Letter from a registered engineer registered in the state of the product manufacturer or State of Florida certifying test results.

(f) Installation instructions. Installation instructions are required to be shipped with each product.

(8) All anchors, piers, and tie-down components shall be recertified when there is a change in design or material.

(9) If the manufacturer or producer request these tests to be conducted out of state, all expenses (travel and per diem) shall be paid by the manufacturer or producer.

Specific Authority 320.011, 320.824(1), 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History – New 1-10-94, Amended 10-02-95.

#### 15C-1.0106 Pier Specifications.

(1) Each pier shall be required to withstand 2500 pounds plus a 2.5 safety factor from a vertical projection and from a horizontal projection equal to the same angle or degree of angle of the leg or support, using the same weight and safety factor. Three (3) consecutive tests must be performed without a failure. (Horizontal projection test not required on piers of less than twelve inches (12”) in height including adjustment.)

(2) Piers manufactured with adjustable heights shall be tested at maximum heights. Test results shall be reported in the format shown in Example No. I.



Specific Authority 320.011, 320.824(1), 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F. S. History – New 1-10-94, Amended 10-02-95.

15C-1.0107 Strap Test Specifications.

(1) All tie-down straps shall be tested to American Society for Testing and Materials (ASTM) D 3953-91.

(2) All tie-down straps, etc., shall be Type 1, Finish B, Grade 1, Steel Strapping 109,000 minimum yield strength, .035" minimum thickness (plus or minus .002 in. - 0.05MM), Finish B - hot-dipped galvanized zinc coating (ASTM Standard 123-89A); .60 ounces per square foot, per surface, 4750 pounds minimum break strength, marked every 12 to 15 inches (manufacturer's name and ASTM Spec. D3953-91), 1¼" width (plus or minus .005 in. - 0.13MM), 6.6 feet per pound of strap, elongation 6.5% to 12%.

(3) All straps shall be subjected to the following test procedures: (Refer to Example No. II for the proper format to use in reporting test results.)

(a) Bend Test (5 bends).

Strap shall be bent by hand over a radius of  $\frac{1}{8}$  inch plus or minus  $\frac{1}{64}$  inch. One bend shall consist of a ninety (90) degree bend in one direction and return to the original position. Make successive bends in opposite directions.

(b) Breaking Test.

The crosshead speed shall be two inches (2"). The test specimen shall be six inches (6") in length between the clamps or jaws.

(c) Elongation Test.

The elongation testing shall be conducted on the six inch (6") length of strap exposed between the jaws. Two (2) measurements for elongation shall be recorded at four thousand

seven hundred twenty-five (4,725) pounds then test shall be continued to strap failure and elongation recorded.

(d) Hardness Test or Military Specification listing the properties.

(4) Strap Splice or Connections

(a) Strap splice shall require at least twelve inches (12") of strap overlap with two (2) seals evenly spaced. Each seal shall have two (2) crimps evenly spaced. All strap connections must be manufactured to meet minimum standards of rule 15C-1.0105 and must be approved by the department.

(b) Factory installed sidewall and centerline bracket attachments shall require at least one (1) seal with two (2) crimps or equivalent welds evenly spaced and protected with a radius clip or manufactured bent or formed radius protective tab. (Note: Bracket lacing or field threading shall not be used.

(c) Vertical and frame tie connections must be designed to swivel where attached to the mobile/manufactured home and must be connected to the home by means of grade #5 bolts with a minimum diameter of one-half inch ( $\frac{1}{2}$ ").

# TEST FOR STRAPPING

\_\_\_\_\_  
PRODUCER

\_\_\_\_\_  
TESTING LABORATORY

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
ADDRESS

STEEL THICKNESS	ZINC (COATING) THICKNESS	WIDTH
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LOAD RANGE	DATE OF TEST
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\_\_\_\_\_  
STRAP IDENTIFICATION (LABEL)

\_\_\_\_\_  
PERSON PERFORMING TEST

SAMPLE NO.	BREAK STRENGTH		ELONGATION TEST			BEND TEST	TEST SAMPLE FORM
	LENGTH OF STRAP EXPOSED FOR TEST	MAXIMUM LOAD POUNDS	LENGTH OF STRAP EXPOSED FOR TEST	PERCENT		# OF BENDS	
				4,725 POUNDS	FAILURE		

COMMENTS:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
TEST CONDUCTED FOR

\_\_\_\_\_  
SIGNATURE OF LABORATORY MANAGER

EXAMPLE NO. II



Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.0108 Anchor and Anchor Component Test Specifications.

(1) The anchor may be tested in one piece or cut in half. When the anchor is cut in half for test purposes, the top or head shall be tested with a sling around a bolt, pin, etc., or through the bolt or connection that the tie-down strap or cable is attached to when the system is installed on the mobile home. The force required shall be seven thousand one hundred twenty-five (7,125) pounds. The disc or helix shall be used in the certified test. Also, the shimming between the steel plate and the disc will assure that the hole (minimum 1 ½") through the plate and disc will be vertical with the shaft or rod. Other tests that are equivalent may be used. (Refer to Example Nos. III, IV and V for the proper format to use in reporting test results.)

(2) When the anchor is tested in one piece, the head and the disc will be tested together. The test block would have a slot cut in the plate for the anchor shaft or rod to pass through to position the test block with the disc. Connection on the head would be the same as required in paragraph (1) of this rule.

(3) Anchor tensioning device test: Each different anchor model or type of tensioning device shall be tested with strap or cable connected to the anchor head connecting device. Force required shall be four thousand seven hundred twenty-five (4,725) pounds and continue to destruction or ten percent (10%) overload. (Refer to Example No. VI for the proper format to use in reporting test results.)

(4) Method of testing: The tensioning device (head) shall be tested with strap or cable inserted or connected to the device or head in the same manner as required to connect or attach when installed on the mobile/manufactured home or park trailer. Bolt(s) used in the test shall be

identified and listed as a part of the approved anchor assembly. No devices shall be used in the test that are not regularly furnished and required to be used with the anchor and component field installation. (Examples: clips, wedges, pins or other required accessories.)

(5) All field tests shall be performed in the lower fifty percent (50%) of the soil class.

(6) Anchor and stabilizer holding power for Type 4(a) Soil shall require a minimum of four thousand seven hundred twenty-five (4,725) pounds in each direction. Anchor and stabilizer for Type 4(b) Soil shall require a minimum of six thousand (6,000) pounds in the vertical direction and four thousand seven hundred twenty-five (4,725) pounds in a forty-five (45) degree horizontal direction. Over two inches (2") of uplift or three inches (3") of side deflection shall be recorded as failure. (Refer to Example Nos. VII and VIII for the proper format to use in reporting test results.)

(7) Required Test Report: Each different type or model design must be field tested for holding power by an independent testing laboratory and certified by an engineer registered in the State of Florida. All field tests shall be conducted in the State of Florida. The lab report shall show the following:

- (a) Model tested as described by engineering drawings.
- (b) Method of installation.
- (c) Date of installation.
- (d) Date of pull-out test.
- (e) Soil profile description for each type soil in which anchor is tested and listed to be installed according to the soil classification chart printed herein.
- (f) Location of field test.
- (g) Test equipment used.

(h) Pounds of force exerted and resultant vertical and horizontal movement in inches for the anchor and stabilizer.

(i) Description of stabilizer used in each auger anchor field test, including stabilizer manufacturer.

### SOIL CLASSIFICATION

	<u>Types of Soils</u>	<u>Blow Count (ASTM D1586)</u>	<u>Test Probe <sup>1</sup> Torque Value <sup>2</sup></u>
1	Hard rock	NA	NA
2 (a)	Very-dense &/or cemented sands, coarse gravel & cobbles, pre-loaded silts, & clays	40-up	more than 550 lbs. inch
(b)	Corals	40-up	more than 550 lbs. inch
3	Medium-dense coarse sands, sandy gravels, very-stiff silts & clays	24-39	350 to 550 lbs. inch
4 (a)	Loose to medium dense sands, firm to still clays, & silts, alluvium fill	18-23	276 to 350 lbs. inch
(b)	Very loose to medium dense sands, firm to still clays & silts, alluvium fill	12-17 <sup>3</sup>	175 to 275 <sup>3</sup> lbs. inch
5	Concrete slab Tensioning devices for use in concrete pad, runner, etc., shall be tested (same as anchors) and specifications as to PSI and cure time of concrete, reinforcement, size and thickness of concrete, size and depth of bolt hole, type and kind of shield if permissible. Minimum distance at which tensioning device can be installed from edge or end of slab, pad, runner, etc., shall be specified. Instructions shipped with each tensioning device shall include the above.		

<sup>1</sup> The test probe is a device for measuring the torque value of soils to assist in evaluating the holding capability of the soils in which the anchor is placed. The test probe has a helix on it. The overall length of the helical section is 10.75 inches; the major diameter is 1.25 inches; the minor diameter is 0.81 inches; the pitch 1.75 inches. The shaft must be of suitable length for anchor depth.

<sup>2</sup> A measure synonymous with moment of a force when distributed around the shaft of the test probe.

<sup>3</sup> Below these values, a professional engineer should be consulted or additional anchors added.

# TEST FOR WELDS AT THE HEAD

ANCHOR MANUFACTURER	TESTING LABORATORY
ADDRESS	ADDRESS
MODEL #	PERSON PERFORMING TEST

## DESCRIPTION OF ANCHOR

HOLD TIME	POUNDS OF FORCE	TEST 1	TEST 2	TEST 3		
Preload	1,000					
5 sec.	1,500					
5 sec.	2,000					
5 sec.	2,500					
5 sec.	3,000					
5 sec.	3,500					
5 sec.	4,000					
5 sec.	4,500					
5 sec.	5,000					
5 sec.	5,500					
5 sec.	6,000					
5 sec.	6,500					
5 sec.	7,000					
5 sec.	7,125					
10% over-load	7,838					
MAXIMUM LOAD						

DATE PULLED					
-------------	--	--	--	--	--

COMMENTS:

EXAMPLE NO. III

# TEST FOR DISC OR COMPLETE ANCHOR

\_\_\_\_\_  
ANCHOR MANUFACTURER

\_\_\_\_\_  
TESTING LABORATORY

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
MODEL #

\_\_\_\_\_  
PERSON PERFORMING TEST

\_\_\_\_\_  
DESCRIPTION OF ANCHOR

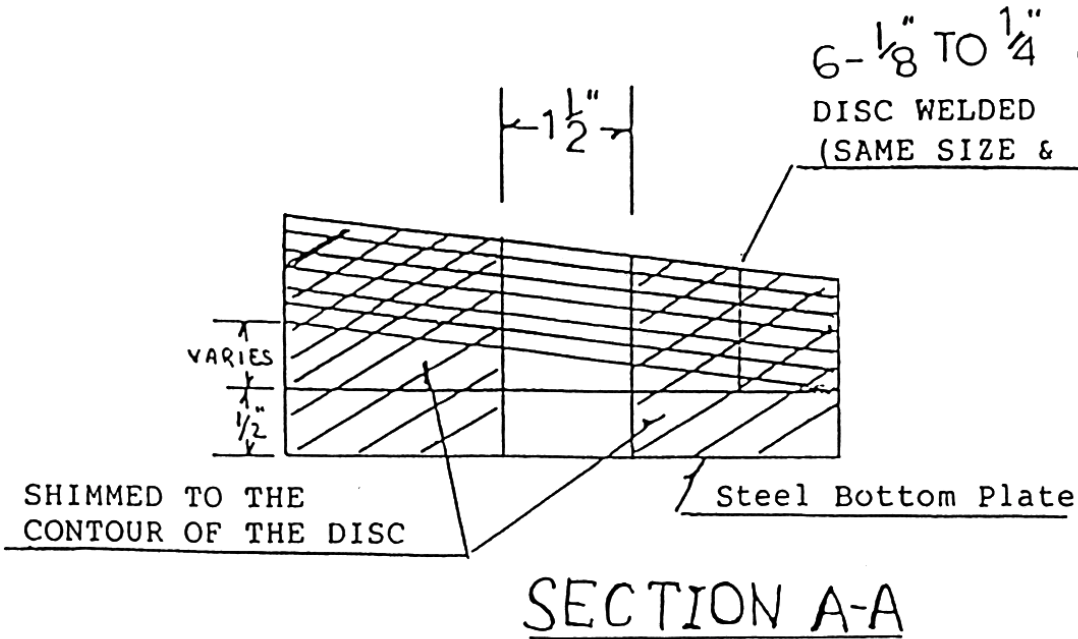
HOLD TIME	POUNDS OF FORCE	TEST 1	TEST 2	TEST 3		
Preload	1,000					
5 sec.	1,500					
5 sec.	2,000					
5 sec.	2,500					
5 sec.	3,000					
5 sec.	3,500					
5 sec.	4,000					
5 sec.	4,500					
5 sec.	5,000					
5 sec.	5,500					
5 sec.	6,000					
5 sec.	6,500					
5 sec.	7,000					
5 sec.	7,125					
10% over-load	7,838					
MAXIMUM LOAD						

DATE PULLED					
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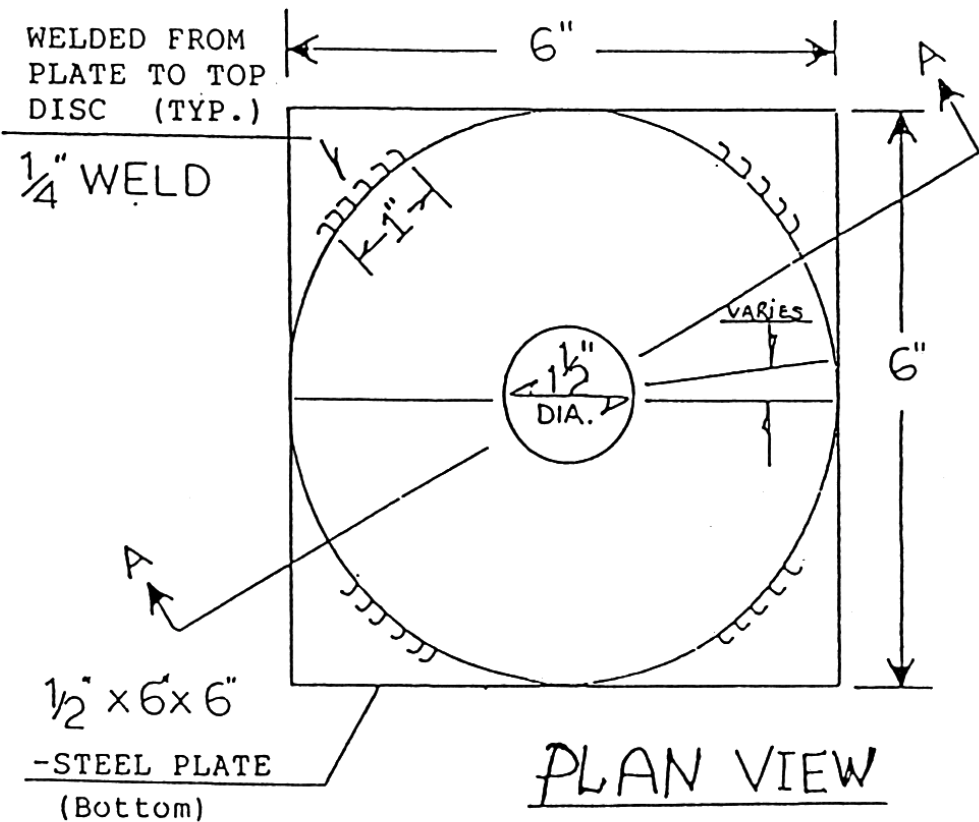
COMMENTS:

EXAMPLE NO. IV

ANCHOR DISC TEST BLOCK



1. Cut a steel bottom plate to 1-1/2" x 6" x 6" with a hole of 1-1/2" diameter at the center.
2. Cut a hole of 1-1/2" diameter at the center of the helix disc and stack them on top of the circular shim with an outside diameter of 6" and an inside diameter of 1-1/2".
3. Attach the bottom plate to the shim and weld them together as shown.



# TEST FOR TENSIONING DEVICE

\_\_\_\_\_  
ANCHOR MANUFACTURER

\_\_\_\_\_  
TESTING LABORATORY

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
ADDRESS

\_\_\_\_\_  
MODEL #

\_\_\_\_\_  
PERSON PERFORMING TEST

\_\_\_\_\_  
DESCRIPTION OF DEVICE

HOLD TIME	POUNDS OF FORCE	TEST 1	TEST 2	TEST 3		
Preload	1,000					
5 sec.	1,500					
5 sec.	2,000					
5 sec.	2,500					
5 sec.	3,000					
5 sec.	3,500					
5 sec.	4,000					
5 sec.	4,500					
5 sec.	4,725					
10% over-load	5,198					
MAXIMUM LOAD						

DATE PULLED					
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COMMENTS:

EXAMPLE NO. VI

# ANCHOR FIELD TEST

ANCHOR MANUFACTURER	TESTING LABORATORY
ADDRESS	ADDRESS
MODEL #	CLASS OF SOIL

DESCRIPTION OF ANCHOR

DIMENSION AND DESCRIPTION OF STABILIZER PLATE AND MANUFACTURER'S NAME

HOLD TIME	POUNDS OF FORCE	TEST 1		TEST 2		TEST 3	
		2" UPLIFT	3" LATERAL	2" UPLIFT	3" LATERAL	2" UPLIFT	3" LATERAL
Preload	1,000						
5 sec.	1,500						
5 sec.	2,000						
5 sec.	2,500						
5 sec.	3,000						
5 sec.	3,500						
5 sec.	4,000						
5 sec.	4,500						
5 sec.	*4,725						
5 sec.	5,000						
10% over-load	*5,200						
5 sec.	5,500						
5 sec.	6,000						
10% over-load	6,600						
MAXIMUM LOAD							

\*Denotes testing for 4,725 pound anchor

DATE OF INSTALLATION						
DATE PULLED						

COMMENTS:

EXAMPLE NO. VII



Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History - New 1-10-94, Amended 10-02-95.

15C-1.0109 Manufacturer Quality Assurance Program and Monitoring.

(1) It is the manufacturer's responsibility to maintain a reliable quality control program which includes inspection of incoming material, control of manufacturing methods, visual inspection of each manufactured anchor or component, and the periodic testing requiring ninety-five percent (95%) to ninety-eight percent (98%) compliance of the finished products.

(2) In-house sample testing of at least two (2) different anchors and/or components shall be conducted at monthly intervals. A schedule shall be set-up to assure that all listed products are tested. A copy of the test results shall be mailed to the Department of Highway Safety and Motor Vehicles, Division of Motor Vehicles, Bureau of Mobile Home and Recreational Vehicle Construction. This sampling is based upon a random sample selection of anchors and components for testing. A random sample is defined as a sampling procedure which avoids systematic choice, conscious or subconscious by the manufacturer. An important part of the quality assurance program shall show that the manufacturer is maintaining the quality level established by this program and according to the specifications as required by the applicable rules of Chapter 15C-1, F.A.C.

(3) The Bureau of Mobile Home and Recreational Vehicle Construction shall periodically pick up a random sample of each anchor manufacturer's anchors and/or components for random testing. If failure occurs, the manufacturer shall be notified and given the option to provide testing of three (3) additional samples or the product shall be removed from the approved list and from sale in the State of Florida. This product shall be redesigned with a new model number including complete testing and listing for sale in Florida.

Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History – New 1-10-94, Amended 10-02-95.

15C-1.0110 Rule Review. The Department shall periodically review rules 15C-1.0101 through 15C-1.0110, and promulgate any amendments to said rules. The first such review will begin January 1, 1997, and shall be repeated at three year intervals thereafter.

Specific Authority 320.011, 320.8325(2), F.S. Law Implemented 320.77(10), 320.822(12), 320.8285, 320.8325, 320.835(2), F.S. History – New 1-10-94.

**Amended 3/31/99**

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