

Company: FlatSafe Tornado Shelters L.L.C.

Date: 17 Jul 2012

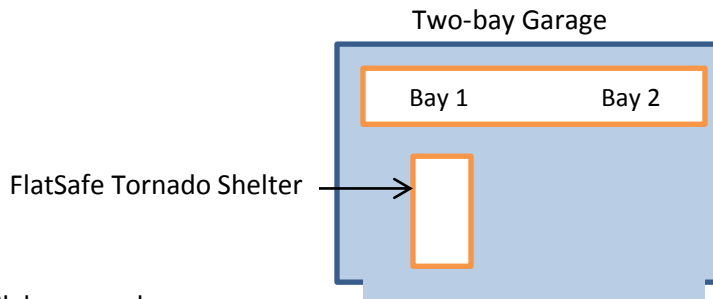
Subject: FlatSafe Tornado Shelter Installation Procedures (Two Pages)

Purpose: The FlatSafe Tornado Shelter installation procedures outlined in this document meet or exceed tornado shelter design criteria for residential construction.

INSTALLATION PROCEDURES:

The following installation procedures were written for the application of a FlatSafe Tornado Shelter in a residential home's garage slab reinforced with standard footings and stem walls. Residential slabs reinforced with post tension cables will be evaluated on an individual basis for clearance requirements &/or adjustments to post tension cable locations.

1. Determine installation location:
 - a. Standard installation location is near an overhead door, and centered in a parking bay. In all cases, ensure automobile tires will remain clear of the sliding lid when car is parked in designated location. See figure below.



2. Slab removal:
 - a. Mark and cut slab using a water supplied pavement saw to minimize dust. The marked dimensions will be approximately 6" wider & 8" longer than the shelter's outside dimensions.
 - b. Carefully remove slab avoiding damage to the surrounding pavement.
 - c. Control contaminated water run-off by using a squeegee and pressure washer to push contaminated water into the void created for shelter. See figures below.



3. Subgrade removal:
 - a. Excavate subgrade and place in dump truck or trailer. Subgrade is normally removed from jobsite. However, dirt may be placed in customer's yard for later landscaping use upon request.
 - b. Following excavation, work area will be cleaned prior to shelter placement. See figure below.



4. Shelter placement:
 - a. Remove shelter's lid and place installation bars near each end of shelter.
 - b. If necessary, adjust shelter elevation using shims. After shelter has been centered, clamp installation bars to existing slab.
 - c. Ensure shelter's elevation is approximately ¼" higher than the existing slab. See figure below.



5. Concrete placement:
 - a. Using only ready-mix concrete rated for not less than 3000psi; properly place (vibrated) concrete beneath the product's edges and up the sides. A 4" slump is recommended.
 - b. Product size and the table below will determine the amount of concrete used for proper installation.

Product Size	Medium	Large	X-Large
Concrete Requirement	1.5 yds ³	2.0 yds ³	2.25 yds ³

6. Lid and bench installation:
 - a. After concrete finishing, place lid on shelter rails and install kick-over wheels with a ¾" wrench.
 - b. Place pre-cut boards with carpeted covers on pre-fabricated ledges and ensure mid-point braces are secure and properly placed.
 - c. Install come-a-long and chain with spring assist. See figures below.



7. Keynotes:
 - a. Chain length for spring assist is preset at factory; an adjustment should not be required.
 - b. Verify operation of locking-pin and brief customer on proper operation of shelter, to include; use of exterior locking pin for shelter access and interior release handle for shelter egress.
 - c. Verify operation of come-a-long and tension of spring assist. Brief customer on proper operation of come-a-long.
 - d. Brief customer on proper use of interior locking chains.
 - e. Upon completion of installation, jobsite should be just as clean (or cleaner) as it was on arrival.
8. Questions and/or comments may be forwarded to FlatSafe Tornado Shelters L.L.C., 1200 Industrial Drive, Yukon, OK 73099, 866.520.3528, fax 580.765.3874, shelters@flatsafe.com .



DID YOU KNOW?

The Federal Emergency Management Agency (FEMA) has been working to tighten the requirements for the manufacture and installation of storm shelters?

FEMA is considering requiring a registered engineer to sign off on each installation.

The National Storm Shelter Association (NSSA) has worked diligently to create a Compliance Verification Process for safe rooms to satisfy FEMA requirements. Please see the attached document which outlines this compliance verification process.

We hope that you will immediately take the necessary action to be a **Safe Room Qualified Provider**.

All NSSA Producer Members who have met the requirement will be listed as such on the NSSA website beginning in January 2013.

By fulfilling these requirements your company will:

- Be at the forefront of all saferoom providers.
- Demonstrate to potential customers your commitment in providing quality work.
- Demonstrate to grant program managers and the Authority Having Jurisdiction (AHJ) your commitment to quality installations
- Help to ensure your future in the saferoom industry.

If you have questions about this process please contact Mike Vaughn at 877-827-8255 or Dr. Ernst Kiesling at NSSA 877-700-6772.

Best Regards,

A handwritten signature in black ink that reads "Michael L. Vaughn". The signature is written in a cursive style with a large initial "M".

Mike Vaughn, P.E.

President

National Storm Shelter Association (NSSA)

How to Get Your Shelter Rated FEMA “Safe Room Qualified”

Why should you want to call your product a "safe room" instead of a "shelter"?

In the past, FEMA and others used the terms “safe room” and “shelter” interchangeably. When the ICC-500 Standard came out FEMA wanted to highlight as better designed those shelters that meet the FEMA guidelines versus those that do not. FEMA believes only their criteria meets their standard of “near-absolute” protection. To highlight differences between safe rooms designed to FEMA P-320 and P-361 guidelines, FEMA’s term "safe room" can only be applied to protective spaces meeting the FEMA criteria. If a space is designed only to the ICC-500 Standard then FEMA requires it be called a “shelter”. Therefore:

- FEMA does not recognize NSSA/ICC 500 compliant safe rooms as meeting FEMA 361. They want to distinguish residential "safe rooms" from the larger "community shelters."
- The difference between a *residential* and a *community* safe room is that the latter is designed for more than 16 persons.
- The ICC-500 provides minimum design requirements for protective spaces and is expected to be incorporated (by reference) into the 2009 International Building Code (IBC) and International Residential Code (IRC). Therefore NSSA members will benefit if designers and inspectors are knowledgeable of both FEMA guidance and ICC standards.
- FEMA recently discovered that some storm shelters partially paid for by FEMA did not comply with FEMA guidelines. Because of this FEMA now requires the producer/installer to develop and use installation checklists followed by inspections by professional engineers in order to meet FEMA 361 safe room design requirements.
- NSSA has developed a “compliance verification processes” for safe rooms (copy attached) to help designers and third-party evaluators do their job. This process places primary responsibility for inspection and installation on the safe room Producer Members (or their representatives) who are present during construction and installation.
- NSSA is about to launch a program to educate building officials with NSSA’s quality control processes. The objective is to get officials to embrace the NSSA compliance verification process and to require an NSSA Seal to be on all safe rooms installed in their jurisdictions. NSSA’s goal is to give NSSA *safe room-qualified producers* a process to avoid costly “special inspections”.

Here, then, are the steps you need to take to qualify your product as a FEMA "safe room":

1. Have the shelter designed by a registered engineer that is familiar with the material used to manufacture the saferoom. He will become “the engineer of record” for your design.

He must be qualified to meet the design requirements for saferooms/storm shelters including but not limited to FEMA 320, FEMA 361, NSSA / ICC 500 (2008).

(Note: If the shelter is already designed, it will have to be reviewed and updated to satisfy the latest version of the requirements listed above plus the (American Society for Testing and Materials) ASTM Standards.)

2. The engineer must provide you with a complete set of shop drawings and an installation checklist as part of his official design work.

The installation checklist must be a detailed, step-by-step, document to make sure that each step of the installation can be easily understood and properly performed. You must train and certify the installer as being qualified to safely install your design. Your installer will need to “check off” that he has done each and every step and then sign the document for the official records.

3. After the safe room design, shop drawings and installation checklist are complete you alone are responsible to be absolutely sure that the design, shop drawings and installation checklist match every component of the saferoom and saferoom installation process.
4. Select an NSSA approved third party engineer to do an independent careful review of the design and shop drawings of all the saferoom components and the installation checklist.
5. Once the third party review is complete you must submit the entire packet to the NSSA, to record the safe room type and document that your design is now safe room qualified.

After your product is “safe room” qualified:

1. Every time one of your shelters is installed an individual (i.e. A certified person that is trained by you in the installation processes and is on site while the safe room is being installed) must complete and sign the installation checklist. That individual must personally sign the document(s) and by so doing agree to accept the accountability and responsibility for making sure that all the installation criteria was done as required.
2. As a NSSA producer member, you are responsible for making sure all aspects of the saferoom are manufactured and installed properly. The compliance verification process and completion of all documents for each installation must be satisfied before the product is “safe room qualified.”
3. If any safe room you install varies from the approved and 3rd party reviewed design, an acceptance of variance from the *Authorities Having Jurisdiction (AHJ)* will need to be obtained, documented and official, signed copies provided to NSSA for their records.

Insurers of Quality in Safe Rooms (Storm Shelters)

PRODUCER MEMBERS - are persons, firms, corporations, or partnerships who are engaged in the manufacture or construction of safe rooms (storm shelters) and who certify that the manufacture and installation or construction are in compliance with the ICC/NSSA Standard, FEMA 320 and FEMA 361 Guidelines. Producer Members apply an NSSA seal bearing the Producer Member's name and a serial number to each safe room (storm shelter) produced. Producer Members may have **AUTHORIZED REPRESENTATIVES** perform designated functions for which the Producer Member assumes responsibility.

AUTHORIZED REPRESENTATIVES – are persons, firms, corporations, or partnerships that are contractually authorized representatives of a Producer Member, who are trained by the Producer Member to perform functions assigned by the Producer Member.

INSTALLER MEMBERS - are persons, firms, corporations, or partnerships who install safe rooms (storm shelters) for Producer Members and who bear responsibility for compliance with installation instructions provided by the Producer Member.

PROFESSIONAL MEMBERS – licensed design professionals such as architects and engineers who are engaged in the storm shelter industry and who subscribe to the NSSA Bylaws and applicable standards and guidelines..

THIRD PARTY EVALUATORS - independent, NSSA-approved, third party, evaluators--architects and engineers--who verify that the Producer Member's design complies with all aspects of the ICC/NSSA Standard and FEMA 320 and 361 Guidelines, as applicable. Legal considerations dictate that the third-party evaluator can only verify designs and calculations produced by a registered design professional architect or engineer who is the designer of record.

CHIEF COMPLIANCE OFFICER - A registered design professional, appointed by NSSA, who is responsible to assure compliance of NSSA Producer Members with the *ICC/NSSA Standard* and other applicable standards and guidelines and to assure compliance of all NSSA members' business practices with the NSSA Bylaws. The Chief Compliance Officer is informed of the *ICC/NSSA Standard* and relevant guidelines and is competent in the field of design of safe rooms (storm shelters) for protection against the effects of tornadoes and hurricanes. The Chief Compliance Officer may be a Producer Member and/or a Professional Member of NSSA.

Processes for Verifying Standards-Compliance of Safe Rooms (Storm Shelters)

General: Producer Members may present a **Quality Assurance Plan (QAP)** on or with each set of **Construction Documents** covering compliance issues. The QAP shall meet requirements of **Section 107** of the **ICC/NSSA Standard**. It shall include the **general construction sequence and the type and frequency of construction observations and/or inspections.**

The QAP shall be evaluated by an NSSA-approved Third-Party Evaluator before presentation to the authority having jurisdiction (AHJ).

NSSA Compliance Verification Process

Design

Designer of Record

For each model, the Designer of Record, who is a licensed design professional:

- Provides engineered drawings and specifications for safe room (storm shelter) to Producer Member. Seals, signs and dates each sheet of drawings.
- Identifies applicable standards and guidelines met or exceeded in design. Include latest editions of ICC/NSSA Standard; FEMA 320 and 361 Guidelines. If differences exist in design criteria, the most stringent shall be met.
Alternate -- Producer/Contractor specifies which prescriptive design presented in FEMA 320 will be followed.
Designer of Record verifies standards-compliance of any design changes or variation from FEMA 320 prescriptive designs
- For above ground safe rooms (shelters), provide:
 - Minimum specifications for foundation or slab design--thickness, reinforcement, overhang; avoidance of pre-tensioning or post-tensioning strands; anchoring details.
 - Assembly and installation instructions including detailed step-by-step installation checklist or a Quality Assurance Plan.
- For below ground safe room (shelter), provide:
 - Specification for site preparation, minimum and maximum slope of grade, slope stabilization
 - Design of anchorage, ballasting to prevent buoyancy with saturated soil conditions.
 - Step-by-step installation instructions including backfilling, encasement, and compaction or a Quality Assurance Plan. Under-slab-on-grade safe rooms (storm shelters) are included in the standards listed above.
- Provide installation checklist.
- Provide list and schedule of needed inspections (may be included in a Quality Assurance Plan).
- Provides these documents to Producer Member and to NSSA home office.

Evaluate

Third-Party Evaluator for standards compliance.

- Evaluates for standards compliance all elements of design
- Reviews and evaluates construction documents and/or detailed Quality Assurance Plan
- Issues statement of scope of third-party evaluation
- Provides evaluation report to Producer Member and to NSSA home office

Production/
Manufacture

Producer Member

- Provides design drawings and specifications and/or Quality Assurance Plan to authority having jurisdiction when requested
- Follows design drawings and specifications
- Has third party evaluator verify compliance with standards of any change from approved drawings and specifications
- Permits plant or construction site visits by NSSA Chief Compliance Officer and/or inspectors of jurisdictional authorities if required by either. Purpose and focus of visit shall be stated in writing upon arrival
- Provides drawings/specifications and Third Party Evaluator report to NSSA home office if not already sent
- Provides drawings and specifications to owner or installer to obtain building permits as required
- Notifies owner that site must be verified to be outside the floodway to meet FEMA guidelines
- Affixes NSSA Producer Member Seal (Type 1 or Type 2) to each safe room (storm shelter) installed

Installation

Installer (NSSA Installer Member or Authorized Representative of Producer Member)

- Completes installation checklist.
- Signs Certificate of Installation or separate document that installation instructions were followed. Attach completed installation check list.
- Records GPS Coordinates of installation site; encourages owner to register site with local emergency management agencies
- Records serial number of Producer Member Seal. Affix Type 3 Seal if Type 2 seal has been affixed.

Inspection

Inspector

- Producer/Contractor performs or has Authorized Representative perform scheduled inspections in accordance with the list and schedule of inspections or the Quality Assurance Plan.
- When required by the Authority Having Jurisdiction (AHJ) or by grant authority, the AHJ or a duly appointed inspector performs scheduled inspections and produces an Inspection Report after the final inspection.
- When required by the grant authority, a licensed design professional issues an Inspection Report including a statement of compliance that relevant standards are met.
- When required by the grant authority, the inspector and licensed design professional provide signed copy of inspection report to Producer Member to attach to Certificate of Installation for submittal to authority having jurisdiction (AHJ) or grant administering agency, if any.

Drawing Index

Sht #	Title
1	Title Sheet/ Bill of Materials
2	Assembly
3	"Medium" Weldment Sheet
4	Shelter, Lid, Flat

Notes:

- 1) All welding per AWS Spec
- 2) Coat exterior with "Tar Gard Black #3760", Anchor Paints
- 3) Remove all sharp edges & burrs
- 4) Install w/ a minimum of 1.50 cu/yds of concrete placed under and around the shelter
- 5) These dwg. are not intended for manufacturing or installation
- 6) Please note that installation of these units near structural walls other than standard footings shall be individually evaluated prior to installation.

The information contained within this analysis is provided in good faith, and reasonable effort was made to ensure that it is accurate. However, this analysis relies upon information, reports, data, observations, installation and analysis not generated or verified by the undersigned engineer.

Accordingly, this information is provided "as is" without warranty of any kind. The undersigned Engineer excludes all warranties, either expressed or implied. In no event shall the undersigned Engineer, nor Engineering firm, be liable for any damages arising, directly or indirectly, from the use of the information contained herein including damages arising from inaccuracies, omissions or errors.

Any person relying on any of the information contained within this analysis or making any use of the information contained herein, shall do so at their own risk. The undersigned Engineer hereby disclaims any liability and shall not be held liable for any damages including, without limitation, direct, indirect or consequential damages.

This Shelter design complies with the applicable standards as set forth in: 1) ICC-500-2008 edition

- 2) FEMA 361
- 3) FEMA 320
- 4) IBC 2006 for wind, seismic, dead & live loads
- 5) ASCE 7-05 for wind
- 6) NPCTS national performance criteria for tornado shelters

Flat Safe Tornado Shelter

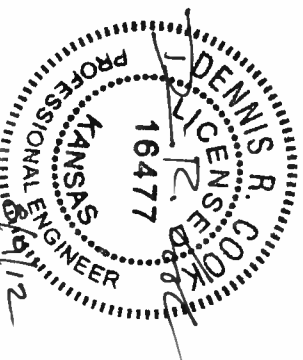
Manufactured by

A to Z

Machining Service L.L.C.

1212 West Liberty

Ponca City, Oklahoma 74602



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LICENSE NUMBER 16477
STRUCTURAL

Pt #	Description	Qty	Pt #	Description	Qty
FL041	Front Latch	1	FL041	Front Latch	1
FL040	Kick Over Axle	2	FL040	Kick Over Axle	2
FL039	Front Latch	1	FL039	Front Latch	1
FL038	Front Latch	1	FL038	Front Latch	1
FL070	Hinge Pin	2	FL070	Hinge Pin	2
FL037	Handle	1	FL037	Handle	1
FL036	Roller	6	FL036	Roller	6
FL035	Front Latch Tube	1	FL035	Front Latch Tube	1
FL069	Hinge Sleeve	4	FL069	Hinge Sleeve	4
FL034	Kick Over Assy	2	FL034	Kick Over Assy	2
FL033	Handle	1	FL033	Handle	1
FL032	Door Rail	2	FL032	Door Rail	2
FL031	Handle Hook	2	FL031	Handle Hook	2
FL030	Front Door Lock	2	FL030	Front Door Lock	2
FL029	Door Brace	3	FL029	Door Brace	3
FL028	Door Frame	1	FL028	Door Frame	1
FL027	Rear Door Lock	2	FL027	Rear Door Lock	2
FL026	Floor Support	2	FL026	Floor Support	2
FL025			FL025		
FL024	Rear Latch	2	FL024	Rear Latch	2
FL023	Side Clips	6	FL023	Side Clips	6
FL022	Side Support	2	FL022	Side Support	2
FL021	Door Frame	1	FL021	Door Frame	1
FL019	End Hooks	2	FL019	End Hooks	2
FL018	Step Bracket, Lt	1	FL018	Step Bracket, Lt	1
FL017	Bench Support	4	FL017	Bench Support	4
FL016	Step Assembly	2	FL016	Step Assembly	2
FL087	Step Leg, Lt	1	FL087	Step Leg, Lt	1
FL015	Step Leg, Rt	1	FL015	Step Leg, Rt	1
FL066	Step Leg, Lt	1	FL066	Step Leg, Lt	1
FL014	Step Leg, Rt	1	FL014	Step Leg, Rt	1
FL071	Star Bracket	1	FL071	Star Bracket	1
FL065	Rear Latch, Lt	1	FL065	Rear Latch, Lt	1
FL013	Rear Latch, Rt	1	FL013	Rear Latch, Rt	1
FL012	Door Hook	2	FL012	Door Hook	2
FL011	Door Handle	2	FL011	Door Handle	2
FL010	Door Handle	2	FL010	Door Handle	2
FL009	Lock Plate	2	FL009	Lock Plate	2
FL008	Roller Bracket	4	FL008	Roller Bracket	4
FL007	Step Side Panel	2	FL007	Step Side Panel	2
FL006	Step	4	FL006	Step	4
FL005	Bottom Step	1	FL005	Bottom Step	1
FL004	End Wall	2	FL004	End Wall	2
FL003	Side Wall	2	FL003	Side Wall	2
FL002	Floor	1	FL002	Floor	1
FL001	Door	1	FL001	Door	1

Bill of Material

Bill of Material

REVISION	DESCRIPTION	BY	DATE
6	Rev. Notes	JV	04/30/12
5	Added FEMA Note	JV	07/15/11
4	Notes	JV	04/10/09
3		JV	01-14-09
2		JV	01-09-09
1	Title Change	JV	06/19/06

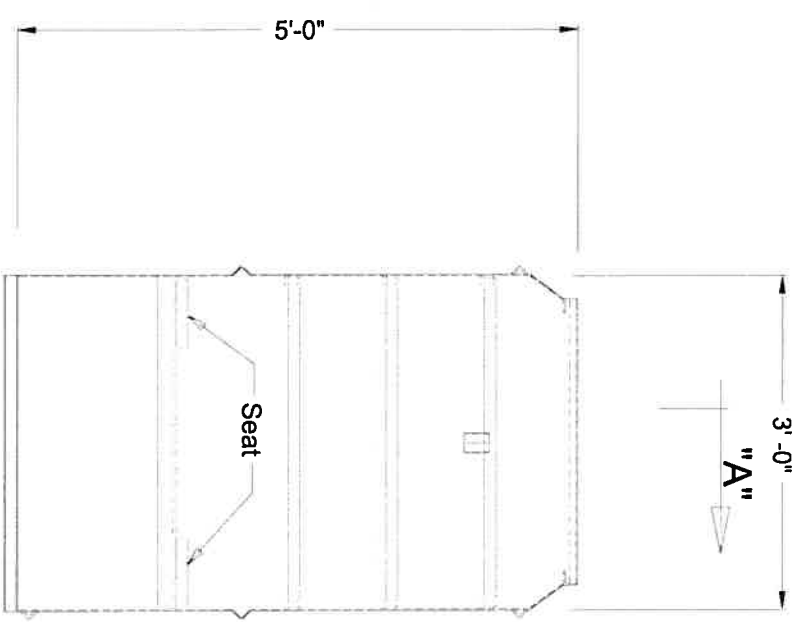


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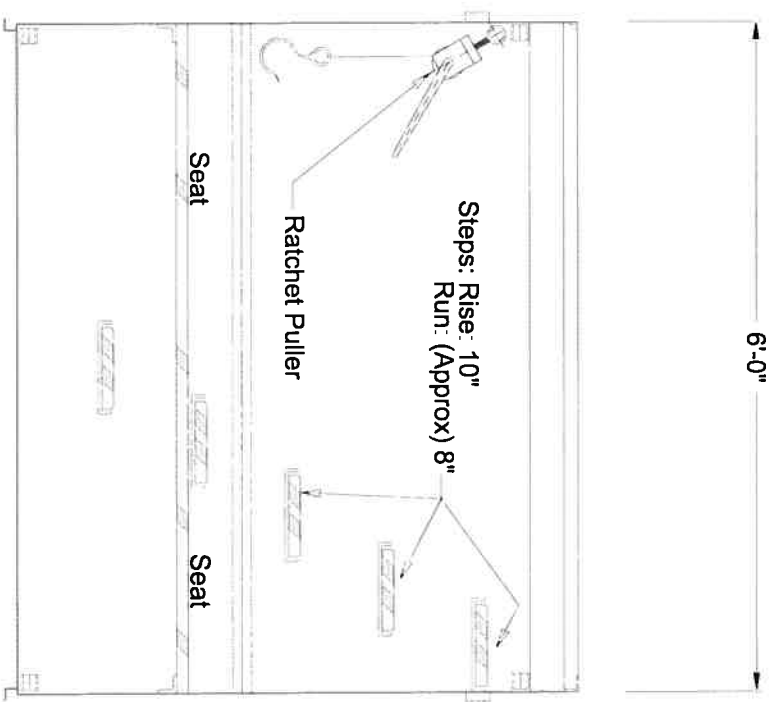
DATE: 10/19/05
SCALE: NTS
DRAWN BY: JV
SHEET: 1 of 4

This Shelter design complies with the applicable standards as set forth in:

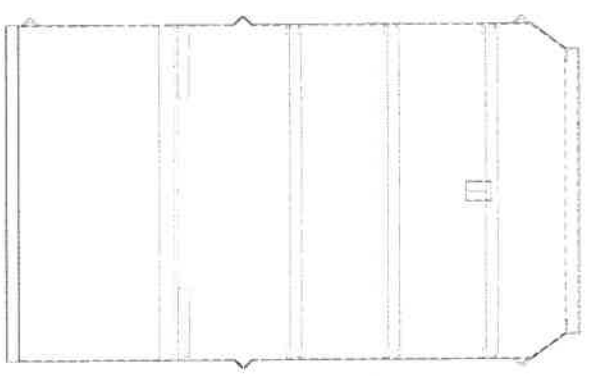
- 1) ICC-500-2008 edition
- 2) FEMA 361
- 3) FEMA 320
- 4) IBC 2006 for wind, seismic, dead & live loads
- 5) ASCE 7-05 for wind
- 6) NPCTS national performance criteria for tornado shelters



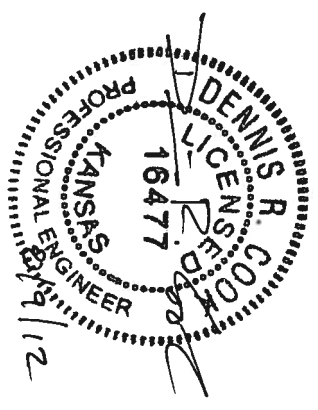
End View



Section "A-A"



End View



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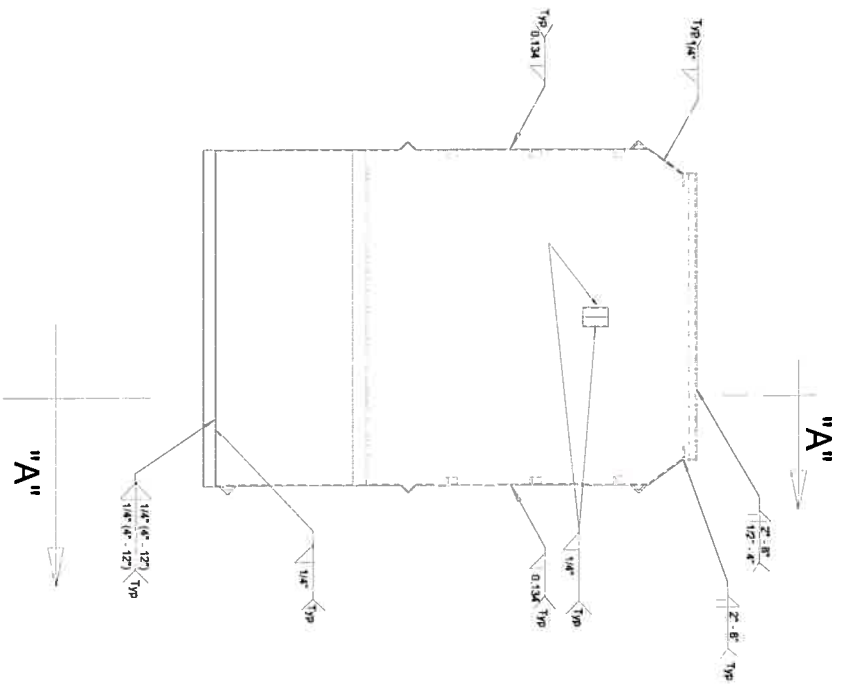
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REVISION	DESCRIPTION	BY	DATE
5	Rev. Notes/ steps	JV	04/14/12
4	Added FEMA note	JV	8/19/11
3		JV	01-14-09
2		JV	01-09-09
1	Added (4) FLO62	JV	06/19/06

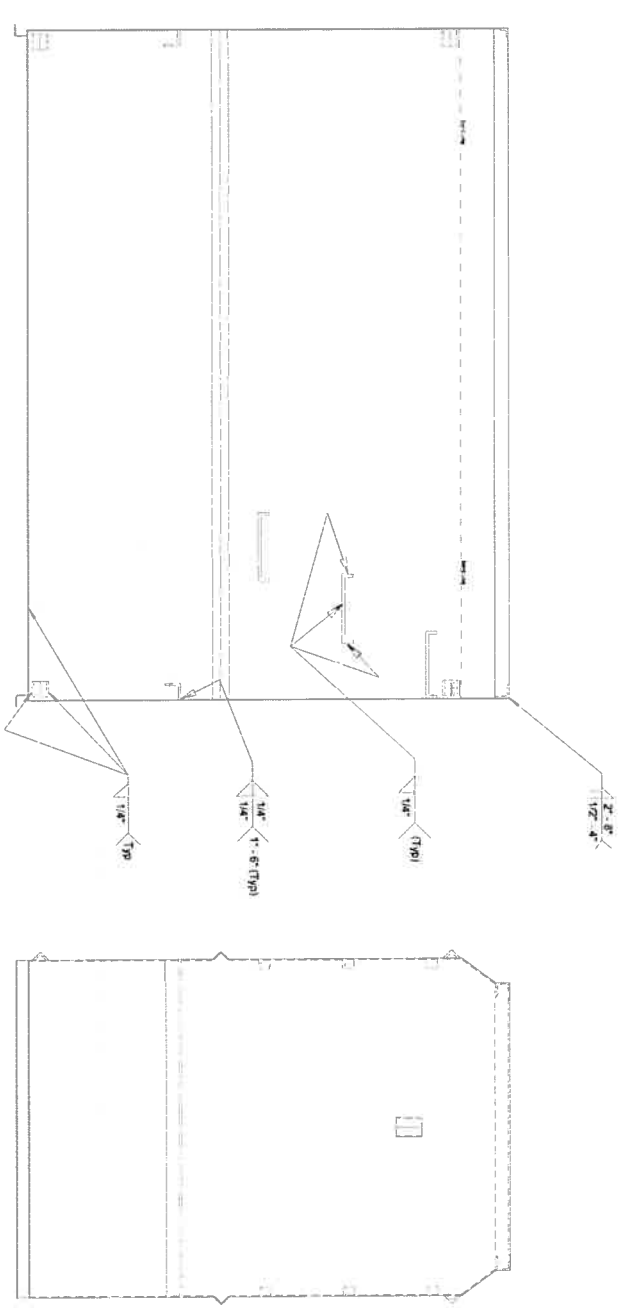
SEQUOYAH ENGINEERING, INC.
 7115 N. Bryant Avenue OKC, OK 73121 ~ (405) 475-9991
 Certificate of Authorization # 2393 Expires 09/03/07

JOB NAME: Flat Safe
 36" x 72" x 60" Tall
 DESCRIPTION: "Small" Assembly Sht
 DATE: 10/19/05
 SCALE: NTS
 DRAWN BY: JV
 SHEET: 2 of 4

- This Shelter design complies with the applicable standards as set forth in:
- 1) ICC-500-2008 edition
 - 2) FEMA 361
 - 3) FEMA 320
 - 4) IBC 2006 for wind, seismic, dead & live loads
 - 5) ASCE 7-05 for wind
 - 6) NPCTS national performance criteria for tornado shelters

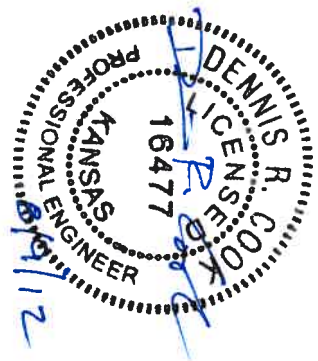


End View



Section "A - A"

End View



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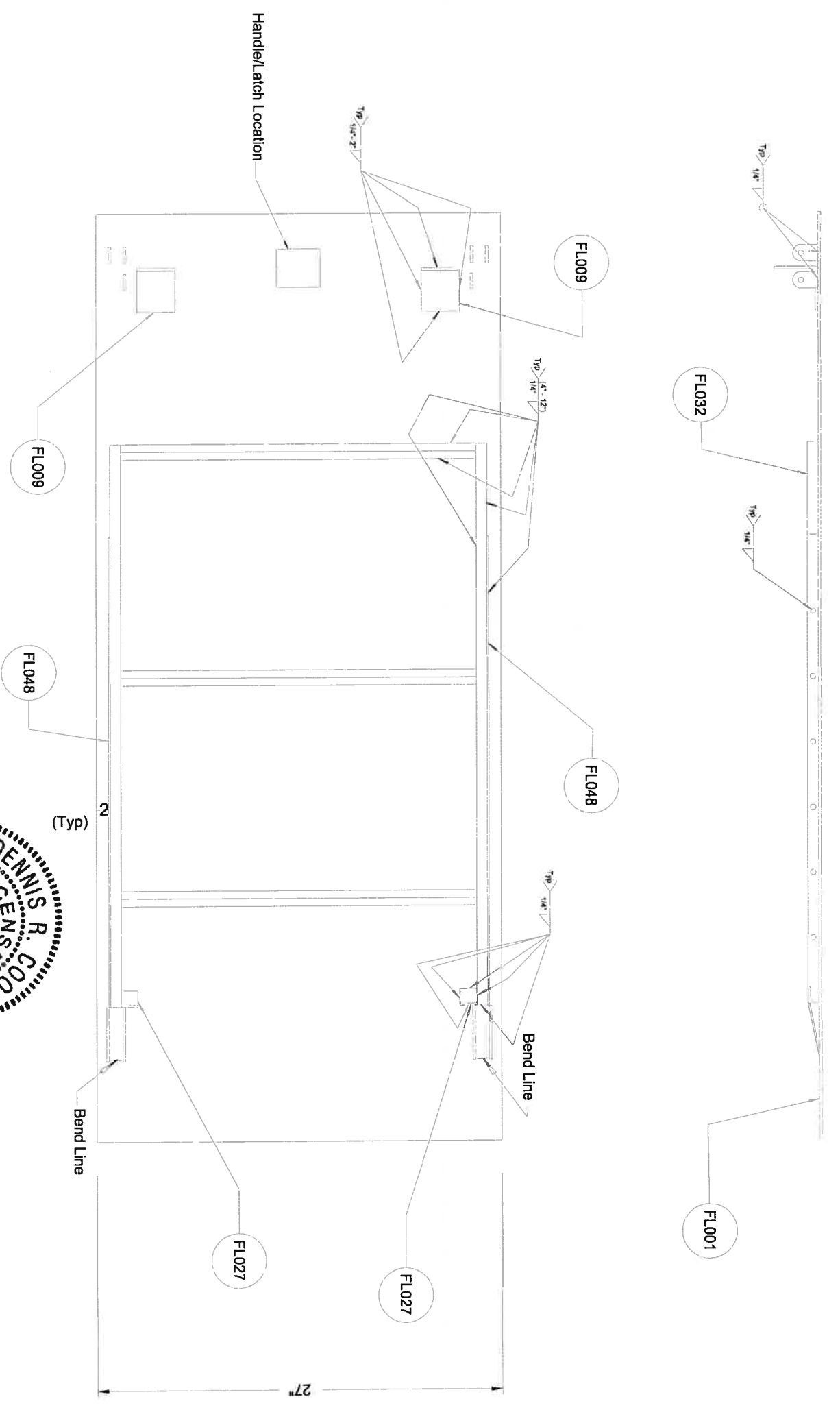
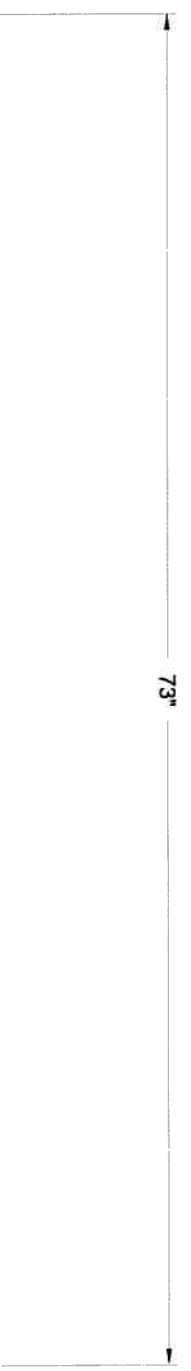
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REVISION	DESCRIPTION	BY	DATE	JOB NAME:	DATE:
1	Added (4) FLO52	JV	06/19/06	Flat Safe	10/19/05
2	Added FEMA note	JV	8/19/11	36" x 72" x 60" Tall	SCALE: NTS
		JV	01-14-09		DRAWN BY: JV
				DESCRIPTION: "Small" Weldment Sht	SHEET: 3 of 4

This Shelter design complies with the applicable standards as set forth in: 1) ICC-500-2008 edition
 2) FEMA 361
 3) FEMA 320
 4) IBC 2006 for wind, seismic, dead & live loads
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REVISION	DESCRIPTION	BY	DATE
1	Added FEMA note	JV	8/19/11
2		JV	01-14-09
3		JV	01-09-09
1	Edit Title Block	JV	06/19/06

SEQUOYAH ENGINEERING, INC.
 7115 N. Bryant Avenue OKC, OK 73121 ~ (405) 475-9991
 Certificate of Authorization # 2393 Expires 09/03/07

JOB NAME:	Flat Safe	DATE:	10/19/05
DESCRIPTION:	36" x 72" x 60" Tall	SCALE:	NTS
	"Small" Sliding Lid	DRAWN BY:	JV
		SHEET:	4 of 4