Project Review Committee (PRC) Referral

Addresses	242, 246 Ormond St, and 3 Leopold St
Reason for Referral	In accordance with 120-181G(3), the Manager of Zoning (MOZ) requests that the PRC make its special knowledge and expertise available relating to the design of the development.
Next Steps	1. PRC to review deviations from design requirements and provide recommendation to the applicant. 2. Applicant to either revise plan to adhere to design requirements and/or proceed with an area variance application to the Zoning Board of Appeals for waivers from the design requirements with a PRC recommendation.

City-Wide Design Guidelines and Standards

120-158 City-wide design standards

Code Section	Requirement	Proposal
120-158B(1)	Any building facade facing a sidewalk, street, waterway or open space district shall have an active building elevation. Active building elevations shall include windows, building entrances and other architectural features that enhance the pedestrian scale and experience of the building facade.	No window, entrance, or architectural feature proposed.
120-158B(4)	Building facades shall not contain blank wall areas that exceed 25 linear feet, measured parallel to the street. Building facades that are 100 linear feet or more shall include a repeating architectural pattern with two or more of the following elements: color change, texture change, material change, or a wall articulation change such as a reveal, recess, offset, or pilaster.	40 linear feet blank wall parallel to Ormond St proposed.
120-158C	Building entrances. The front facade and main entrance shall face a public street and shall have a direct pedestrian connection to the street.	Building entrance not proposed.

Attachments

1. Container Specs
2. Container Configurations
3. Container Elevation
4. Picture
5. Fire Rating Report
6. Structural Engineering Reports

UNIVERSAL STORAGE CONTAINERS®
The Leader in Storage Container Solutions

2020,2019,2018,2017,2016,2015,2014,2013,2012,2011
International Award Winner for
"Best Self-Storage Container"

The #1 selling storage container in the world

USC GreenLite®

USC Greenlite® is a foldable portable moving & storage container solution developed by USC, the leader in the portable storage and moving industry, with over 200,000 units being utilized worldwide. Key standard features include sanitary cleanable powder coated steel base, walls, roof, fork lift sleeves, and foldability which provides the advantage of quick 30 minute assembly and backhaul of 12 to 60 containers in one 53' truck, storing up to 10 containers on top of each other (with optional stacking braces), and quick disassembly for moving as needed. USC Greenlite® gives you a significant advantage over your competition because it is less expensive than new construction, you can use it to expand where new construction may not be allowed, and it provides a faster ROI and lower initial investment than alternative options to enter the self-storage and/or portable moving & storage market.

Container	20' Model	20' Model	20' Model
GreenLite® Model #	GL-209396-FLS-1DED	GL-209396-FLS-2DSD-1P	GL-209396-FLS-4SSD-3P
Weight	2,700 lbs.	2,800 lbs.	2,850 lbs.
Sanitary Steel Structure	Powder Coated Steel Base, Walls & Roof	Powder Coated Steel Base, Walls & Roof	Powder Coated Steel Base, Walls & Roof
Floor	Slip-Resistant Floor	Slip-Resistant Floor	Slip-Resistant Floor
Roof	Powder Coated Steel	Powder Coated Steel	Powder Coated Steel
Doors	Double Swing End Doors	2 Double Swing Side Doors	4 Single Swing Side Doors
Exterior	231"L x 93"W x 96"H	231"L x 93"W x 96"H	231"L x 93"W x 96"H
Interior	227"L x 90"W x 91"H	227"L x 90"W x 91"H	227"L x 90"W x 91"H
Cubic Capacity	1075 Cubic Feet	1075 Cubic Feet	1075 Cubic Feet
Floor Load	10,000 lbs.	10,000 lbs.	10,000 lbs.
Partitions	None	1	3
Door Opening	72"W x 78"H	72"W x 78"H	48"W x 78"H
Forklift Sleeves	12"W x 4"H	12"W x 4"H	12"W x 4"H
Stackable	NO	NO	NO
Qnty in 40'HQ	12	12	12

Universal Storage Containers, LLC – Common Container Configurations

Please talk to your USC representative about other possible configurations and sizes not listed here that can optimize space and layout. All configurations can always be used with both GreenLite® (non-portable, ideal for Self-Storage) and Z-Box® (portable, stackable, ideal for portable storage) models.

USC model 209396-FLS-1DED has a double swing door on the end wall

USC model 209396-FLS-1SD has a double swing door on the side/long wall

USC model 209396-FLS-2DED-1P has a double swing door on each end wall, with a (removable) partition in the middle.

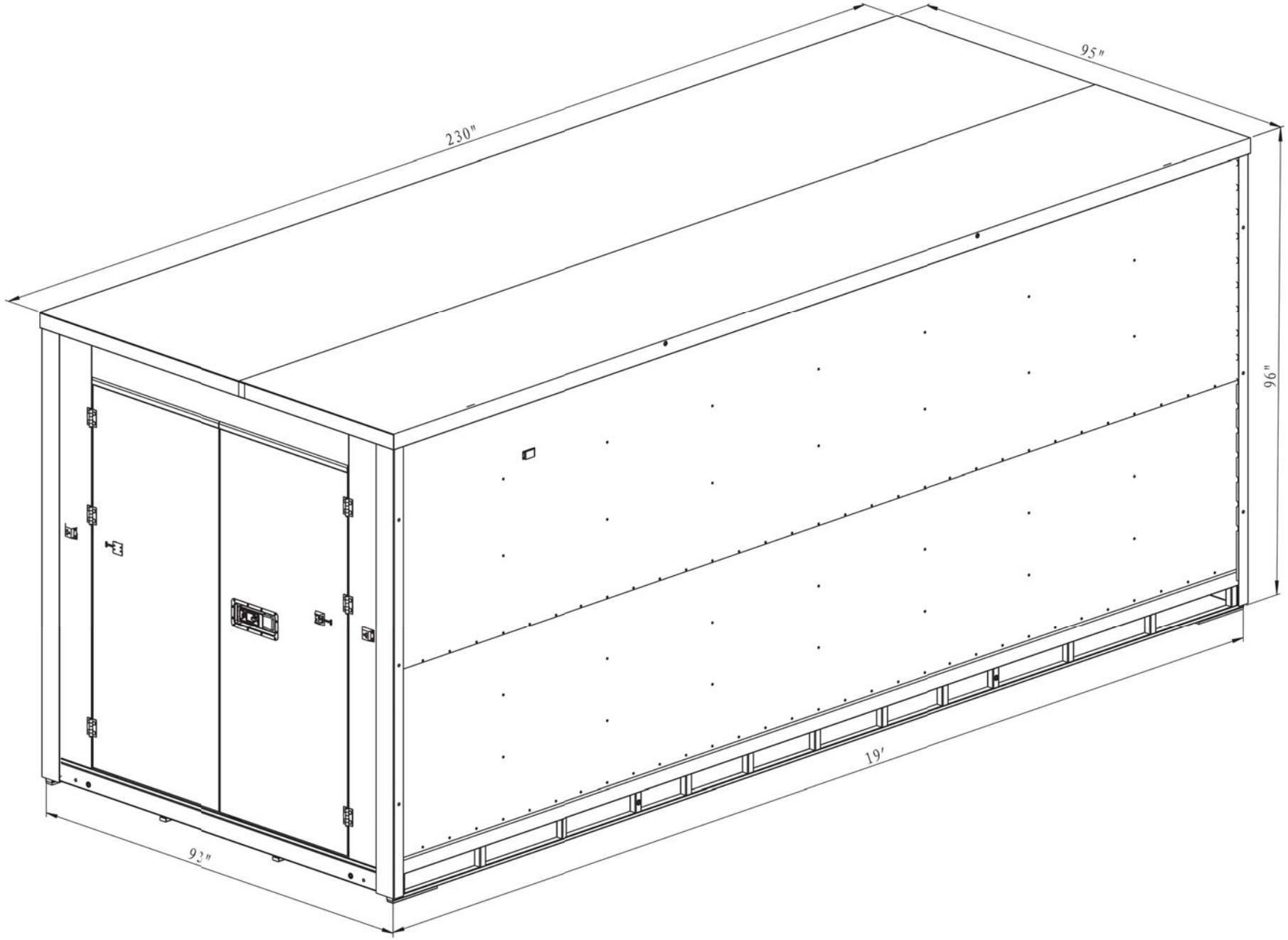
USC model 209396-FLS-2DSD-1P has a double swing door on one side/long wall with one (removable) partition in the middle.

USC model 209396-FLS-3DSD-2P has three double swing doors on one side/long wall with two (removable) partitions.

A **smaller** 169396-FLS-3SSD-2P that has three swing doors on one side/long wall with two (removable) partitions. The additional length of a 209396 allows for double swing doors.

USC model 209396-FLS-4SSD-3P has four double swing doors on one side/long wall with three (removable) partitions.

USC model 209396-FLS-16DSD has 16 double swing doors, 8 on each long/side wall.

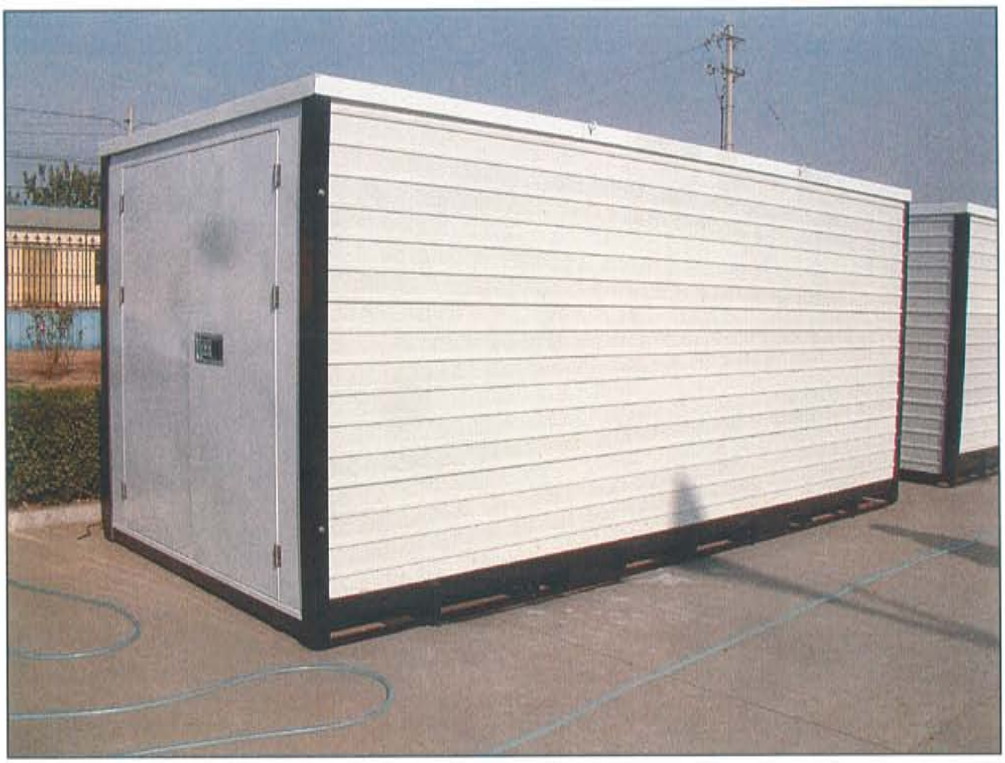

230"
95"
96"
19'
92"


Z111
Z112

Fire Protection Study for USC Z-Box Portable & Moving Storage Containers

Prepared for:

Universal Storage Containers LLC
146 Old Kings Highway
New Canaan, CT 06840



Prepared by:

CONSULTING ENGINEERS

540 Commercial Street • Manchester, NH 03101
Tel: (603) 668-8223 • Fax: (603) 668-8802
cld@cldengineers.com • www.cldengineers.com
New Hampshire • Vermont • Maine

Fire Protection Engineering by:

SFC Engineering Partnership, Inc.
25 Sundial Avenue, 205W
Manchester, NH 03103
Tel: (603) 647-8700 • Fax: (603) 647-8711

February 2007

CLD Ref. # 06-0283

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FIRE PROTECTION STUDY OF USC Z-BOX
PORTABLE & MOVING STORAGE CONTAINERS

CONSULTING ENGINEERS

1976 Celebrating 30 Years of Service 2006

February 8, 2007

Mr. Peter Nemiroff, President
Universal Storage Containers, LLC
146 Old Kings Highway
New Canaan, CT 06840

Re: Universal Storage Containers, LLC
Fire Protection Study
CLD Reference No. 06-0283

Dear Mr. Nemiroff:

We are pleased to submit with this letter our report covering the fire protection issues with a new-style container developed by Universal Storage Containers, LLC. The new container is a foldable, portable steel-framed moving and storage container that you have given the name: USC Z-Box. The Z-Box container has the unique characteristic of being capable of folding into a compact bundle with a height of about 14 inches to enable economical shipment from the manufacturing site to the franchise location and then to a further knockdown to accommodate the shipment of empty containers between various franchise locations. Also addressed in the report is an earlier designed non-foldable storage box that is noted herein as the first generation box.

For this assignment, we have associated with SFC Engineering Partnership, Inc. of Manchester, NH, and particularly with Nicholas J. Cricenti, Jr., P.E., who is an acknowledged expert in matters relating to fire protection engineering.

The accompanying letter from SFC Engineering Partnership, Inc. points out that storage system operators have regulations as to what goods may be placed into these storage boxes, which have no electrical or heat-producing systems built into them. This generates the opinion that if there is a fire protection issue associated with the boxes, the fire would be initiated from outside hazard sources. While the containers are designed to be stored outdoors as well as indoors, the principal function in this study has been associated with the indoor storage of stacked containers filled with materials that could be combustible, but not hazardous. So, the emphasis has been on the description of the fire suppression systems that would be appropriate for buildings that the filled boxes are stored in. The sprinkler system options are discussed and stacking arrangements for the boxes are defined to be consistent with what operators of the storage facilities are currently in the habit of providing.

The conclusion of the SFC Engineering Partnership, Inc. study is that in and of itself either type of storage box does not present a fire protection hazard, although the contents of the boxes should certainly be considered combustible, but the ignition source would come from outside the box as long as hazardous materials are not allowed to be stored in the boxes. Standard sprinkler systems are available that can not only protect the enclosing structure, but also suppress a fire in a single container or in a group of stacked containers.

540 Commercial Street • Manchester, NH 03101 • ph: (603) 668-8223 • fx: (603) 668-8802 • www.cldengineers.com

It has been a pleasure working with you on this most unique evaluation. We are available to assist you with further studies should the need arise.

Very truly yours,

CLD CONSULTING ENGINEERS, INC.

David W. Gates, P.E.

DWG:jt

Enclosures

THE STATE OF NEW HAMPSHIRE
DAVID W. GATES
No. 1357
REGISTERED PROFESSIONAL ENGINEER

SFC ENGINEERING PARTNERSHIP INC.
"Partnering With Clients for Success"

January 24, 2007

Mr. David Gates, P.E.
CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester NH 03101

RE: **Universal Storage Containers LLC** Our Project No. 449001
Fire Protection Study
For 1-800-Pack-Rat Box

Dear Mr. Gates,

On January 16, 2007 you visited the offices of SFC Engineering Partnership Inc., (SFC) and met with Nick Cricenti, P.E. to review potential fire protection issues with a new style container developed by Universal Storage Containers LLC. The new style container is a foldable portable steel framed moving and storage container called by the name USC Z-Box. Earlier styles of the storage containers were of the same construction materials except that the earlier versions have a polypropylene (plastic) roof material and are not foldable. In this report the earlier version of the container will be called *First Generation Box.* You reviewed the development and design of the USC Z-Box in addition to expressing some concerns expressed by some local fire officials as to how to classify and protect the storage facilities that eventually will house the USC Z-Box and the First Generation Box.

Subsequent to that meeting, on January 18, 2007, you again met with Nick Cricenti at your offices in Manchester. Included in this meeting was Mr. Peter Nemiroff, President of Universal Storage Containers Inc. The meeting focused upon fire protection issues for the USC Z-Box as well as the history of the development of the USC Z-Box including the structural design characteristics, how they are handled in the field, how they are handled in the storage facilities, and the likely contents of the USC Z-Boxes when they are in the storage facility.

Background Information

The USC Z-Box is a steel moving and storage container primarily designed to provide storage of residential goods at a site away from the residence. The USC Z-Box has a tubular steel frame with a steel skin and a plywood floor. The USC Z-Box is uniquely designed to fold for transportation and storage when empty. The USC Z-Box is designed to be handled by a forklift at a storage facility. The USC Z-Box has nominal dimensions of 8 feet wide, 7 foot-6 inches tall and 16 feet long.

As stated, the intended use of the USC Z-Box is for the long-term offsite storage of household goods. The units are delivered to a residence and are filled by the occupants of the residence. The units are then picked up by the storage operator and returned to the storage facility to be stored with other units. The storage operators have very strict regulations as to what goods can

be placed into the USC Z-Box and what weight can be placed into the USC Z-Box. The maximum weight that can be placed in a USC Z-Box is 6000 pounds, for a total weight of 8,800 pounds.

At the storage facility the USC Z-Boxes can be stacked with a limit of 3 units high to a height of 22 feet 6 inches. Typically several of these three high stacks are clustered together up to a maximum of 15 units. The aisles between the clusters of storage units are required to be approximately 18 feet wide to accommodate the moving of the units by forklift.

Virtually all of the model building codes require that storage occupancies be equipped with automatic sprinkler protection in accordance with National Fire Protection Association (NFPA) Standard 13; *Standard for the Installation of Automatic Sprinkler Systems*. This standard is the basis for sprinkler system requirements throughout the world. All of the automatic sprinkler protection requirements put forth in this report are from NFPA 13. NFPA 13 describes the required protection based upon type of materials stored, the storage footprint, the storage arrangement, and the storage height.

There are several types of sprinkler systems permitted by NFPA 13. There is what is described as an ordinary sprinkler system. This is the system that is seen in most buildings and uses standard sprinkler heads in either and upright or pendant configuration. In certain instances, these types of systems are permitted in storage occupancies. These systems are designed to control a fire. Ordinary systems are often coupled with in rack sprinklers in storage occupancies with rack storage to provide the necessary protective coverage. Early Suppression Fast Response (ESFR) sprinkler systems are system specifically designed for the protection of storage facilities. This system uses a sprinkler head designed to flow a large amount of water at the target fire. Unlike ordinary sprinkler system ESFR systems are designed to actually extinguish a fire and not just control the fire. Large Drop Sprinkler Systems are designed to provide a bigger water drop with more velocity to penetrate deeper into a fire and thus providing a greater ability to provide cooling to limit or prohibit the generation of heat in the fire. High temperature sprinkler heads are designed to react slower to heat, however they are designed to provide large quantities of water to the fire upon activation.

Each type of sprinkler head is designed to provide certain flows at certain pressures based upon the size of the water opening in the sprinkler head. The formula that ties the flows and pressures together is the Hazen-Williams Equation. This is a complex equation that includes factors about the pipe, and the size of the water opening in the sprinkler. For each type of sprinkler, the manufacturers have reduced the Hazen-Williams Equation to a single factor that describes the sprinkler head flow characteristics. The letter "K" designates this factor and sprinkler heads are typed by their K factors. With the exception of very small systems, all automatic sprinkler systems installed today are hydraulically calculated using the Hazen-Williams equation or the sprinkler head K value. That means that such things as friction loss in the pipes and system elevation are accounted for in the design of the systems. Hydraulically calculating sprinkler systems provides the opportunity to customize the system to provide the most economical piping arrangement along with the best water distribution.

Evaluation

As a unit itself, the USC Z-Box and the First Generation Box are not susceptible to fire in that they contain no electricity or heat system to create the impetus for a fire. For a fire to occur an outside source must initiate the fire. Possible fire starts can be grouped into two areas. The first area is at the residence while being filled by the occupants. The ignition scenarios that may occur at a home are improper disposal of smoking materials, or in the event that the unit is being filled at night a light source too close to the combustibles in the container. In either case the fire is similar to a fire in a truck and the fire department can easily handle the fire and no exposures should be involved. The second place a fire may occur is at the storage facility. Again it is improbable that a fire will initiate itself from inside the unit. That leaves an outside source for ignition. Light ballasts, forklifts, and hot work are typical of the scenarios that cause fires in this type of storage facility. Proper automatic sprinkler systems will prevent the spread of fires that start in the storage building that may affect the USC Z-Box.

The USC Z-Box is a storage container primarily designed for long-term storage of combustible household goods. Items that may be contained in the box consist of clothing, papers, dishes, pieces furniture, and other common household items. All of the companies that provide this service forbid the storage of liquids including flammable and combustible liquids, charcoal, hazardous materials of any kind and other dangerous materials. Based upon Chapter 34 of NFPA 1 *The Uniform Fire Code*, the contents of the USC Z-Box are classified as a Class IV Commodity.

> *34.2.5.4 Class IV.*
>
> *34.2.5.4.1 A product, with or without pallets, that meets one of the following criteria shall be classified as a Class IV commodity:*
>
> *(1) Constructed partially or totally of Group B plastics*
>
> *(2) Consists of free-flowing Group A plastic materials*
>
> *(3) Contains within itself or its packaging an appreciable amount (5 percent to 15 percent by weight or 5 percent to 25 percent by volume) of Group A plastics*
>
> *34.2.5.4.2 The remaining materials shall be permitted to be metal, wood, paper, natural or synthetic fibers, or Group B or Group C plastics.*

Additional information that is required for determining the automatic sprinkler requirements are the height of the units when stacked. The height of the containers when stacked 3 high is 22 feet 6 inches. The stacking along with the clustering of the units produces what is termed a solid pile. The storage of the USC Z-Box is classified as Class IV commodity, up to 24-foot high, solid piled storage. Based upon that information a spreadsheet has been prepared showing the NFPA 13 design criteria for the various types of sprinkler systems permitted. It is critical that all the requirements of NFPA 13 are followed when determining if an automatic sprinkler system is appropriate for the storage of the USC Z-Box. Such things as obstructions from columns or even simple things like the placement of lights greatly affect the ability of the sprinkler systems to control or extinguish the fire. It is not a case of looking up to see if there is a sprinkler system. It is necessary to have the proper system for the hazard. When considering the suitability of a building for storage a Fire Protection Engineer or a reputable automatic sprinkler company must be consulted to determine if the sprinkler system meets Code requirements.

Conclusion

It is the opinion of SFC Engineering Partnership Inc. and myself that neither the USC Z-Box nor the First Generation Box do not in and of themselves pose an ignition hazard and will not present an unusual fire hazard in a properly protected storage facility. If the guidelines on Exhibit A are followed, storage of the USC Z-Box and the First Generation Box will meet NFPA standards. Exhibit A shows the NFPA 13 requirements for ESFR, Ordinary, High Temperature, and Large Drop sprinkler systems.

Sincerely,

SFC ENGINEERING PARTNERSHIP, INC.

Nicholas J. Cricenti Jr., P.E.
President

NJC: M:\Fire Protection\cld-Zbox\Gates Z-box FP Ltr pack rate.doc

Cc: file
Encl: Sprinkler Spreadsheet, Photos, Resume

Exhibit A

Warehouse Sprinkler System Requirements for Z-Box Container Systems

Reduced from National Fire Protection Association Standard 13

ESFR Sprinklers

Commodity	Maximum Storage Height	Maximum Ceiling/Roof Height	Nominal K-Factor	Orientation	Minimum Operating Pressure	Hose Stream Demand	Water Supply Duration
	Ft	Ft			psi	gpm	minutes
Class IV	25	30	14	Upright or Pendent	50	250	60
			16.8	Pendent	35	250	60
			25.2	Pendent	15	250	60
		32	14	Upright or Pendent	60	250	60
			16.8	Pendent	42	250	60

Ordinary Temperature Sprinklers

Commodity	Maximum Storage Height		Nominal K-Factor	Area of Operation	Density	Hose Stream Demand	Water Supply Duration
	Ft			sq ft	gpm/sq ft	gpm	minutes
Class IV	up to 24			2000	0.507	500	150

High Temperature Sprinklers

Commodity	Maximum Storage Height		Nominal K-Factor	Area of Operation	Density	Hose Stream Demand	Water Supply Duration
	Ft			sq ft	gpm/sq ft	gpm	minutes
Class IV	24		8.0 to 5.6	2000	0.398	500	150

Large Drop Sprinklers

Commodity	Maximum Storage Height	Maximum Ceiling/Roof Height	Nominal K-Factor	Type / # hds	Minimum Operating Pressure	Hose Stream Demand	Water Supply Duration
	Ft	Ft			psi	gpm	minutes
Class IV	25	30	16.8	Wet/15	22	500	90

25 Sundial Ave., Suite 205W Manchester, NH 03103-7230 (603) 647-8700 Fax (603) 647-8711

Structural Analysis of USC Z-Box Portable & Moving Storage Containers

Prepared for:

Universal Storage Containers LLC
146 Old Kings Highway
New Canaan, CT 06840

Prepared by:

CONSULTING ENGINEERS

540 Commercial Street • Manchester, NH 03101
Tel: (603) 668-8223 • Fax: (603) 668-8802
cld@cldengineers.com • www.cldengineers.com
New Hampshire • Vermont • Maine

Structural Engineering by:

NGC Structural, LLC
Consulting Structural Engineering
241 Tolend Road, Dover, NH 03820
Tel: (603) 749-4177 • Fax: (603) 740-4177

October 2006

CLD Ref. # 06-0283

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STRUCTURAL ANALYSIS OF USC Z-BOX
PORTABLE & MOVING STORAGE CONTAINERS

CONSULTING ENGINEERS

October 9, 2006

Mr. Peter Nemiroff, President
Universal Storage Containers, LLC
146 Old Kings Highways
New Canaan, CT 06840

Re: Universal Storage Containers, LLC
Structural Analysis of USC Z-Box Portable & Moving Storage Containers
CLD Reference No. 06-0283

Dear Mr. Nemiroff:

We are pleased to submit with this letter our report covering the structural analysis of the Universal Storage Containers, LLC (USC) Z-Box Portable & Moving Storage Containers. We were retained in July to work with your product designer, Matt Graves of CADD Edge Consulting, Londonderry, NH, to evaluate the design of the containers as provided by Mr. Graves. To supplement our structural engineering capacity, CLD Consulting Engineers, Inc. (CLD) retained NGC Structural, LLC (NGC) of Dover, NH to assist in this evaluation. NGC has generated a significant letter report on the structural evaluation work carried out by them, and that report is a part of this presentation.

Storage container designs prepared by CADD Edge Consulting have been modified from time-to-time based on the structural analysis of the various structural members and components, as well as suggestions made by USC.

As indicated in the attached NGC Report, the finalized design meets your criteria that was established at the beginning of the work effort. The report points out that an empty container on the ground, say, as delivered to a customer's location for filling by the customer, will be stable under the design wind loads that were established at the beginning of this evaluation. As the container is loaded by the customer, the wind load situation is improved due to the added live load in the container. Also noted is the proposed storage situation wherein containers would be stacked either empty or full in a three-tier arrangement. The containers are adequately designed to support the static load produced by the three-tier stack, but some of the design criteria, including wind, presents some concerns with respect to overturning of the stack. Since high wind events can usually be predicted or anticipated, the party in control of the outdoor stacked containers should be in a position to protect the containers by either utilizing a site-specific tie-down system or spreading out the three-tier arrangement to provide a single-tier configuration that would be safe under any of the stipulated design criteria.

You might give consideration to offering a pre-engineered tie-down system to storage unit franchisees who operate in areas of the country where high winds or seismic events are anticipated. Such a tie-down system could be developed incorporating aircraft tie-down components, which are readily available in the marketplace and easily available straps and buckles.

Container sliding due to wind loads was a concern during the investigation and the structural analysis activities. Sliding, of course, is resisted by the friction between the container and the surface it is sitting on, and resisting the sliding is the friction factor which is related to the weight of the container. Field tests were run to simulate a design wind on the exposed side of a container, with the container resting on a concrete slab. The empty container was stable and did not move, as outlined in the NGC Report. It should be noted that a stacked empty container is also subject to sliding due to wind loads, and no doubt the friction factor between the underside of a container and the roof of the one it is resting on would probably be less than the friction factor between a container and a concrete slab. Note that we have evaluated the overturning of stacked containers due to wind loads, and it is only the empty containers in the second and third tier that give any concern.

It has been a pleasure working with you on this most unique design review assignment. We are available to assist you with further studies should the need arise.

Very truly yours,

CLD CONSULTING ENGINEERS, INC.

David W. Gates, P.E.

DWG:jt

Enclosures

THE STATE OF NEW HAMPSHIRE
DAVID W. GATES
No. 1357
REGISTERED PROFESSIONAL ENGINEER

NGC Structural, LLC

Consulting Structural Engineering
241 Tolend Road
Dover, NH 03820

Phone: 603-749-4177
Fax: 603-740-4177
Email: ngcstructural@comcast.net

October 5, 2006

Mr. David Gates, PE
CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester NH 03101

Re: Universal Storage Containers LLC
Structural Analysis of USC Z-Box Portable & Moving Storage Containers
NGC Project No. 06-647

Dear Mr. Gates,

Beginning in late July 2006, Peter Nemiroff, President, Universal Storage Containers LLC (USC), hired Matt Graves, Solidworks Designer with CADD Edge Consulting and David Gates, Professional Engineer with CLD Consulting Engineers to begin the unique development for USC of an innovative collapsible portable and moving storage container to be named the USC Z-Box. Mr. Gates subsequently retained Normand G. Cote, PE, Principal of consulting structural engineering firm NGC Structural, LLC to perform the structural analysis of the USC Z-Box. Mr. Cote is a licensed professional engineer in twelve states including NH, CT, MA, MD, ME, NY, RI, VT, PA, FL, VA & MI, and he has 30 years of structural engineering experience.

Mr. Peter Nemiroff provided us with these basic design criteria for the USC Z-Box Portable & Moving Storage Containers (hereinafter referred to as the "USC Z-Box"), which we have refined for technical accuracy and relevance to the product:

- International Building Code 2003 Edition (refers to ASCE Standard 7) will be used as reference for development of environmental load loads including wind, snow and seismic.
- Wind Velocity 120 MPH (3-second gust) with exposure Category "C" will be the criteria for survival of single box.
- Seismic base shear of 10% of dead load will be used to approximate seismic forces for seismic events in most areas of the United States, excluding high seismic regions such as California, St. Louis and Memphis as identified in Appendix C.
- Dead and Live Load Criteria; USC Z-Box weight is approximately 2,600 lbs, Maximum contents weight of filled USC Z-Box should be not more than 6,000 lbs.

- The USC Z-Box should be designed to be stacked in three tiers; so that the load on top of the bottom USC Z-Box would be no more than 18,000 lbs. as limited by fork truck limit switch.

We have reviewed the latest set of shop drawings for the USC Z-Box dated September 22, 2006 as presented in the attached Appendix A. We have also reviewed the field static load and lateral load tests performed on the USC Z-Box as presented in the attached Appendix B. Based on our structural analysis of the field static load and lateral load tests performed on the USC Z-Box and our review of latest set of shop drawings for the USC Z-Box, we are of the opinion that this USC Z-Box design is based on sound engineering principles and meets the structural design criteria developed for the USC Z-Box.

We have made the following observations regarding the USC Z-Box design based on our structural analysis and field testing:

1. The USC Z-Box roof members are capable of resisting a 20 psf live load which is roughly equivalent to a foot of snow, which was one of the design criteria. Snow loading will be a variable under the user's control. Excessive snow loading should be prevented by wind blowing, melting and/or manual snow removal.

2. The USC Z-Box floor members were analyzed and were determined to be capable of carrying a live load in excess of 50 psf. This is the uniform load equivalent of 6,000 lbs contents weight, which was one of the design criteria.

3. The USC Z-Box when not stacked is capable of resisting wind force from a 120 mph design wind (3-sec gust) without excessive deflection or permanent deformation, which was one of the design criteria.

4. The USC Z-Box vertical members are capable of carrying a static gravity load of 24,000 lbs positioned on the roof to simulate the axial forces in the vertical members as a result of stacking two fully loaded USC Z-Boxes on top of the bottom USC Z-Box with a safety factors consistent with allowable stress design for structural steel, which was one of the design criteria. The actual field test performed on the USC Z-Box recorded a static load of 25,683 lbs positioned on the roof without resulting in excessive deflection or permanent deformation of any of the members. This test load is 143% of the maximum design load of 18,000 pounds.

5. The USC Z-Box design resists racking due to the bracing with diagonal cross support bracing and shear walls that remain structurally sound under lateral loads from wind and seismic events, which was one of the design criteria.

   Satisfactory resistance to racking was documented with a field test applying a static load of 25,683 lbs on the roof concurrently with a lateral force of 1,000 lbs applied to the top of the USC Z-Box to simulate the force produced from a 120 mph wind event. More technically described, this lateral force is equivalent to a 30 psf uniform pressure acting over the tributary area which contributes to the loading of the top of the front or end wall frame.

6. Our seismic analysis used a base shear of 10% of the weight of the USC Z-Box plus content weight, which may be a typical conservative loading in low to moderate seismic regions in the United States. For example, the seismic base shear for Boston will be less than 5%, but our prototype load test applied the loading equivalent of 10% base shear on a 3-tier stack of boxes. We believe that the 10% base shear would be applicable to most of the country with the exception of the high seismicity areas identified in Appendix C.

7. The analysis indicates that the USC Z-Box would not be unstable whether loaded or empty, thereby satisfying one of the design criteria. However, any stacking of USC Z-Boxes during a seismic event should be in a controlled area not accessible to building occupants or the public unless the USC Z-Box has a site-specific engineered tie-down system rated for the particular requirements of that site. Any specially engineered tie-down system for boxes in high seismic regions must incorporate bracing to protect the internal structure of the boxes from damage.

8. We do not recommend that any USC Z-Boxes be stacked outside of any building without a site-specific engineered tie-down system rated for that site due to the lack of control over wind forces and seismic events. However, we did perform a wind analysis on empty, half-full and full USC Z-Box to determine what wind force would overturn a stacked USC Z-Box that was outside of any building. The complete wind analysis test report can be found in Appendix B – Test Reports, but some minimum safety factors relating to wind forces overturning stacked USC Z-Boxes are worth summarizing as follows:

   <u>Empty USC Z-Boxes</u>
   Stacked 3 tier outside may overturn in wind forces lower than 85 mph
   Stacked 2 tier outside may overturn in wind forces greater than 85 mph
   Single tier outside may overturn in wind forces greater than 110 mph

Half-Full USC Z-Boxes
Stacked 3 tier outside may overturn in wind forces greater than 90 mph
Stacked 2 tier outside may overturn in wind forces greater than 115 mph
Single tier outside may overturn in wind forces greater than 120 mph

Fully Loaded USC Z-Boxes
Stacked 3 tier outside may overturn in wind forces greater than 115 mph
Stacked 2 tier outside may overturn in wind forces greater than 120 mph
Single tier outside may overturn in wind forces greater than 120 mph

Our analysis under 120 mph wind gust loading shows that a single container located outdoors will be unlikely to overturn when partially loaded, which was one of the design criteria.

9. Sliding Stability was investigated by prototype testing on concrete pavement. The findings indicated that the lateral force to initiate movement of an empty box was about 2100 lbs. or about 80% of the box weight. The wind force on the box resulting from a 120 mph wind gust can approach 3800 pounds. An empty box weighing 2600 lbs may slide, but a half-loaded box exceeding 4750 lbs. would likely resist sliding under this extreme condition.

The various design criteria that we used to evaluate the USC Z-Box were provided to us by Mr. Peter Nemiroff, President of Universal Storage Containers LLC. Our structural analysis of the USC Z-Box was based on the shop drawings which are included in Appendix A. The field static load and lateral load tests performed on the USC Z-Box Prototype are also included in Appendix B. These tests were designed with our guidance and were subsequently reviewed by us and used to confirm the findings of our analysis.

However, it is our opinion that the building codes do not apply to the USC Z-Box units, although the design criteria that we used to evaluate the USC Z-Box that was provided to us by Mr. Peter Nemiroff, do have similarities to some structures addressed by the codes. For instance, the USC Z-Box units may be considered similar to agricultural storage buildings which are intended only for incidental human occupancy and subsequently have reduced loads for wind and snow and are exempt from seismic requirements. Even single-family residential dwellings with human occupancy are exempt from seismic requirements. The ASCE 7 Standard referenced by the International Building Code addresses site-specific design requirements for buildings with human occupancy, but in the case of portable and moving storage containers we have neither.

Recognizing that we need certain structural design guidelines to provide a functional and durable portable and moving storage container, we referred to the wind design load requirements referenced by the building codes. Our primary objective is that a single USC Z-Box can survive moderate hurricane force winds without overturning or structural failure. We also addressed the seismic design load criteria in ASCE 7 to approximate seismic loads for our analysis as included in Appendix C.

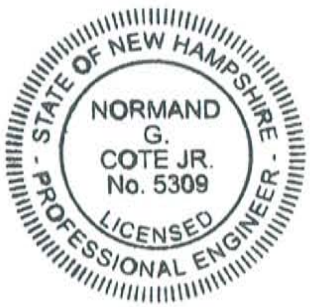
It is my professional opinion as a licensed professional structural engineer that the USC Z-Box design is based on sound engineering principles and meets the structural design criteria that the USC Z-Box was developed to meet.

Please feel free to contact our office if you have any questions.

Respectfully yours,

NGC STRUCTURAL, LLC

Normand G. Cote, PE, SECB



Enclosures