GROUP A GENERAL WG – OCTOBER 2-3, 2018
PUBLIC COMMENTS

G130-18 Part II

IPMC: 404.6

Proposed Change as Submitted

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2018 International Property Maintenance Code

Revise as follows

404.6 Efficiency unit. Nothing in this section shall prohibit an efficiency ~~living~~ dwelling unit from meeting the following requirements:

1. A unit occupied by not more than one occupant shall have a minimum clear floor area of 120 square feet (11.2 m^2). A unit occupied by not more than two *occupants* shall have a minimum clear floor area of ~~220~~ 190 square feet (~~20.4~~ 17.6 m^2). A unit occupied by three *occupants* shall have a minimum clear floor area of ~~320~~ 260 square feet (~~29.7~~ 24.1 m^2). These required areas shall be exclusive of the areas required by Items 2 and 3.
2. The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a minimum clear working space of ~~30~~ 40 inches (~~762~~ 990 mm) in front. Light and *ventilation* conforming to this code shall be provided.

   Exception: Dwelling units not required to be Accessible units, Type A units and Type B units shall have a clear working space of not less than 30 inches (762 mm) in front of the kitchen sink, cooking appliacne and refrigerator.
3. The unit shall be provided with a separate *bathroom* containing a water closet, lavatory and bathtub or shower.
4. The maximum number of *occupants* shall be three.

Reason:

Cost Impact: The code change proposal will decrease the cost of construction

G130-18 Part II

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: Referencing accessible units in the IPMC will cause confusion as most property maintenance inspectors can not be expected to identify accessible units and therefore may misapply the provisions. (Vote: 7-2)

Assembly Action: **None**

G130-18 Part II

Individual Consideration Agenda

Public Comment 1:

Proponent: Ed Kullik, representing ICC Building Code Action Committee (bcac@iccsafe.org)requests As Modified by This Public Comment.

Modify as follows:

2018 International Property Maintenance Code

404.6 Efficiency unit. Nothing in this section shall prohibit an efficiency dwelling unit from meeting the following requirements:

1. A unit occupied by not more than one occupant shall have a minimum clear floor area of 120 square feet (11.2 m^2). A unit occupied by not more than two *occupants* shall have a minimum clear floor area of 190 square feet (17.6 m^2). A unit occupied by three *occupants* shall have a minimum clear floor area of 260 square feet (24.1 m^2). These required areas shall be exclusive of the areas required by Items 2 and 3.
2. The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a minimum clear working space of ~~40~~ 30 inches (~~990~~ 762 mm) in front. Light and *ventilation* conforming to this code shall be provided~~.~~

   ~~**Exception:** Dwelling units not required to be Accessible units, Type A units and Type B units shall have a clear working space of not less than 30 inches (762 mm) in front of the kitchen sink, cooking appliacne and refrigerator~~.
3. The unit shall be provided with a separate *bathroom* containing a water closet, lavatory and bathtub or shower.
4. The maximum number of *occupants* shall be three.

Commenter's Reason: This public comment restores the minimum clear working space in front of the kitchen facilities in an efficiency unit to 30 inches and deletes the exception that refers to Accessible units, Type A units and Type B units. The 40 inch clearance is required for a new building constructed in accordance with the IBC and the A117.1 standard, but is not necessarily required for an existing building. For an existing building, increasing the clear working space to 40 inches would only be required if the unit were altered or added to. Ordinary maintenance and repairs would not trigger a need to bring the clear working space into compliance.

The typical activity that would be required of a tenant or owner cited under the IPMC to bring the unit up to minimum health and safety standards is most likely the repair or replacement of a non-working appliance, or the repair or replacement of deteriorated floor, wall or ceiling finishes. The IPMC in turn requires such work (or any other work to correct conditions cited by the property maintenance inspector) to be in accordance with the IEBC. Unless the work was extensive enough to qualify as a Level 2 Alteration under the IEBC, an upgrade for accessibility would not be required. If such a level of work is needed, the IEBC would likely require the owner or their authorized agent (e.g. architect, contractor or other professional hired by the owner) to apply for a building permit and submit construction documents. Presumably, either the owner s authorized agent or the building official would catch the need to increase the clear working space.

The primary reason the IPMC committee voted to disapprove G130, Part II was over concerns the typical property maintenance inspector would not necessarily be familiar with ICC A117.1, ADA or the Fair Housing Act Design Guidelines, and therefore not know what Accessible Units, Type A units and Type B units are. The BCAC agrees with the committee that it isn t necessary for the property maintenance inspector to know when the clearance needs to be increased, as that would be triggered by work done under the IEBC and reviewed by the building department, and has removed the language of concern. As there were no other objections to the proposal, the BCAC asks the Committee Action of Disapprove be overturned and this Public Comment be considered.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

The net effect of the public comment and code change proposal will not increase or decrease the cost of construction because the resulting change is simply to allow smaller areas for efficiency units.

G130-18 Part II

G151-18

IBC: (New), 3101.1, 3114 (New), 3114.1 (New), 3114.2 (New), 3114.3 (New), 3114.4 (New), 3114.5 (New), 3114.6 (New), 3114.7 (New), 3114.8 (New), 3114.8.1 (New), 3114.8.1.1 (New), 3114.8.2 (New), 3114.8.3 (New), 3114.8.4 (New), 3114.8.4.1 (New), 3114.8.4.2 (New), 3114.8.4.3 (New), 3114.8.5 (New), 3114.8.5.1 (New), 3114.8.5.2 (New), 3114.8.5.3 (New), 3114.8.5.3(1) (New), 3114.8.5.3(2) (New), 3114.8.5.3(4) (New), 3114.8.5.3(3) (New), 3114.8.5.3 (New), Chapter 35

Proposed Change as Submitted

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

2018 International Building Code

Add new definition as follows

INTERMODAL SHIPPING CONTAINER. A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

Revise as follows

3101.1 Scope. The provisions of this chapter shall govern special building construction including *membrane structures*, temporary structures, *pedestrian walkways* and tunnels, automatic vehicular gates, awnings and *canopies*, marquees, signs, towers, antennas, relocatable buildings, swimming pool enclosures and safety devices, ~~and~~ solar energy ~~systems.~~systems and intermodal shipping containers.

Add new text as follows

SECTION 3114 INTERMODAL SHIPPING CONTAINERS

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.

3114.2 Construction Documents. The construction documents shall contain information to verify the dimensions and establish the physical properties of the steel components, and wood floor components, of the intermodal shipping container in addition to the information required by Sections 107 and 1603.

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

1. Manufacturer's name or identification number
2. Date manufactured.
3. Safety approval number.
4. Identification number.
5. Maximum operating gross mass (kg) (Lbs)
6. Allowable stacking load for 1.8G (kg) (lbs)
7. Transverse racking test force (Newtons)
8. Valid maintenance examination date

Where approved by the building official, the markings and existing data plate are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3114.4 Protection against decay and termites. Wood structural floors of intermodal shipping containers shall be protected from decay and termites in accordance with the applicable provisions of Section 2304.12.1.1.

3114.5 Under-floor ventilation. The space between the bottom of the floor joists and the earth under any intermodal shipping container, except spaces occupied by basements and cellars, shall be provided with ventilation in accordance with Section 1202.4.

3114.6 Roof assemblies. Intermodal shipping container roof assemblies shall comply with the applicable requirements of Chapter 15.

Exception: Single-unit stand-alone intermodal shipping containers not attached to, or stacked vertically over, other intermodal shipping containers, buildings or structures.

3114.7 Joints and voids. Joints and voids that create concealed spaces between intermodal shipping containers, that are connected or stacked, at fire-resistance-rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved fire-resistant joint system in accordance with Section 715.

3114.8 Structural. . Intermodal shipping containers which conform to ISO 1496-1 that are repurposed for use as buildings or structures, or as a part of buildings or structures, shall be designed in accordance with Chapter 16 and this section.

3114.8.1 Foundations. Intermodal shipping containers repurposed for use as a permanent building or structure shall be supported on foundations or other supporting structures designed and constructed in accordance with Chapters 16 through 23 of this code.

3114.8.1.1 Anchorage. Intermodal shipping containers shall be anchored to foundations or other supporting structures as necessary to provide a continuous load path for all applicable design and environmental loads in accordance with Chapter 16.

3114.8.2 Welds. All new welds and connections shall be equal to or greater than the original connections.

3114.8.3 Structural design. The structural design for the intermodal shipping containers repurposed for use as a building or structure, or as part of a building or structure, shall comply with Section 3114.8.4 or 3114.8.5.

3114.8.4 Detailed design procedure. A structural analysis meeting the requirements of this section shall be provided to the building official to demonstrate the structural adequacy of the intermodal shipping containers.

Exception: Intermodal shipping containers designed in accordance with Section 3114.8.5.

3114.8.4.1 Material properties. Structural material properties for existing intermodal shipping container steel components shall be established by material testing where the steel grade and composition cannot be identified by the manufacturer's designation as to manufacture and mill test.

3114.8.4.2 Seismic design parameters. ~~The appropriate detailing requirements of ASCE 7; response modification coefficient, R; overstrength factor, $\hat{a}_{l_0}$; deflection amplification factor, C_d; and limits on structural height, h_n, for the corrugated shear wall is permitted to be developed in accordance with generally accepted procedures where approved by the building official in accordance with Section 104.11.~~ The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials,occupancies with an *occupant load* of 50 or less.
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Sectuion 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

3114.8.4.3 Allowable shear value. The allowable shear values for the intermodal shipping container corrugated steel sheet panel side walls and end walls shall be demonstrated by testing and analysis accordance with Section 104.11.

Where penetrations are made in the side walls or end walls designated as part of the lateral force-resisting system, the penetrations shall be substantiated by rational analysis.

3114.8.5 Simplified structural design of single-unit containers. Single-unit intermodal shipping containers conforming to the limitations of Section 3114.8.5.1 shall be permitted to be designed in accordance with the simplified structural design provisions of Section 3114.8.5.

3114.8.5.1 Limitations. Use of Section 3114.8.5 is subject to all the following limitations:

1. The intermodal shipping container shall be a single-unit, stand-alone unit supported on a foundation and shall not be in contact with or supporting any other shipping container or other structure.
2. The intermodal shipping container top and bottom rails, corner castings, and columns or any portion thereof shall not be notched, cut, or removed in any manner.
3. The intermodal shipping container shall be erected in a level and horizontal position with the floor located at the bottom.
4. The intermodal shipping container shall be located in Seismic Design Category A, B, C or D.

3114.8.5.2 Simplified structural design. Where permitted by Section 3114.8.5.1, single-unit, stand-alone intermodal shipping containers shall be designed using the following assumptions for the corrugated steel shear walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23.
2. Response modification coefficient, R=2,
3. Overstrength factor, Ω_0=2.5,
4. Deflection amplification factor, C_d = 2, and
5. Limits on structural height, h_n = 9.5 feet (2,900 mm).

3114.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and for seismic design using the coefficients of Section 3114.8.5.2 shall be permitted to have the allowable shear values set forth in Table 3114.8.5.3 provided that all of the following conditions are met:

1. The total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls, as shown in Figure 3114.8.5.3(1).
2. Any full height wall length, or portion thereof, less than 4 feet (305 mm) long shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3114.8.5.3(2).
3. All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3114.8.5.3(3).
4. Where openings are made in container walls, floors, or roofs for doors, windows and other openings:
   4.1 The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 22.

   4.2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than a 6-inch (152 mm) diameter hole for conduits, pipes, tubes or vents, or not greater than 16 square inches (10,322 sq mm) for electrical boxes, is permitted for each individual 8 foot length (2,438 mm) lateral force resisting wall. Penetrations located in walls that are not part of the wall lateral force resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).
6. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

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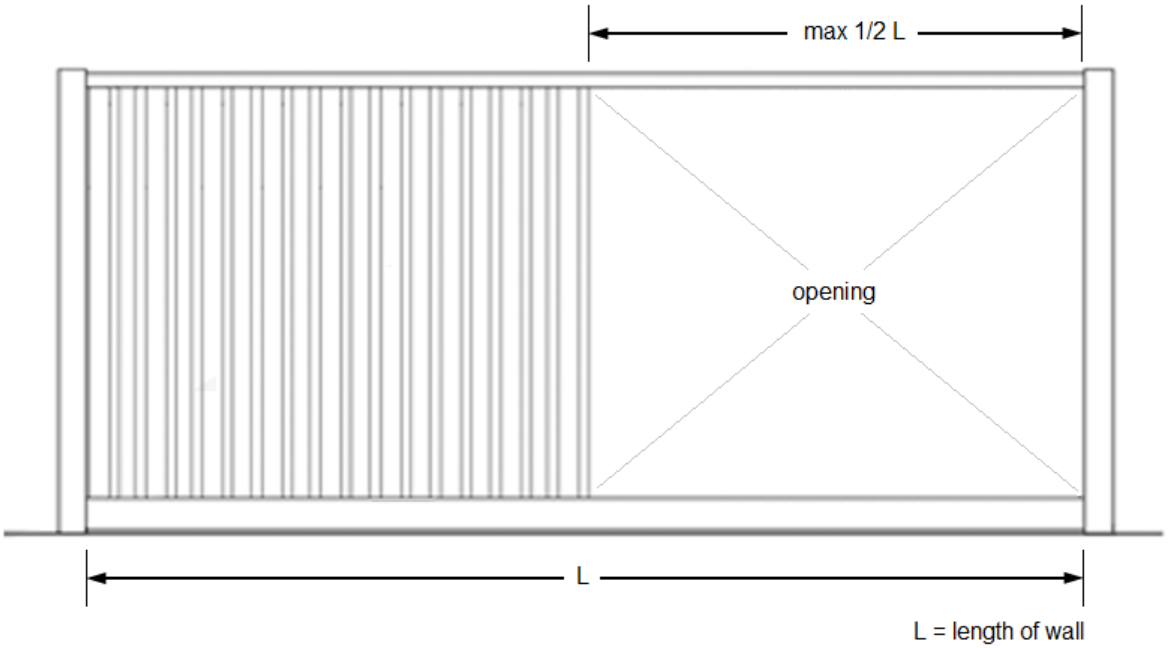
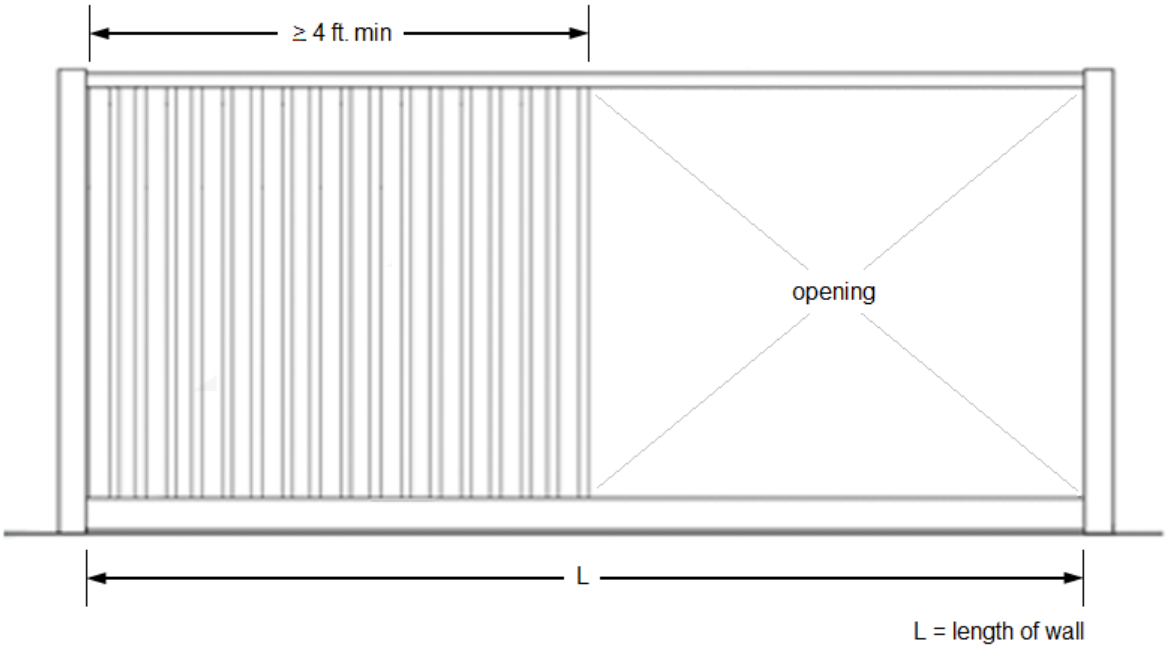
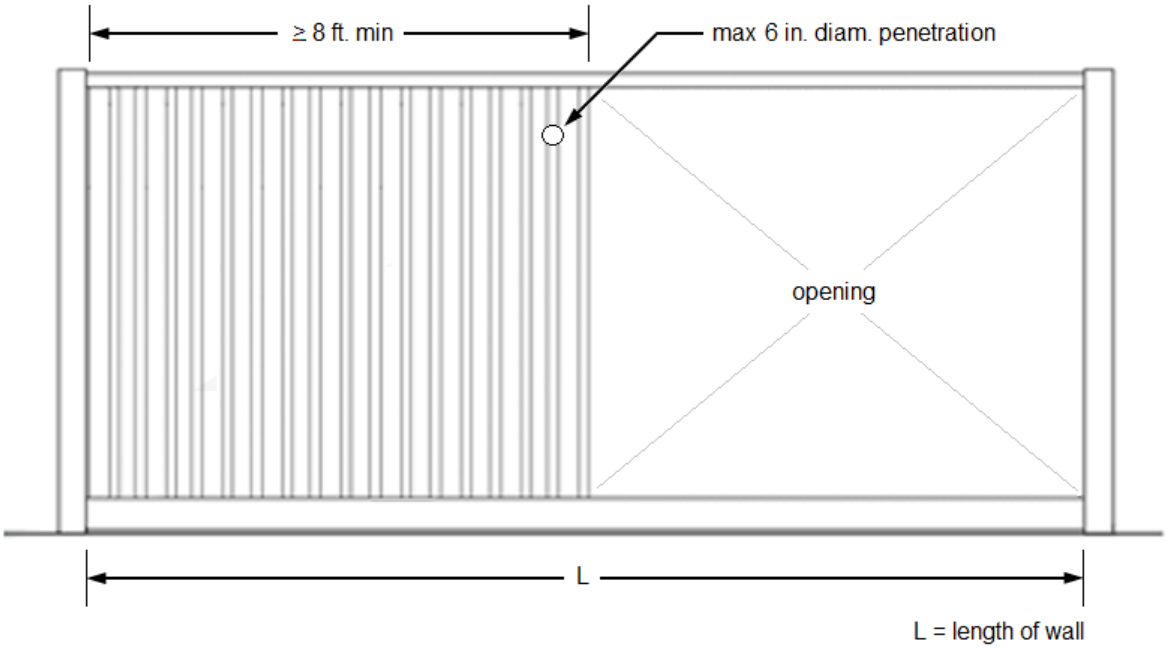


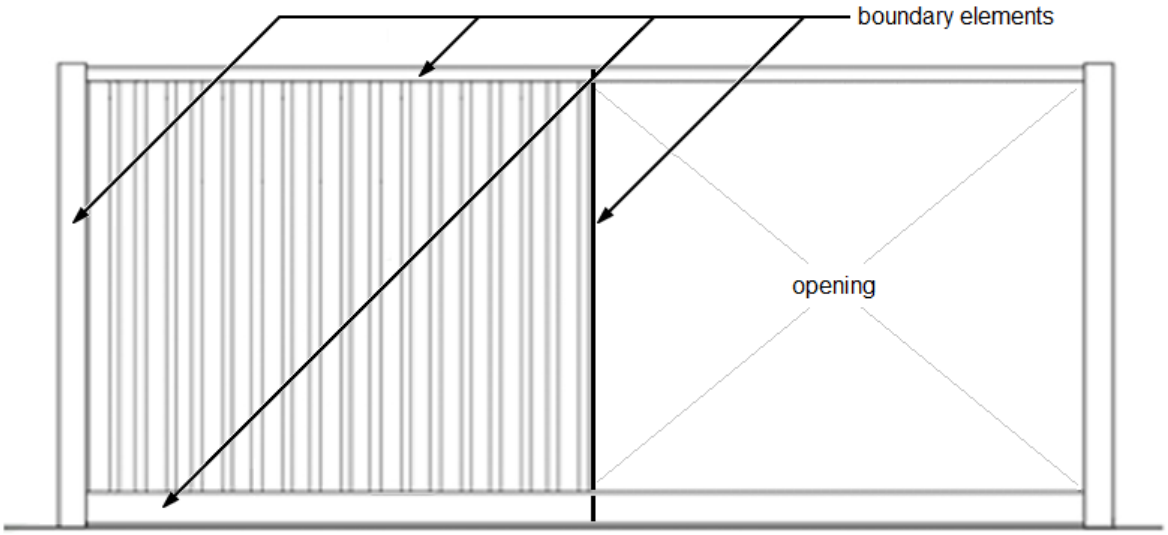
3114.8.5.3(1)
Bracing Unit Distribution--Maximum Linear Length



3114.8.5.3(2)
Bracing Unit Distribution -- Minimum Linear Length



3114.8.5.3(4)
Bracing Unit Distribution -- Penetration Limitations



3114.8.5.3(3)
Bracing Unit Distribution -- Boundary Elements

TABLE 3114.8.5.3
Allowable Strength Values for Intermodal Shipping Container Corrugated Steel Siding Shear Walls for Wind or Seismic Loading

CONTAINER DESIGNATION [2]	CONTAINER DIMENSION (Nominal Length)	CONTAINER DIMENSION (Nominal Height)	ALLOWABLE SHEAR VALUES (PLF) [1,3]	
			Side Wall	End Wall
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843
1EE		8.6 feet (2591 mm)		
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84	
1AA		8.5 feet (2592 mm)		
1A		8.0 feet (2438 mm)		
1AX		< 8.0 feet (2438 mm)		
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112	
1BB		8.5 feet (2591 mm)		
1B		8.0 feet (2438 mm)		
1BX		< 8.0 feet (2438 mm)		
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168	
1C		8.0 feet (2438 mm)		
1CX		< 8.0 feet (2438 mm)		
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337	
1DX		< 8.0 feet (2438 mm)		

1. The allowable strength shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
2. Container designation type is derived from ISO 668.
3. Limitations of Sections 3114.8.5.1 shall apply

Add new standard(s) follows

ISO

International Organization for Standardization
Chemin de Blandonnet 8 CP 401
1214 Vernier

ISO 668: 2013:

Series 1 Freight Containers - Classifications, dimensions and ratings

ISO 1496-1: 2013:

Series 1 Freight Containers - Specification and Testing - Part 1: General Cargo Containers for General Purposes

ISO 6346: 1995, with Amendment 3: 2012:

Freight Containers - Coding, Identification and marking

Reason: This code change purpose is to introduce intermodal shipping containers into the International Building Code based on requests by code officials in the U.S. Prior to this proposal, several jurisdictions had created their own individual regulations or ordinances, or had administered additional requirements beyond the code (e.g. Section 104.11 "Alternative materials, design and methods of construction and equipment**"**) so as to be comfortable to ensure a safe structure. This code change proposal is in response to those requests to develop a set of consistent code provisions which cover the minimum safety requirements, but which do not duplicate existing code provisions.

This proposal covers:

- Creation of a new definition in order to separate the container from other I-code sections which refer to, but intentionally do not define, shipping containers,
- Creating exceptions so to differentiate the intermodal shipping container from other code sections which could be interpreted as applying to intermodal shipping containers under other applications (e.g. temporary storage, relocatable buildings, energy storage facilities, and listed equipment),
- Verification of containers construction, condition, and structural integrity to assist the structural engineer in the evaluation for building construction,
- References to other sections concerning foundations, decay and termite control, crawlspace ventilation, roof assemblies, interior finishes, and joints/intersections.
- Introduction of structural provisions unique to intermodal shipping containers and which do not duplicate the existing structural requirements, and
- Addition of three ISO standards for reference.

Chapter 2 - New definition - A new definition has been created in order that these provisions can be adequately enforced and not confused the other multiple varieties of definitions of containers currently in the market.

Section 3114.1 – This represents the charging statement that outlines the requirements for containers, and list the appropriate exceptions with the I-codes in order to coordinate with other provisions that may appear similar in nature and where intermodal shipping containers could possibly be used in those other applications.

Section 3114.2 – Construction documents – These provision emphasize the material requirements as specified in this section.

Section 3114.3 – Verification - These provisions focus on the characteristics of the intermodal shipping container prior to it being repurposed. In this case the provisions require a straight forward inspection by an approved agency, and verification of the data plate which is normally found on intermodal shipping containers. There was an intent not to specify who the approved agency would be for two reasons; 1) so as to allow the code official or state law(s) to handle this aspect recognizing that in each jurisdiction their requirements may be different, and 2) to avoid dictating an international agreement onto jurisdictions that are currently employed by the shipping and container manufacturers worldwide today. In this case, the standards are regulated by the International Convention of Safe Containers (CSC) that have policies and procedures for inspecting containers worldwide. These procedures include policies for Approved Continuous Examination Program (ACEP) at the time the container is used in production, and policies for third party inspection agencies. The list shown in this section is a extract from the ISO standard and serves as a reference of items to be verified in order to validate the type of container.

3114.4 through 3114.6 – While we have strived to focus on only those provisions that recognize the unique aspects of intermodal shipping containers, we felt that some direction references were appropriate. In this case specific pointers are provided to foundations, decay and termite control, crawlspace ventilation, and roof requirements addressing drainage and weather protection.

3114.7 – Joints and voids – This provision is provided to address the interstitial spaces that may be created when multiple intermodal shipping containers are connected or stacked, whereby that concealed space between the containers is protected to prevent fire and hot gasses from passing between containers.

Section 3114.8 – Structural - The structural provisions are divided into multiple categories, as follows: 1) the general characteristics for all containers; 2) engineered structural design; and 3) simplified method for single-unit stand-alone container.

3114.8.1 – Foundations or supports – Provisions have been included to outline the two options for securing the container; a foundation or the connection to another structure. This provision makes it clear that the load path anchorage is required for all containers and to ensure the designed performance provided by the remainder of the structural provisions.

3114.8.2 – Welds – An additional provision has been added to require that any new welds be designed and installed with welds of greater structural capabilities.

Section 3114.8.4 – Detailed structural analysis - The detailed analysis engineering approach represents the general engineering practice allowed for all other types of building constructions. For this section the engineer of record is allowed to practice as they normally would for any other building type. As may be noted much of this section requires submission through the alternative means and methods provisions in order to obtain a permit as information about intermodal shipping containers is not readily listed in the IBC provisions or referenced standards.

Section 3114.8.5 – Simplified analysis - The concept for the single container approach is to make the design and construction process simpler. The provisions include a strict listing of limitations for use of these provisions. The proposal also provides structural design information, and pre-established shear wall information that is contained in the ISO 1496-1 standard, which is used to design and construct intermodal shipping containers. The shear wall values were obtained from the ISO 1496-1 standard through engineering analysis using a factor of safety of 5. In addition, a provision was installed to limit the number and size of openings and service holes within the container, as well as to prevent building owners or designers from embellishing the size to something most engineers would define as an opening. This method is intended to address the simple structure approach and provide available information for use by the structural engineer to supplement their work.

Chapter 35 – Referenced Standards – Included with this proposal are three ISO standards which are relevant to the intermodal shipping container's construction. These standards are part of the industry standards regulated by the International Convention of Safe Containers (CSC) that have policies and procedures for inspecting containers worldwide.

BCAC - The International Code Council's Building Code Action Committee (BCAC) was established by the ICC Board of Directors to pursue opportunities to improve and enhance an assigned International Code or portion thereof. This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. Since its inception in July, 2011, the BCAC has held open meetings and numerous workgroup calls which included members of the BCAC as well as any interested party to discuss and debate the proposed changes and the public comments. Related documentation and reports are posted on the BCAC website at: http://www.iccsafe.org/cs/BCAC/Pages/default.aspx.

The ICC Building Code Action Committee created a task group to facilitate the development of this proposal. Members of the assigned task group included representatives from: City of Long Beach, CA; County of Mecklenburg, NC; Modular Building Institute; American Iron and Steel Institute; Underwriters Laboratories; and the Portland Cement Association. Additional contacts included the State of California (Division of State Architect, Housing and Community Development), City of San Diego; City of Los Angeles, CA; City of Seattle; Clark County, NV; Falcon Structures, RADCO a Twining Company, SEABOX Company, FEMA ATC Seismic Code Support Committee, and other guests who provided their individual expertise.

Cost Impact: The code change proposal will decrease the cost of construction
The code change proposal will decrease the cost of construction. This new code section will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

Analysis: A review of the standards proposed for inclusion in the code, ISO 668, ISO 1496-1 and ISO 6346, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Public Hearing Results

Errata: The proposed table has been corrected.

Committee Action: As Modified

Committee Modification: 3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.
Exceptions:

Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
Intermodal shipping containers used as experimental equipment or apparatuses.

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear an existing data plate containing the following information as required by ISO 6346 and verified by an approved agency. A report of the verification process and findings shall be provided to the building owner.

Manufacturer's name or identification number
Date manufactured.
Safety approval number.
Identification number.
Maximum operating gross mass or weight (kg) (Lbs)
Allowable stacking load for 1.8G (kg) (lbs)
Transverse racking test force (Newtons)
Valid maintenance examination date

Where approved by the building official, the markings and existing data are permitted to be removed from the intermodal shipping containers before they are repurposed for use as buildings or structures or as a part of buildings or structures.

3114.8.4.2 Seismic design parameters. ~~The appropriate detailing requirements of ASCE 7; response modification coefficient, R; overstrength factor; deflection amplification factor, C_d; and limits on structural height, h_n, for the corrugated shear wall is permitted to be developed in accordance with generally accepted procedures where approved by the building official in accordance with Section 104.11.~~ The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials.
Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.

3114.8.5.3 Allowable shear. The allowable shear for the corrugated steel side walls (longitudinal) and end walls (transverse) for wind design and for seismic design using the coefficients of Section 3114.8.5.2 shall be ~~permitted to have the allowable shear values set forth in~~ in accordance with Table 3114.8.5.3 provided that all of the following conditions are met:

The total linear length of all openings in any individual side walls or end walls shall be limited to not more than 50% of the length of that side walls or end walls, as shown in Figure 3114.8.5.3(1).
Any full height wall length, or portion thereof, less than 4 feet (305 mm) long shall not be considered as a portion of the lateral force-resisting system, as shown in Figure 3114.8.5.3(2).
All side walls or end walls used as part of the lateral force-resisting system shall have an existing or new boundary element on all sides to form a continuous load path, or paths, with adequate strength and stiffness to transfer all forces from the point of application to the final point of resistance, as shown in Figure 3114.8.5.3(3).
Where openings are made in container walls, floors, or roofs for doors, windows and other openings: 4.1. The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 4.2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

5. A maximum of one penetration not greater than a 6-inch (152 mm) diameter hole for conduits, pipes, tubes or vents, or not greater than 16 square inches (10,322 sq mm) for electrical boxes, is permitted for each individual 8 foot length (2,438 mm) lateral force resisting wall. Penetrations located in walls that are not part of the wall lateral force resisting system shall not be limited in size or quantity. Existing intermodal shipping container vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).

6. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

TABLE 3114.8.5.3

Allowable ~~Strength~~ Shear Values for Intermodal Shipping Container Corrugated Steel Siding Shear Walls for Wind or Seismic Loading

(No changes to body of table)

The allowable ~~strength~~ shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
Container designation type is derived from ISO 668.
Limitations of Sections 3114.8.5.1 shall apply

(Portions of proposal not shown are not modified)

Committee Reason: The modifications add clarifications that will help the approval process go smoothly, but the committee would like to see a public comment to change the term "corrugated" container to "intermodal" container to be consistent with other language in the proposal. Other discrepancies in the modifications are minor and could also be cleaned up in the public comment process. The proposal addresses a need for guidance regarding the approval of intermodal shipping containers in the context of the building code. (Vote: 14-0)

Assembly Action: **None**

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Individual Consideration Agenda

Public Comment 1:

Proponent: Ed Kullik, representing ICC Building Code Action Committee (bcac@iccsafe.org)requests As Modified by This Public Comment.

Modify as follows:

2018 International Building Code

3114.1 General. The provisions of Section 3114 and other applicable sections of this code, shall apply to intermodal shipping containers that are repurposed for use as buildings or structures or as a part of buildings or structures.

Exceptions:

1. Intermodal shipping containers previously approved as existing relocatable buildings complying with Chapter 14 of the International Existing Building Code.
2. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the International Fire Code.
3. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular data centers, and other similar equipment.
4. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:
   4.1. Such units shall be single stand-alone units supported at grade level and used ~~as experimental equipment or apparatuses.~~ only for occupancies as specified under Risk Category I in Table 1604.5;
   4.2. Such units are located a minimum of 8 feet from adjacent structures, and are not connected to a fuel gas system or fuel gas utility; and
   4.3. In hurricane-prone regions and flood hazard areas, such units are designed in accordance with the applicable provisions of Chapter 16.

Commenter's Reason: Without scoping limits, this exception could permit varying uses and locations in which the container could pose substantial earthquake safety hazard to surrounding structures and persons. This could include containers located in or on structures, where container shifting could damage the structure, or fall and injure persons in the vicinity. This could also include fire hazard if a container shifts and gas lines are damaged.
This safety concern is addressed by the public comment language which provides scoping limits defining conditions under which risk is minimal such that regulation of the structural design and anchorage is not needed. The proposed language addresses:

- Occupancies that represent low risk to human life,
- Supported at grade where the risk of damage or injury due to falling is minimal,
- Eight foot distance to surrounding structures provides a zone for container shifting without causing damage to other structures,
- Prohibition of fuel gas intends to avoid fire ignition hazards should the container shift under seismic or wind loading,
- For hurricane prone and flood hazard areas, Chapter 16 will trigger requirements to reduce hazard.

These are believed to be scoping limits that can be readily screened for, permitting true low-hazard uses to occur with minimal regulation.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The resulting new provisions will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

Public Comment 2:

Proponent: Ed Kullik, representing ICC Building Code Action Committee (bcac@iccsafe.org)requests As Modified by This Public Comment.

Further modify as follows:

2018 International Building Code

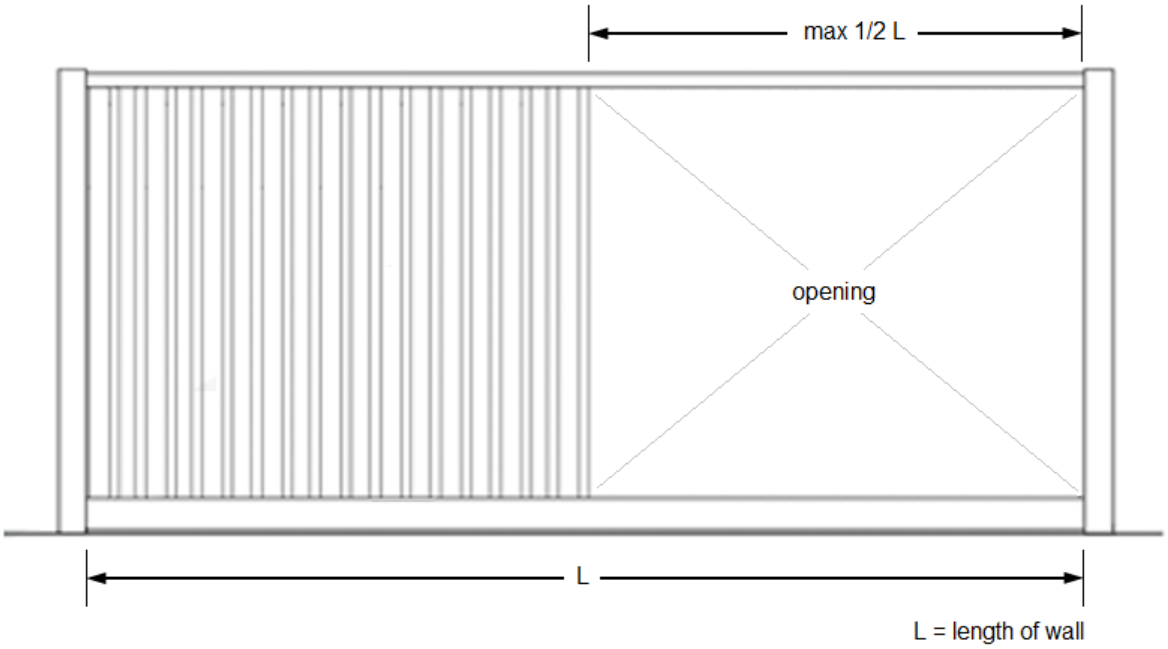
TABLE 3114.8.5.3
Allowable Shear Values for Intermodal Shipping Container Corrugated Steel ~~Siding Shear~~ Walls for Wind or Seismic Loading

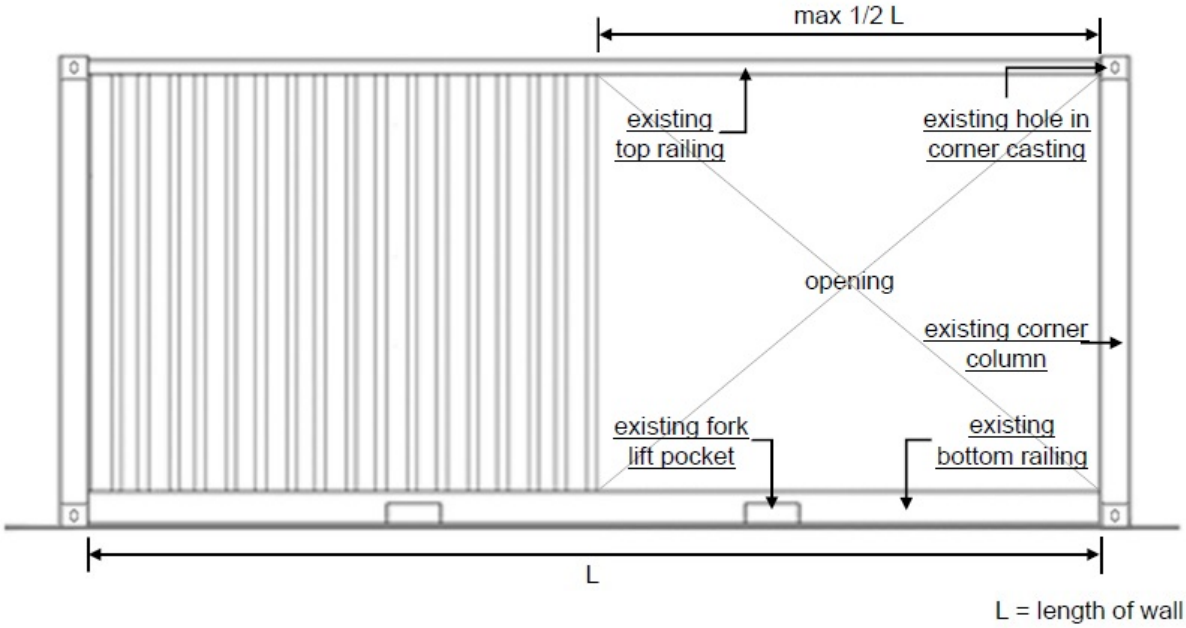
CONTAINER DESIGNATION [2]	CONTAINER DIMENSION (Nominal Length)	CONTAINER DIMENSION (Nominal Height)	ALLOWABLE SHEAR VALUES (PLF) [1,3]		
			Side Wall	End Wall	
1EEE	45 feet (13.7 M)	9.5 feet (2896 mm)	75	843	
1EE		8.6 feet (2591 mm)			
1AAA	40 feet (12.2 M)	9.5 feet (2896 mm)	84		
1AA		8.5 feet (2592 mm)			
1A		8.0 feet (2438 mm)			
1AX					
1BBB	30 feet (9.1 M)	9.5 feet (2896 mm)	112		
1BB		8.5 feet (2591 mm)			
1B		8.0 feet (2438 mm)			
1BX					
1CC	20 feet (9.1 M)	8.5 feet (2591 mm)	168		
1C		8.0 feet (2438 mm)			
1CX					
1D	10 feet (3.0 M)	8.0 feet (2438 mm)	337		
1DX					

1. The allowable shear for the side walls and end walls of the intermodal shipping containers are derived from ISO 1496-1 and reduced by a factor of safety of 5.
2. Container designation type is derived from ISO 668.
3. Limitations of Sections 3114.8.5.1 shall apply

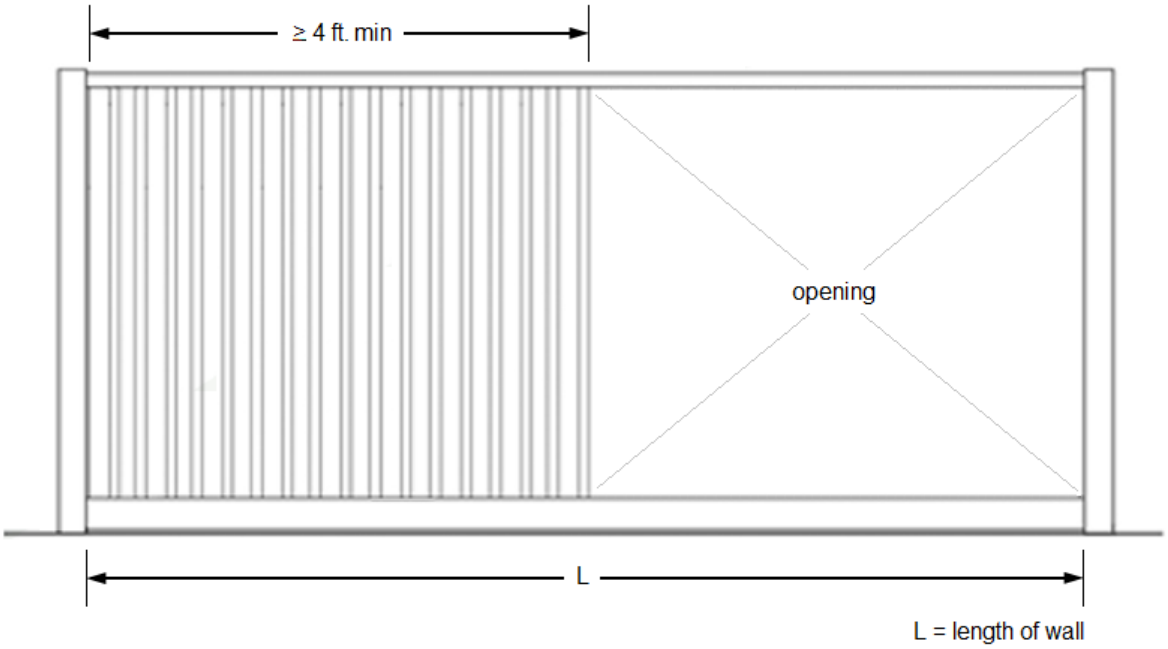
3114.8.4.2 Seismic design parameters. The seismic force-resisting system shall be designed and detailed in accordance with one of the following:

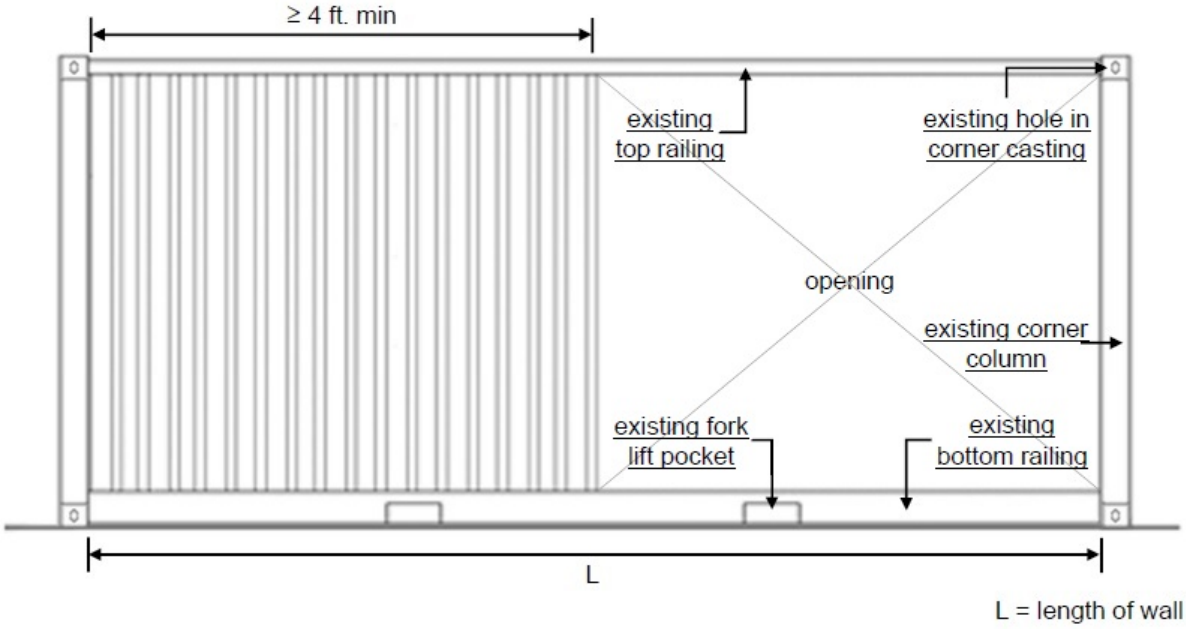
1. Where all or portions of the corrugated steel container sides are considered to be the seismic force-resisting system, design and detailing shall be in accordance with the ASCE 7 Table 12.2-1 requirements for light-frame bearing-wall systems with shear panels of all other materials,
2. Where portions of the corrugated steel container sides are retained, but are not considered to be the seismic force-resisting system, an independent seismic force-resisting system shall be selected, designed and detailed in accordance with ASCE 7 Table 12.2-1, or
3. Where portions of the corrugated steel container sides are retained and integrated into a seismic force-resisting system other than as paermitted by Sectuion 3114.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 104.11 and ASCE 7 Section 12.2.1.1 or 12.2.1.2.



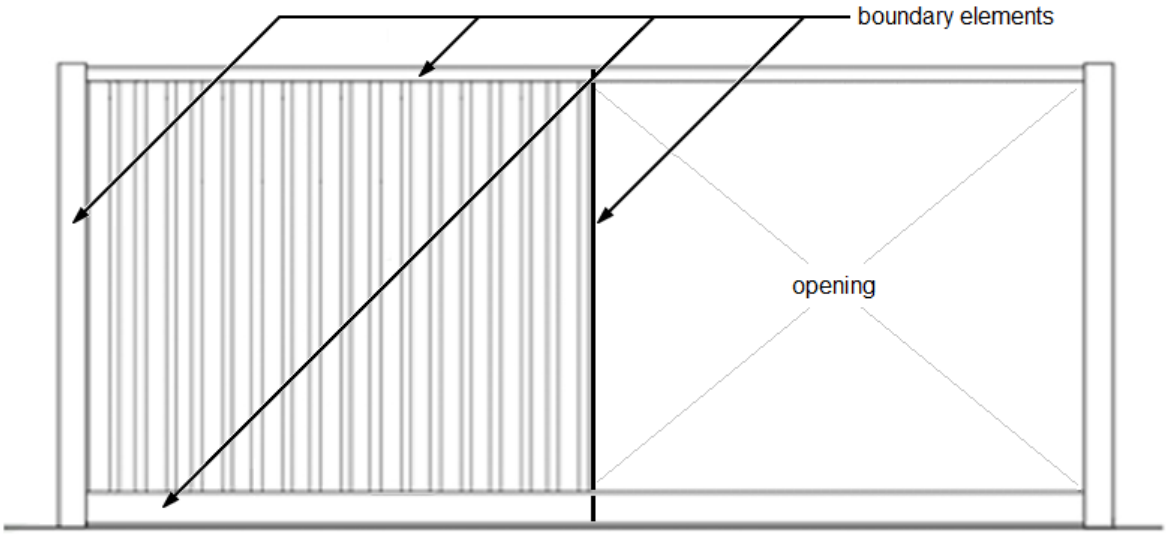


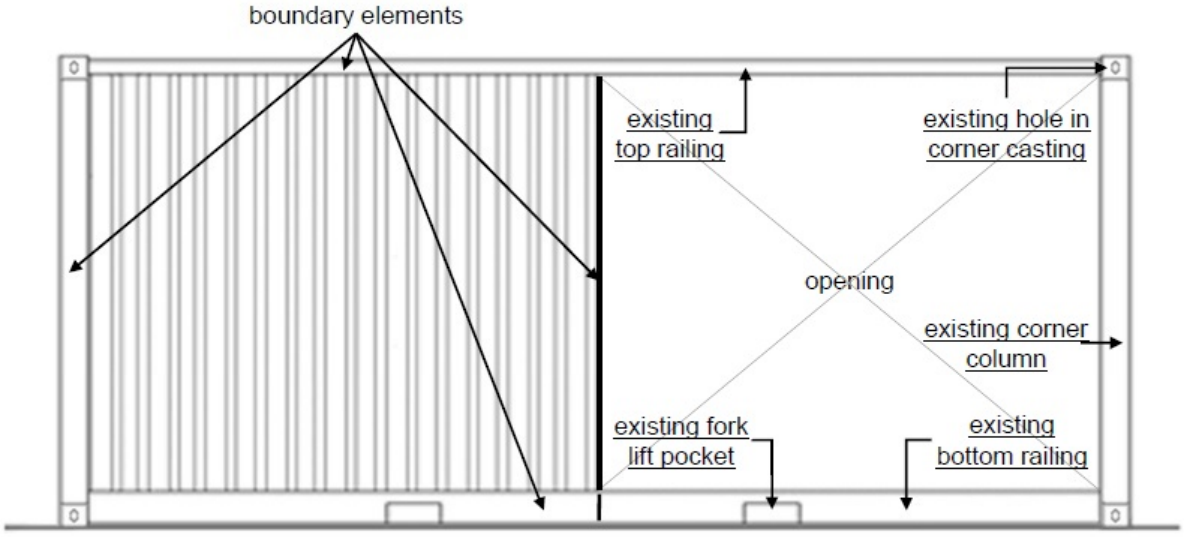
3114.8.5.3(1)
Bracing Unit Distribution--Maximum Linear Length



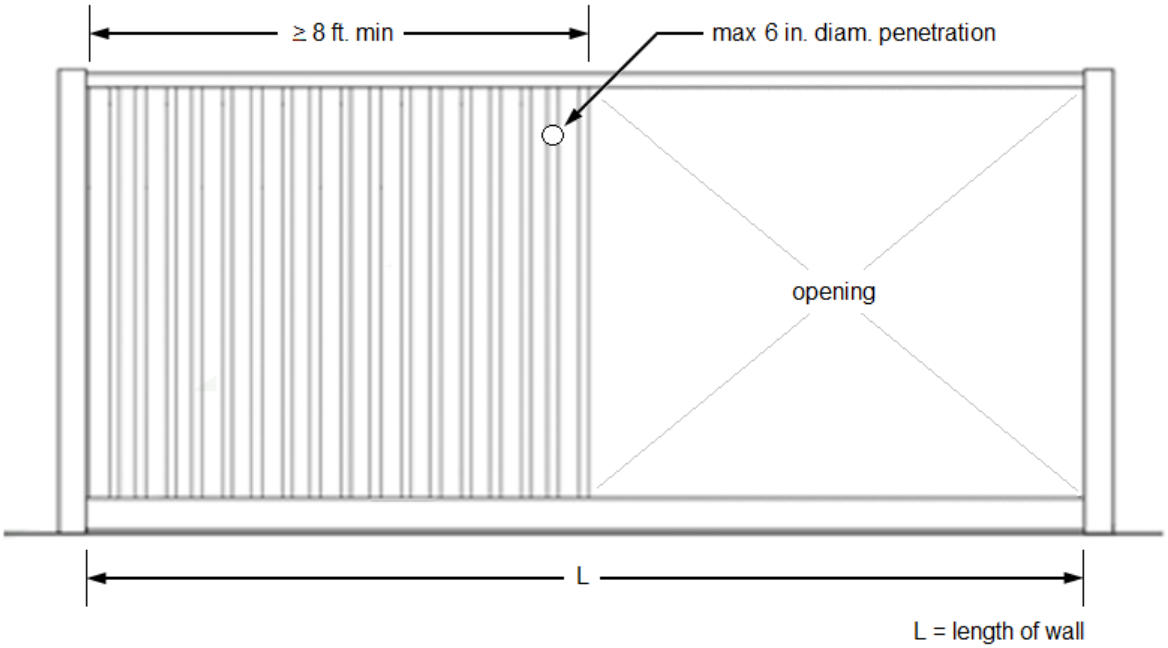


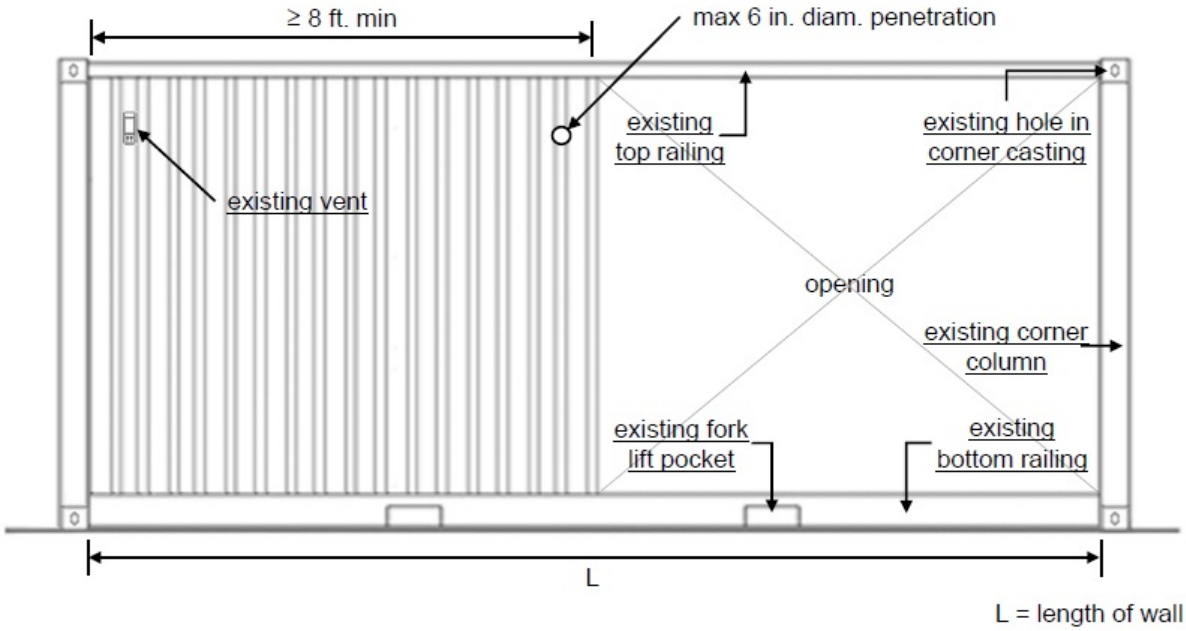
3114.8.5.3(2)
Bracing Unit Distribution -- Minimum Linear Length





3114.8.5.3(3)
Bracing Unit Distribution -- Boundary Elements





3114.8.5.3(4)
Bracing Unit Distribution -- Penetration Limitations

Commenter's Reason: Section 3114.8.4.2 – This is an editorial correction in order to cite the correct section number. Table 3114.8.5.3 title - This represents a change to heading to delete “siding shear”. The change is based on public testimony and comments received during the committee action hearing to keep terms consistent throughout the code change proposal.

Figures 3114.8.5.3 (1) through (4) – It was brought to our attention that it may be beneficial to identify parts of the intermodal shipping container more clearly rather than use a simple line drawing figure. This is for the benefit of the user to more readily recognize existing conditions versus the permissible cut-aways as allowed by Section 3114.8.5.3. In

response we are proposing to add identifying text (the rails, lift slots, and holes) to illustrate those existing elements that are part of the manufacture of intermodal shipping containers.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The resulting new provisions will provide clarity on how to consistently design with, permit, and field inspect shipping containers that are repurposed for building construction. Current use of repurposed intermodal shipping containers requires the building owner or designee to submit through the alternative means and methods administrative provisions.

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