



INFORMATION BULLETIN

BU-031

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Intermodal Shipping Containers Repurposed as Buildings/Structures

The purpose of this Information Bulletin (“IB”) is to clarify the applicable standards for intermodal shipping containers (“containers”) that are to be repurposed for use as buildings or structures or as a part of buildings or structures. Containers shall be treated as “new construction” for the purposes of determining the applicable requirements of this IB and the provisions of the code referenced herein. The basis for recognizing the use of containers is under Section 18.03.060 of the Long Beach Municipal Code (“LBMC”) when approved by the Building Official.

Applicants will be required to obtain the necessary land use and development approval from the Planning Bureau, construction permits from the Building and Safety Bureau, and other permits from other City agencies or departments, where applicable.

It is not the intent of this IB to address intermodal shipping containers located on terminals within the port, rail yards, or trucking facilities; used as temporary storage at active construction sites having a valid building permit; at event sites having a valid special event permit; approved by the California Department of Housing and Community Development as Factory-Built Housing, Manufactured Home, Commercial Modular, or Special Purpose Commercial Modular units; or stand-alone units in industrial zoning districts. For additional information regarding containers that are permitted to be used as storage, refer to Information Bulletin BU-030 Intermodal Shipping Containers Used as Accessory Storage.

ZONING REGULATIONS

1. Nonresidential Zoning Districts. No specific Zoning Code Regulation addresses the use of design, treatment, and finish of adapted containers as a building material. Such containers are subject to the same design, review, and permitting standards as any other building material.
2. Residential Zoning Districts. The Zoning Code Regulation prohibits the use of metallic or metallic looking roofing or siding pursuant to the LBMC Section 21.31.255 Design, Treatment, and Finish. At a Classification of Use hearing on April 21, 2011, the Planning Commission ruled that these prohibitions did not apply to design, treatment, and finish of containers adapted as a building material for dwellings in residential zoning districts. This includes the use of containers, or elements thereof, that are finished (i.e., painted) but otherwise undisguised. The Planning Commission also ruled that such adaptation of containers is subject to Site Plan Review Committee approval, similar to wing walls or residences on narrow lots. Site Plan Review approval must be obtained before such a project may apply for construction permits.

BUILDING REGULATIONS

The applicable building code regulations for the design and use of containers are established in the following sections of the LBMC:

- LBMC Section 18.40.030 – Amend CBC Sections 202—Intermodal shipping containers.
- LBMC Section 18.40.620 – Amend CBC Section 3101.1—Intermodal shipping containers.
- LBMC Section 18.40.630 – Add CBC Section 3114—Intermodal shipping containers.
- LBMC Section 18.40.640 – Amend CBC Chapter 35—Intermodal shipping containers.

Section 202, Section 3101.1, Section 3114 and Chapter 35 of the 2019 Edition of the California Building Code are added or amended to read as follows:

LBMC Section 18.40.030 – Amend CBC Sections 202—Intermodal shipping containers.

Section 202 of the California Building Code is amended to add a new definition for “Intermodal Shipping Container” 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.

LBMC Section 18.40.620 – Amend CBC Section 3101.1—Intermodal shipping containers.

Section 3101.1 of the California Building Code is amended to read 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, solar energy systems, and intermodal shipping containers.

LBMC Section 18.40.630 – Add CBC Section 3114—Intermodal shipping containers.

Section 3114 is added to the California Building Code to read 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. Stationary storage battery arrays located in intermodal shipping containers complying with Chapter 12 of the California Fire Code.

2. Intermodal shipping containers that are listed as equipment complying with the standard for equipment, such as air chillers, engine generators, modular datacenters, and other similar equipment.
3. Intermodal shipping containers housing or supporting experimental equipment are exempt from the requirements of Section 3114 provided they comply with all of the following:
 - a. Single-unit stand-alone intermodal shipping containers shall be supported at grade level and used only for occupancies as specified under Risk Category I in Table 1604.5;
 - b. Single-unit stand-alone intermodal shipping containers shall be located a minimum of 8 feet from adjacent structures and are not connected to a fuel gas system or fuel gas utility; and
 - c. In hurricane-prone regions and flood hazard areas, single-unit stand-alone intermodal shipping containers are designed in accordance with the applicable provisions of Chapter 16.
4. Intermodal shipping containers approved as temporary structures complying with Section 3103.
5. Single-unit stand-alone intermodal shipping containers used as temporary storage or construction trailer on active construction sites. Construction support facilities for uses and activities not directly associated with the actual processes of construction, including but not limited to, offices, meeting rooms, plan rooms, other administrative or support functions shall not be exempt from Section 3114.

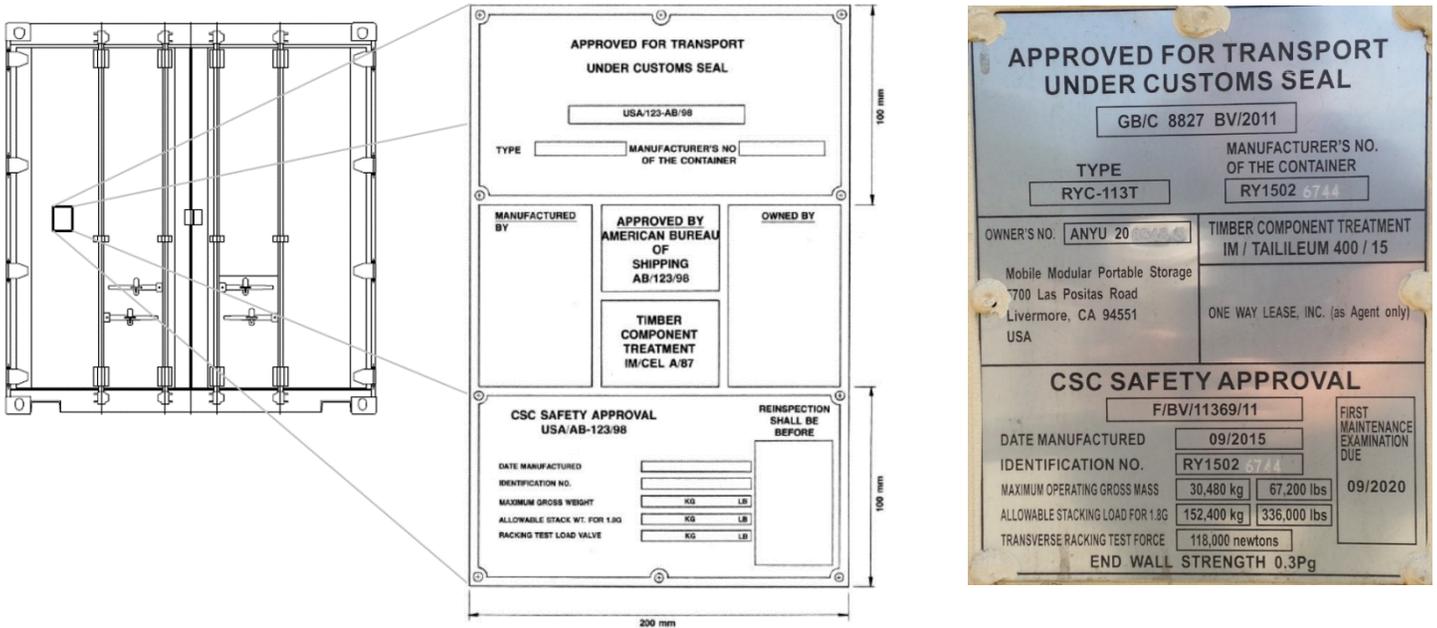
3114.2 Construction documents. The construction documents shall contain information to verify the dimensions and establish the physical properties of the steel components, and wood floor components, of the intermodal shipping container in addition to the information required by Chapter 18.05 of the Long Beach Municipal Code and Section 1603.

3114.3 Intermodal shipping container information. Intermodal shipping containers shall bear the manufacturer's 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 or weight (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 manufacturer's 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 part of buildings or structures.

**FIGURE 3114.3
MANUFACTURER DATA PLATE**



**TABLE 3114.4
APPROVED AGENCY**

NAME	ABBREVIATION
Lloyd's Register	LR
Bureau Veritas	BV
Croatian Register of Shipping/Austrian Veritas	CRS
Registro Italiano Navale	RINA
American Bureau of Shipping	ABS
DNV GL	DNV GL
Nippon Kaiji Kyokai	NK
Russian Maritime Register of Shipping	RS
Polish Register of Shipping	PRS
China Classification Society	CCS
Korean Register of Shipping	KR
Indian Register of Shipping	IR Class



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 that conform to ISO 1496-1 and 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.

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 Openings in containers. Where openings are made in container walls, floors, and roofs for doors, windows and other similar openings:

1. The openings shall be framed with steel elements that are designed in accordance with Chapter 16 and Chapter 22.
2. The cross section and material grade of any new steel element shall be equal to or greater than the steel element removed.

3114.8.4 Detailed structural 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 that meet the limitation of Section 3114.8.5.1 and designed in accordance with the simplified procedure in 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 seismic force-resisting system shall be designed and detailed in accordance with one of the following:

1. Where all or portions of the intermodal shipping 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 intermodal shipping 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 intermodal shipping container sides are retained and integrated into a seismic force-resisting system other than as permitted by Section 3114.8.4.2 Item 1, seismic design parameters shall be developed from testing and analysis in accordance with Section 18.03.060 of the Long Beach Municipal Code 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 side walls and end walls shall be demonstrated by testing and analysis accordance with Section 18.03.060 of the Long Beach Municipal Code. 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 procedure 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 Sections 3114.8.5.2 and 3114.8.5.3.

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 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's 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.

3114.8.5.2 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 side walls and end walls:

1. The appropriate detailing requirements contained in Chapters 16 through 23,
2. Response modification coefficient, $R = 2$,
3. Over strength factor, $\Omega_o = 2.5$,
4. Deflection amplification factor, $C_d = 2$, and
5. Limits on structural height, $h_n = 9.5$ feet (2900 mm).

3114.8.5.3 Allowable shear value. The allowable shear values for the intermodal shipping container side walls (longitudinal) and end walls (transverse) for wind design and seismic design using the coefficients of Section 3114.8.5.2 shall be in accordance with 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 percent 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. 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 322mm²) for electrical boxes, is permitted for each individual 8 feet length (2438 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’s vents shall not be considered a penetration, as shown in Figure 3114.8.5.3(4).
5. End wall door or doors designated as part of the lateral force-resisting system shall be welded closed.

**TABLE 3114.8.5.3
ALLOWABLE SHEAR VALUES FOR INTERMODAL SHIPPING CONTAINER
SIDE WALLS AND END 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 (2483 mm)		
1BBB		9.5 feet (2896 mm)		
1BB	30 feet (9.1 M)	8.5 feet (2591 mm)	112	
1B		8.0 feet (2438 mm)		
1BX		<8.0 feet (2438 mm)		
1CC		8.5 feet (2591 mm)		
1C	20 feet (9.1 M)	8.0 feet (2438 mm)	168	
1CX		<8.0 feet (2438 mm)		

1. The allowable shear value 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 and 3114.8.5.3 shall apply.

FIGURE 3114.8.5.3(1)
BRACING UNIT DISTRIBUTION – MAXIMUM LINEAR LENGTH

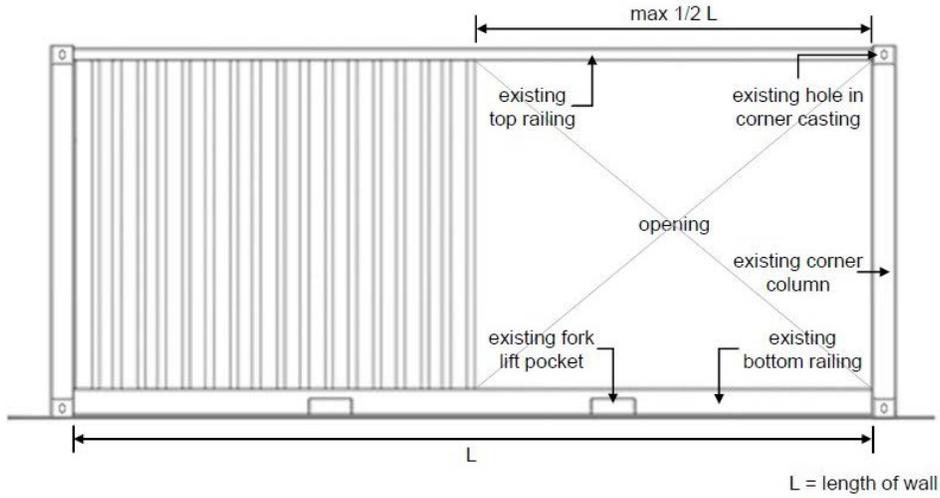


FIGURE 3114.8.5.3(2)
BRACING UNIT DISTRIBUTION – MINIMUM LINEAR LENGTH

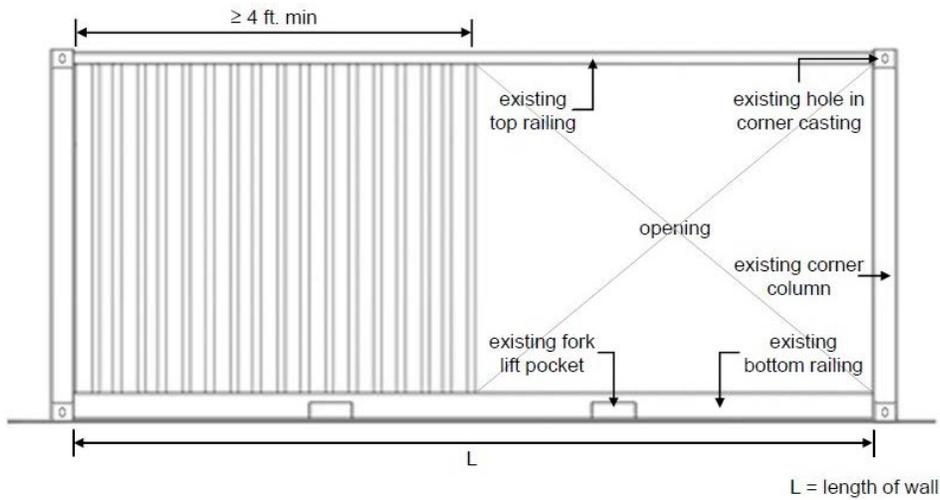
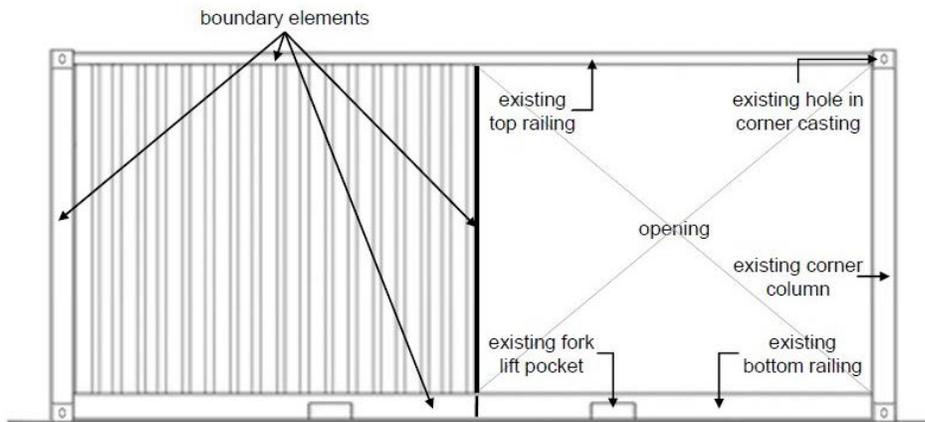
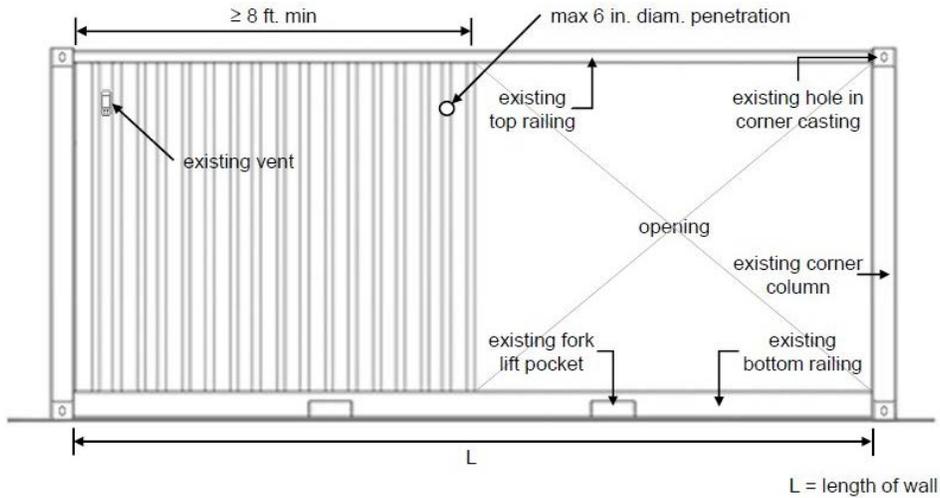


FIGURE 3114.8.5.3(3)
BRACING UNIT DISTRIBUTION – BOUNDARY ELEMENTS



**FIGURE 3114.8.5.3(4)
BRACING UNIT DISTRIBUTION – PENETRATING LIMITATIONS**



LBMC Section 18.40.640 – Amend CBC Chapter 35—Intermodal shipping containers.

Chapter 35 of the California Building Code is amended to add ISO standards to read as follows:

**CHAPTER 35
REFERENCED STANDARDS**

Standard Reference Number	Title	Referenced in code section number
ISO	International Organization for Standardization ISO Central Secretariat 1 ch, de la Voie-Creuse, Casa Postale 566 CH-1211 Geneva 20, Switzerland	
ISO 1496-1:2013	Series 1 Freight Containers – Specification and Testing – Part 1: General Cargo Containers for General Purposes	3114.8, Table 3114.8.5.3
ISO 6346:1995, with Amendment 3: 2012	Freight Containers – Coding, Identification and marking	3114.3
ISO 668:2013	Series 1 Freight Containers – Classifications, dimensions and ratings.	Table 3114.8.5.3

To request this information in an alternative format or to request a reasonable accommodation, please contact the Development Services Department at longbeach.gov/lbds and 562.570.3807. A minimum of three business days is requested to ensure availability; attempts will be made to accommodate requests with shorter notice.