**Intermodal Container Sea Van**

From Wikipedia, the free encyclopedia



A 40-foot (12 m) long shipping container. Each of the eight corners has an essential [twistlock](https://en.wikipedia.org/wiki/Twistlock) fitting for hoisting, stacking, and securing



In 2012 there were over 20 million intermodal containers in the world.



Freight train carrying containers through West Kingman Canyon, Arizona



Making containers *stackable* made loading and transport on large ships feasible and efficient

An **intermodal container** is a large standardized [shipping container](https://en.wikipedia.org/wiki/Shipping_container), designed and built for [intermodal freight transport](https://en.wikipedia.org/wiki/Intermodal_freight_transport), meaning these containers can be used across different [modes of transport](https://en.wikipedia.org/wiki/Mode_of_transport) – from [ship](https://en.wikipedia.org/wiki/Container_ship) to rail to [truck](https://en.wikipedia.org/wiki/Semi-trailer_truck) – without unloading and reloading their cargo. Intermodal containers are primarily used to store and transport materials and products efficiently and securely in the global [containerized](https://en.wikipedia.org/wiki/Containerization) intermodal freight transport system, but smaller numbers are in regional use as well. These containers are known under a number of names, such as simply **container**, **cargo** or **freight** container, **ISO** container, **shipping, sea** or **ocean** container, **container van** or **(Conex) box**, **sea** or **c can**.

Intermodal containers exist in many types and a number of standardized sizes, but ninety percent of the global container fleet are so-called *"dry freight"* or *"general purpose"* containers[durable](https://en.wikipedia.org/wiki/Durable_good) closed [steel](https://en.wikipedia.org/wiki/Weathering_steel) boxes, mostly of either twenty or forty foot (6 or 12m) standard length. The common heights are 8 feet 6 inches (2.6 m) and 9 feet 6 inches (2.9 m) – the latter are known as ***High Cube*** or ***Hi-Cube*** containers.

Just like [cardboard boxes](https://en.wikipedia.org/wiki/Cardboard_box) and [pallets](https://en.wikipedia.org/wiki/Pallet), these containers are a means to bundle cargo and goods into larger, [unitized loads](https://en.wikipedia.org/wiki/Unit_load), that can be easily handled, moved, and stacked, and that will pack tightly in a ship or yard. Intermodal containers share a number of key construction features to hold-up to the stresses of intermodal shipping, to facilitate their handling and to allow stacking, as well as being identifiable through their individual, unique [ISO 6346](https://en.wikipedia.org/wiki/ISO_6346) reporting mark.

In 2012 there were about 20.5 million intermodal containers in the world of varying types to suit different cargoes. Containers have largely supplanted the traditional [break bulk cargo](https://en.wikipedia.org/wiki/Break_bulk_cargo) – in 2010 containers accounted for 60% of the world's seaborne trade. The predominant alternative methods of transport carry [bulk cargo](https://en.wikipedia.org/wiki/Bulk_cargo) – either gaseous, liquid or solid – e.g. by [bulk carrier](https://en.wikipedia.org/wiki/Bulk_carrier) or [tank ship](https://en.wikipedia.org/wiki/Tanker_(ship)), [tank car](https://en.wikipedia.org/wiki/Tank_car) or [truck](https://en.wikipedia.org/wiki/Tank_truck). For [air freight](https://en.wikipedia.org/wiki/Air_freight), the more light-weight [IATA](https://en.wikipedia.org/wiki/IATA)-defined [unit load device](https://en.wikipedia.org/wiki/Unit_load_device) is used.

**History**



Transferring freight containers on the [London, Midland and Scottish Railway](https://en.wikipedia.org/wiki/London,_Midland_and_Scottish_Railway) (LMS; 1928)



Freight car in railway museum [Bochum-Dahlhausen](https://en.wikipedia.org/wiki/Bochum_Dahlhausen_Railway_Museum), showing four different UIC-590 pa-containers



In 1975, many containers still featured riveted aluminum sheet and post wall construction, instead of welded, corrugated steel.

Main article: [Containerization](https://en.wikipedia.org/wiki/Containerization)

By the 1830s, railways on several continents were carrying containers that could be transferred to other modes of transport. The [Liverpool and Manchester Railway](https://en.wikipedia.org/wiki/Liverpool_and_Manchester_Railway) in the United Kingdom was one of these. "Simple rectangular timber boxes, four to a truck, they were used to convey coal from the Lancashire collieries to Liverpool, where they were transferred to horse-drawn carts by crane." Early versions of standardized containers were used in Europe before World War II. Construction of these containers had a steel frame with wooden walls, floor, roof and doors.

The first international standard for containers was established by the [Bureau International des Containers](https://en.wikipedia.org/wiki/Bureau_International_des_Containers) et du Transport Intermodal (B.I.C.) in 1933, and a second one in 1935, primarily for transport between European countries. American containers at this time were not standardized, and these early containers were not yet stackable – neither in the U.S. nor Europe. In November 1932, the first container terminal in the world was opened by the Pennsylvania Rail Road Company in Enola, PA. The development of containerization was created in Europe and the US as a way to revitalize rail companies after the [Wall Street Crash of 1929](https://en.wikipedia.org/wiki/Wall_Street_Crash_of_1929), in New York, and resulting economic collapse and drop in all modes of transport.

In April 1951 at [Zürich Tiefenbrunnen railway station](https://en.wikipedia.org/wiki/Z%C3%BCrich_Tiefenbrunnen_railway_station) the Swiss Museum of Transport and the *Bureau International des Containers* (BIC) held demonstrations of container systems for representatives from a number of European countries, and from the United States. A system was selected for Western Europe, based on the Netherlands' system for consumer goods and waste transportation called *Laadkisten* (lit. "Loading bins"), in use since 1934. This system used [roller containers](https://en.wikipedia.org/wiki/Roller_container) for transport by rail, truck and ship, in various configurations up to 5,500 kg (12,100 lb.) capacity, and up to 3.1 x 2.3 × 2 meters in size. This became the first post-World War II European railway standard of the [International Union of Railways](https://en.wikipedia.org/wiki/International_Union_of_Railways) – *UIC-590*, known as "pa-Behälter." It was implemented in the Netherlands, Belgium, Luxembourg, West Germany, Switzerland, Sweden and Denmark.

The use of standardized steel [shipping containers](https://en.wikipedia.org/wiki/Shipping_container) began during the late 1940s and early 1950s, when commercial shipping operators and the US military started developing such units. In 1948 the [U.S. Army](https://en.wikipedia.org/wiki/United_States_Army) [Transportation Corps](https://en.wikipedia.org/wiki/Transportation_Corps) developed the "Transporter", a rigid, corrugated steel container, able to carry 9,000 pounds (4,100 kg). It was 8 ft 6 in (2.6 m) long, 6 ft 3 in (1.9 m) wide, and 6 ft 10 in (2.1 m) high, with double doors on one end, was mounted on skids, and had lifting rings on the top four corners. After proving successful in Korea, the Transporter was developed into the Container Express (CONEX) box system in late 1952. Based on the Transporter, the size and capacity of the Conex were about the same, but the system was made *modular*, by the addition of a smaller, half-size unit of 6 ft 3 in (1.9 m) long, 4 ft 3 in (1.3 m) wide and 6 ft 10.5 in (2.1 m) high. CONEXes could be stacked three high, and protected their contents from the elements. By 1965 the US military used some 100,000 Conex boxes, and more than 200,000 in 1967. making this the first worldwide application of intermodal containers.

From 1949 onwards, engineer [Keith Tantlinger](https://en.wikipedia.org/wiki/Keith_Tantlinger) repeatedly contributed to the development of containers, as well as their handling and transportation equipment. In 1949, while at Brown Trailers Inc. of [Spokane](https://en.wikipedia.org/wiki/Spokane,_Washington), he modified the design of their [stressed skin](https://en.wikipedia.org/wiki/Semi-monocoque) aluminum 30-foot trailer, to fulfil an order of two-hundred 30 by 8 by 8.5 feet (9.1 m × 2.4 m × 2.6 m) containers that could be stacked two high, for Alaska-based *Ocean Van Lines*. Steel castings on the top corners provided lifting and securing points.

In 1955 trucking magnate [Malcom McLean](https://en.wikipedia.org/wiki/Malcom_McLean) bought [Pan-Atlantic Steamship Company](https://en.wikipedia.org/wiki/Pan-Atlantic_Steamship_Company), to form a container shipping enterprise, later known as [Sea-Land](https://en.wikipedia.org/wiki/Sea-Land_Service). The first containers were supplied by Brown, where McLean met [Keith Tantlinger](https://en.wikipedia.org/wiki/Keith_Tantlinger), and hired him as vice-president of engineering and research. Under the supervision of Tantlinger, a new 35 ft (10.7 m) x 8 ft (2.4 m) x 8 ft 6 in (2.6 m) Sea-Land container was developed, the length determined by the maximum length of trailers then allowed on Pennsylvanian highways. Each container had a frame with eight corner castings that could withstand stacking loads. Tantlinger also designed automatic [spreaders](https://en.wikipedia.org/wiki/Spreader_(container)) for handling the containers, as well as the [twistlock](https://en.wikipedia.org/wiki/Twistlock) mechanism that connects with the corner castings.



Every international shipping container must have a "CSC-Plate"

Two years after McLean's first container ship, the [*Ideal X*](https://en.wikipedia.org/wiki/SS_Ideal_X) started container shipping on the U.S. East Coast, [Matson Navigation](https://en.wikipedia.org/wiki/Matson,_Inc.) followed suit between California and Hawaii. Just like [Pan-Atlantic](https://en.wikipedia.org/wiki/Pan-Atlantic_Steamship_Company)'s containers, Matson's were 8 ft (2.4 m) wide and 8 ft 6 in (2.6 m) high, but due to California's different traffic code, Matson chose to make theirs 24 ft (7.3 m) long. In 1968, McLean began container service to South Vietnam for the US military with great success.

ISO standards for containers were published between 1968 and 1970 by the International Maritime Organization. These standards allow for more consistent loading, transporting, and unloading of goods in ports throughout the world, thus saving time and resources.

The International Convention for Safe Containers is a 1972 regulation by the [Inter-governmental Maritime Consultative Organization](https://en.wikipedia.org/wiki/International_Maritime_Organization) on the safe handling and transport of containers. It decrees that every container travelling internationally be fitted with a CSC Safety-approval Plate. This holds essential information about the container, including age, registration number, dimensions and weights, as well as its strength and maximum stacking capability.

Longshoremen and related unions around the world struggled with this revolution in shipping goods. For example, by 1971 a clause in the [International Longshoremen's Association](https://en.wikipedia.org/wiki/International_Longshoremen%27s_Association) (ILA) contract stipulated that the work of "stuffing" (filling) or "stripping" (emptying) a container within 50 miles of a port must be done by ILA workers or if not done by ILA that the shipper needed to pay royalties and penalties to the ILA. Unions for truckers and consolidators argued that the ILA rules were not valid work preservation clauses because the work of stuffing and stripping containers away from the pier had not traditionally been done by ILA members. In 1980 the [Supreme Court of the United States](https://en.wikipedia.org/wiki/Supreme_Court_of_the_United_States) heard this case and ruled against the ILA.

**Description**



Forty foot (12.2 m) containers make up 70% of the world's container volume, which is measured in [TEU's](https://en.wikipedia.org/wiki/Twenty-foot_equivalent_unit)



The standard castings on the eight corners of each container. The [twistlock](https://en.wikipedia.org/wiki/Twistlock) proper is done through a larger oval hole on the top or bottom.

Ninety percent of the global container fleet consists of *"dry freight"* or *"general purpose"* containers – both of standard and special sizes. And although lengths of containers vary from 8 to 56 feet (2.4 to 17.1 m), according to two 2012 container census reports about 80% of the world's containers are either twenty or forty foot standard length boxes of the dry freight design. These typical containers are rectangular, closed box models, with doors fitted at one end, and made of [corrugated](https://en.wikipedia.org/wiki/Roll_forming) [weathering steel](https://en.wikipedia.org/wiki/Weathering_steel) (commonly known as CorTen) with a [plywood](https://en.wikipedia.org/wiki/Plywood) floor. Although corrugating the [sheet metal](https://en.wikipedia.org/wiki/Sheet_metal) used for the sides and roof contributes significantly to the container's rigidity and stacking strength, just like in [corrugated iron](https://en.wikipedia.org/wiki/Corrugated_galvanised_iron) or in [cardboard boxes](https://en.wikipedia.org/wiki/Corrugated_box_design#Stacking_strength), the corrugated sides cause aerodynamic drag, and up to 10% fuel economy loss in road or rail transport, compared to smooth-sided vans.

Standard containers are 8-foot (2.44 m) wide by 8 ft 6 in (2.59 m) high, although the taller "High Cube" or "hi-cube" units measuring 9 feet 6 inches (2.90 m) have become very common in recent years. By the end of 2013, high-cube 40 ft containers represented almost 50% of the world's maritime container fleet, according to Drewry's Container Census report.

About 90% of the world's containers are either [nominal](https://en.wikipedia.org/wiki/Real_versus_nominal_value#Measurement) 20-foot (6.1 m) or 40-foot (12.2 m) long, although the United States and Canada also use longer units of 45 ft (13.7 m), 48 ft (14.6 m) and 53 ft (16.15 m). ISO containers have castings with openings for [twistlock](https://en.wikipedia.org/wiki/Twistlock) fasteners at each of the eight corners, to allow gripping the box from above, below, or the side, and they can be stacked up to ten units high. Regional intermodal containers, such as European and U.S. domestic units however, are mainly transported by road and rail, and can frequently only be stacked up to three laden units high. Although the two ends are quite rigid, containers flex somewhat during transport.

Container capacity is often expressed in [twenty-foot equivalent units](https://en.wikipedia.org/wiki/Twenty-foot_equivalent_unit) (**TEU**, or sometimes *teu*). A twenty-foot equivalent unit is a measure of containerized cargo capacity equal to one standard 20-foot (6.1 m) long container. This is an approximate measure, wherein the height of the box is not considered. For example, the 9 ft 6 in (2.9 m) tall high-cube, as well as 4-foot-3-inch (1.3 m) half-height 20-foot (6.1 m) containers are equally counted as one TEU. Similarly, extra-long 45 ft (13.72 m) containers are commonly designated as two TEU, no different than standard 40 feet (12.19 m) long units. Two TEU are equivalent to one forty-foot equivalent unit (FEU).

In 2014 the global container fleet grew to a volume of 36.6 million TEU, based on Drewry Shipping Consultants' Container Census. Moreover, in 2014 for the first time in history 40-foot High cube containers accounted for the majority of boxes in service, measured in TEU.

Manufacturing prices for regular, dry freight containers are typically in the range of $1750—$2000 U.S. per CEU (container equivalent unit), and about 90% of the world's containers are made in China. The average age of the global container fleet was a little over 5 years from end 1994 to end 2009, meaning containers remain in shipping use for well over 10 years.

**Bottom structure features**



Forty foot or longer containers typically have a *gooseneck tunnel*, an indentation in the floor structure, that meshes with the gooseneck on dedicated container [semi-trailers](https://en.wikipedia.org/wiki/Semi-trailer_truck). The gooseneck tunnel is clearly visible in the underside of a toppled-over container (first picture), as well as in a container's interior, where it takes the space otherwise covered by wood flooring. Gooseneck container trailer showing twistlock couplings for forty-foot boxes at its four corners. Twenty foot containers on the other hand, frequently have forklift pockets, accessible from the sides (last picture).

**Types**



Forty foot High-cube actively refrigerated container – refrigerating equipment visible on the front end.



A [spine car](https://en.wikipedia.org/wiki/Flatcar#Spine_car) with a 20 ft [tank container](https://en.wikipedia.org/wiki/Tank_container) and an open-top 20 ft container with canvas cover



A flat-rack container loaded with a small vessel loaded by a [reach stacker](https://en.wikipedia.org/wiki/Reach_stacker).

Other than the standard, general purpose container, many variations exist for use with different cargoes. The most prominent of these are [refrigerated containers](https://en.wikipedia.org/wiki/Refrigerated_container) (a.k.a. *Reefer*s) for perishable goods, that make up six percent of the world's shipping boxes. And tanks in a frame, for bulk liquids, account for another 0.75% of the global container fleet.

Although these variations are not of the standard *type*, they mostly are *ISO standard* containers – in fact the [ISO 6346](https://en.wikipedia.org/wiki/ISO_6346#Size_and_Type_Codes) standard classifies a broad spectrum of container types in great detail. Aside from different *size* options, the most important container types are:

* General-purpose dry vans, for boxes, cartons, cases, sacks, bales, pallets, drums, etc., Special interior layouts are known, such as:
  + rolling-floor containers, for difficult-to-handle cargo
  + garmentainers*, for shipping garments on hangers (GOH)*
* Ventilated containers. Essentially dry vans, but either passively or actively ventilated. For instance for organic products requiring ventilation
* Temperature controlled – either [insulated](https://en.wikipedia.org/wiki/Insulated_shipping_container), [refrigerated](https://en.wikipedia.org/wiki/Refrigerated_container), and/or heated containers, for perishable goods
* [Tank containers](https://en.wikipedia.org/wiki/Tank_container), for liquids or gases. Frequently these are [dangerous goods](https://en.wikipedia.org/wiki/Dangerous_goods), and in the case of gases one shipping unit may contain multiple gas bottles
* Bulk containers (sometimes *bulktainers*), either closed models with roof-lids, or hard or soft open-top units for top loading, for instance for bulk minerals. Containerized coal carriers and "bin-liners" (containers designed for the efficient road and rail transportation of rubbish from cities to recycling and dump sites) are used in Europe.
* Open-top and open-side containers, for instance for easy loading of heavy machinery or oversize pallets. Open sides are also used for ventilating hardy perishables like apples or potatoes.
* Platform based containers such as:
  + flat-rack and bolster containers, for barrels, drums, crates, and any heavy or bulky out-of-gauge cargo, like machinery, semi-finished goods or processed timber. Empty flat-racks can either be stacked or shipped sideways in another ISO container
  + collapsible containers, ranging from flush folding flat-racks to fully closed ISO and CSC certified units with roof and walls when erected.

Containers for [Offshore](https://en.wikipedia.org/wiki/Offshore_construction) use have a few different features, like [pad eyes](https://en.wikipedia.org/wiki/Padeye), and must meet additional strength and design requirements, standards and certification, such as the DNV2.7-1 by [Det Norske Veritas](https://en.wikipedia.org/wiki/Det_Norske_Veritas) and the [European standard](https://en.wikipedia.org/wiki/European_Committee_for_Standardization) EN12079: *Offshore Containers and Associated Lifting Sets*.

A multitude of equipment, such as generators, has been installed in containers of different types to simplify logistics – see [containerized equipment](https://en.wikipedia.org/wiki/Intermodal_container#Containerized_equipment) for more details.

[Swap body](https://en.wikipedia.org/wiki/Swap_body) units usually have the same bottom corner fixtures as intermodal containers, and often have folding legs under their frame so that they can be moved between trucks without using a crane. However they frequently don't have the upper corner fittings of ISO containers, and are not stackable, nor can they be lifted and handled by the usual equipment like reach-stackers or straddle-carriers. They are generally more expensive to procure.

**Specifications**



Two 45-foot 'High-cube' containers on a [Roll-on/roll-off](https://en.wikipedia.org/wiki/Roll-on/roll-off) (RoRo) tractor. The 9 ft 6 height of the boxes is identified by diagonal yellow and black markings on the top corners of the container

Basic dimensions and permissible gross weights of intermodal containers are largely determined by two ISO standards:

* [ISO 668](https://en.wikipedia.org/wiki/ISO_668):2013 Series 1 freight containers—Classification, dimensions and ratings
* ISO 1496-1:2013 Series 1 freight containers—Specification and testing—Part 1: General cargo containers for general purposes

Weights and dimensions of the most common *standardized* types of containers are given below. Values vary slightly from manufacturer to manufacturer, but must stay within the tolerances dictated by the standards. Empty weight ([*tare weight*](https://en.wikipedia.org/wiki/Tare_weight)) is not determined by the standards, but by the container's construction, and is therefore indicative, but necessary to calculate a net load figure, by subtracting it from the maximum permitted gross weight.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **20′ container** | | **40′ container** | | **40′ high-cube container** | | **45′ high-cube container** | |
| [**imperial**](https://en.wikipedia.org/wiki/Imperial_units) | [**metric**](https://en.wikipedia.org/wiki/Metric_system) | **imperial** | **metric** | **imperial** | **metric** | **imperial** | **metric** |
| **external dimensions** | **length** | 19′ 10.5″ | 6.058 m | 40′ 0″ | 12.192 m | 40′ 0″ | 12.192 m | 45′ 0″ | 13.716 m |
| **width** | 8′ 0″ | 2.438 m | 8′ 0″ | 2.438 m | 8′ 0″ | 2.438 m | 8′ 0″ | 2.438 m |
| **height** | 8′ 6″ | 2.591 m | 8′ 6″ | 2.591 m | 9′ 6″ | 2.896 m | 9′ 6″ | 2.896 m |
| **interior dimensions** | **length** | 19′ 3″ | 5.867 m | 39′ 5 45⁄64″ | 12.032 m | 39′ 4″ | 12.000 m | 44′ 4″ | 13.556 m |
| **width** | 7′ 8 19⁄32″ | 2.352 m | 7′ 8 19⁄32″ | 2.352 m | 7′ 7″ | 2.311 m | 7′ 8 19⁄32″ | 2.352 m |
| **height** | 7′ 9 57⁄64″ | 2.385 m | 7′ 9 57⁄64″ | 2.385 m | 8′ 9″ | 2.650 m | 8′ 9 15⁄16″ | 2.698 m |
| **door aperture** | **width** | 7′ 8 ⅛″ | 2.343 m | 7′ 8 ⅛″ | 2.343 m | 7′ 6" | 2.280 m | 7′ 8 ⅛″ | 2.343 m |
| **height** | 7′ 5 ¾″ | 2.280 m | 7′ 5 ¾″ | 2.280 m | 8′ 5″ | 2.560 m | 8′ 5 49⁄64″ | 2.585 m |
| **internal volume** | | 1,169 ft³ | 33.1 m³ | 2,385 ft³ | 67.5 m³ | 2,660 ft³ | 75.3 m³ | 3,040 ft³ | 86.1 m³ |
| **maximum gross weight** | | 66,139 lb | 30,400 kg | 66,139 lb | 30,400 kg | 68,008 lb | 30,848 kg | 66,139 lb | 30,400 kg |
| **empty weight** | | 4,850 lb | 2,200 kg | 8,380 lb | 3,800 kg | 8,598 lb | 3,900 kg | 10,580 lb | 4,800 kg |
| **net load** | | 61,289 lb | 28,200 kg | 57,759 lb | 26,600 kg | 58,598 lb | 26,580 kg | 55,559 lb | 25,600 kg |



Load bearing of container stacking is at the 40 ft coupling

**Stacking containers**



53' 48' 45' 40' and (2x) 20' containers stacked



Forty-five-foot containers can be seen sticking out 2½ feet, as part of the forty foot container stacks at the back of this ship.

At stacking load-bearing locations, 40-foot containers are the standard unit length, and 45 ft, 48 ft, and 53 ft all stack at the 40 ft coupling width. Other units can be stacked on top of 20 ft units only if there are two in a row (40 ft coupling width) but 20 ft units cannot be stacked on top of 40 ft units, or any other larger container.

The coupling holes are all female and it takes a double male twistlock to securely mate stacked containers together.

**Non-standard and uncommon size**

**Pallet wide containers**

*Pallet Wide* containers have about 4 inches (10.2 cm) more internal floor width than standard containers to accommodate more [Euro-pallets](https://en.wikipedia.org/wiki/Euro-pallet), common in Europe. These containers typically have an internal width of 2.44 m (96.1 in), to be able to load either two or three of the 1.2 m (47.2 in) long by 0.8 m (31.5 in) wide pallets side by side. Many sea shipping providers in Europe allow these as overhangs on standard containers are sufficient and they fit in the usual interlock spaces (or with the same floor panel the side ribs of pallet-wide containers are embossed to the outside instead of being molded to the inside).

Especially the 45 ft (13.72 m) pallet-wide high-cube shortsea container has gained wider acceptance, as these containers can replace the 13.6 m (44.6 ft) swap bodies that are common for truck transport in Europe. The EU has started a standardization for pallet wide containerization in the European Intermodal Loading Unit (EILU) initiative.

Australian [RACE](https://en.wikipedia.org/wiki/RACE_(container)) containers are also slightly wider to optimize them for the use of [Australia Standard Pallets](https://en.wikipedia.org/wiki/Australia_Standard_Pallets).

**48-foot containers**

The 48-foot (14.63 m) shipping container is a High Cube container in that it is 9 ft 6 in (2.90 m) tall on the exterior. It is 8 ft 6 in (2.59 m) wide which makes it 6 inches (15 cm) wider than ISO-standard containers. This size was introduced by container shipping company [APL](https://en.wikipedia.org/wiki/American_President_Lines) in 1986, and is used domestically in North America on road and rail, and may be transported on deck by ship. This size being 8 feet (2.44 m) longer and 6 inches (15 cm) wider has 29% more cubic capacity than the standard 40-ft High Cube, yet the cost to move it by truck or rail are almost the same.

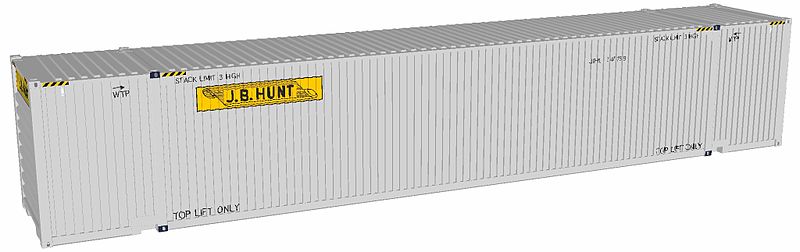
**53-foot containers**



Swift 53 ft Intermodal container

General purpose 53-foot (16.15 m) containers were introduced in the United States in 1989, and are used both in the U.S.A. and Canada, mainly for domestic road and rail transport. They are considered High-cubes, based on their 9 ft 6 in (2.90 m) ISO-standard height. Their width of 8 ft 6 in (2.59 m) however makes them 6 inches (15 cm) wider than ISO-standard containers. These large boxes have 60% more capacity than standard-height 40-foot (12.2 m) containers, enabling shippers to consolidate more cargo into fewer containers.

Generally, North American 53-foot containers were not constructed strong enough to endure the rigors of ocean transport, but in 2007 container carrier [APL](https://en.wikipedia.org/wiki/American_President_Lines) introduced the first 53-foot ocean-capable containers. All new, reinforced 53-foot boxes were built specifically for international trade and designed to withstand ocean voyages on its South-China to Los Angeles service. In 2013 however, APL stopped offering vessel space for 53-foot containers on its trans-Pacific ships. Nevertheless, In 2015 both [Crowley](https://en.wikipedia.org/wiki/Crowley_Maritime) and TOTE Maritime each announced the construction of their respective second combined container & [RoRo](https://en.wikipedia.org/wiki/Roll-on/roll-off) ships for Puerto Rico trade, with the specific design to maximize cubic cargo capacity by carrying 53-foot, 102-inch-wide containers. Within Canada, [Oceanex](https://en.wikipedia.org/w/index.php?title=Oceanex&action=edit&redlink=1) offers 53-foot-container ocean service to and from the island of Newfoundland. Fifty-three-foot containers are also being used on some Asia Pacific international shipping routes.



**Small containers**

The United States military continues to use small containers, strongly reminiscent of their Transporter and Conex boxes of the 1950s and 1960s. These either comply with ISO standard dimensions, or are a direct derivative thereof. Current terminology of the US armed forces calls these small containers Bicon, Tricon and Quadcon, which correspond with [ISO 668](https://en.wikipedia.org/wiki/ISO_668) standard sizes 1D, 1E and 1F respectively. This comes down to containers of 8 ft (2.44 m) height, and with a footprint size either one half (Bicon), one third (Tricon) or one quarter (Quadcon) the size of a standard 20-foot, one TEU container.   
At a nominal length of 10 feet (3.0 m), two Bicons coupled together *lengthwise* match one 20-foot ISO container, but their height is 6 inches (15 cm) shy of the more commonly available 10-foot ISO containers of so-called *standard* height, which are 8 ft 6 in (2.59 m) tall. Tricons and Quadcons however have to be coupled *transversely* – either three or four in a row – to be stackable with twenty foot containers. Their *length* of 8 ft (2.44 m) corresponds to the *width* of a standard 20-foot container, which is why there are forklift pockets at their ends, as well as in the sides of these boxes, and the doors only have one locking bar each. The smallest of these, the Quadcon, exists in two heights: 96 in (2.44 m) or 82 in (2.08 m). Only the first conforms to ISO-668 standard dimensions (size 1F).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | |  | | US Navy tractor moves Quadcon containers at Kin Red Port in Okinawa (2005) |  |  | | --- | |  | | US Navy load Tricon containers into a C-5 Galaxy transport aircraft (2006) |  |  | | --- | |  | | US Navy moving a Bicon box – notice forklift pockets only in the sides, not at the ends. | |

**Reporting mark**



Various markings on the rear end of a container

Each container is allocated a standardized [ISO 6346](https://en.wikipedia.org/wiki/ISO_6346) [reporting mark](https://en.wikipedia.org/wiki/Reporting_mark) (ownership code), four letters long ending in either U, J or Z, followed by six digits and a check digit. The ownership code for intermodal containers is issued by the [*Bureau International des Containers*](https://en.wikipedia.org/wiki/Bureau_International_des_Containers) (International container bureau, abbr. B.I.C.) in France, hence the name **BIC-Code** for the intermodal container reporting mark. So far there exist only four-letter BIC-Codes ending in "U".

The placement and registration of BIC Codes is standardized by the commissions TC104 and TC122 in the JTC1 of the ISO which are dominated by shipping companies. [Shipping containers](https://en.wikipedia.org/wiki/Shipping_container) are labelled with a series of identification codes that includes the manufacturer code, the ownership code, usage classification code, UN placard for hazardous goods and reference codes for additional transport control and security.

Following the extended usage of pallet-wide containers in Europe the EU had started the Intermodal Loading Unit (ILU) initiative. This showed advantages for intermodal transport of containers and swap bodies. This led to the introduction of **ILU-Codes** defined by the standard EN 13044 which has the same format as the earlier BIC-Codes. The International Container Office BIC agreed to only issue ownership codes ending with U, J or Z. The new allocation office of the UIRR (International Union of Combined Road-Rail Transport Companies) agreed to only issue ownership reporting marks for swap bodies ending with A, B, C, D or K – companies having a BIC-Code ending with U can allocate an ILU-Code ending with K having the same preceding digits. Since July 2011 the new ILU codes can be registered, beginning with July 2014 all intermodal ISO containers and intermodal swap bodies must have an ownership code and by July 2019 all of them must bear a standard-conforming placard.

**Handling**



A cargo container being transferred from a rail car to a flat-bed truck, lifted by a [reach stacker](https://en.wikipedia.org/wiki/Reach_stacker)

Containers are transferred between rail, truck and ship by [container cranes](https://en.wikipedia.org/wiki/Container_crane) at [container terminals](https://en.wikipedia.org/wiki/Container_terminal). [Forklifts](https://en.wikipedia.org/wiki/Forklift), [reach stackers](https://en.wikipedia.org/wiki/Reach_stacker), [straddle carriers](https://en.wikipedia.org/wiki/Straddle_carrier), and [cranes](https://en.wikipedia.org/wiki/Crane_(machine)) may be used to load and unload trucks or trains outside of container terminals. [Swap bodies](https://en.wikipedia.org/wiki/Swap_body), [side lifters](https://en.wikipedia.org/wiki/Sidelifter), tilt deck trucks and [hook trucks](https://en.wikipedia.org/wiki/Hydraulic_hooklift_hoist) allow transfer to and from trucks with no extra equipment.

ISO-standard containers can be handled and lifted in a variety of ways by their corner fixtures, but the structure and strength of 45-foot (type E) containers limits their tolerance of side-lifting, nor can they be forklifted, based on ISO 3874 (1997).

**Transport**

Main article: [Intermodal freight transport](https://en.wikipedia.org/wiki/Intermodal_freight_transport)

Containers can be transported by [container ship](https://en.wikipedia.org/wiki/Container_ship), truck and [freight trains](https://en.wikipedia.org/wiki/Freight_train) as part of a single journey without unpacking. Units can be secured in transit using "[twistlock](https://en.wikipedia.org/wiki/Twistlock)" points located at each corner of the container. Every container has a unique [BIC code](https://en.wikipedia.org/wiki/ISO_6346) painted on the outside for identification and tracking, and is capable of carrying up to 20–25 [metric tons](https://en.wikipedia.org/wiki/Metric_tons). Costs for transport are calculated in [twenty-foot equivalent units](https://en.wikipedia.org/wiki/Twenty-foot_equivalent_unit) (TEU).

**Rail**



A portion of a "double stack" container train operated by [Union Pacific Railroad](https://en.wikipedia.org/wiki/Union_Pacific_Railroad), the containers are owned by [Pacer Stacktrain](https://en.wikipedia.org/wiki/Pacer_Stacktrain), the well cars by [DTTX](https://en.wikipedia.org/wiki/TTX_Company).

When carried by rail, containers may be carried on [flatcars](https://en.wikipedia.org/wiki/Flatcar) or [well cars](https://en.wikipedia.org/wiki/Well_car). The latter are specially designed for container transport, and can accommodate [double-stacked containers](https://en.wikipedia.org/wiki/Double-stack_rail_transport). However the [loading gauge](https://en.wikipedia.org/wiki/Loading_gauge) of a rail system may restrict the modes and types of container shipment. The smaller loading gauges often found in European railroads will only accommodate single-stacked containers. In some countries, such as the United Kingdom, there are sections of the rail network through which high-cube containers cannot pass, or can pass through only on well cars. On the other hand, [Indian Railways](https://en.wikipedia.org/wiki/Indian_Railways) runs double-stacked containers on [flatcars](https://en.wikipedia.org/wiki/Flatcar) under [25 kV](https://en.wikipedia.org/wiki/25_kV_AC_railway_electrification) [overhead electrical wires](https://en.wikipedia.org/wiki/Overhead_line). In order to do this, the wire must be at least 7.45 meters (24 ft 5 in) above the [track](https://en.wikipedia.org/wiki/Track_(rail_transport)), but IR is able to do so because of its large loading gauge and the extra stability provided by its 1,676 mm (5 ft 6 in) track. [China Railways](https://en.wikipedia.org/wiki/China_Railways) also runs double-stacked containers under overhead wires, but must use [well cars](https://en.wikipedia.org/wiki/Well_car) to do so, since the wires are only 6.6 meters (21 ft 8 in) above the track and 1,435 mm (4 ft 8 1⁄2 in) ([standard gauge](https://en.wikipedia.org/wiki/Standard_gauge)) does not provide adequate stability to run double-stacked containers on flat cars.

**Ship**

Each year an estimated 10,000 shipping containers fall into the sea; of these 10% are expected to contain chemicals toxic to marine life.

**Plane**

Containers can also be transported in planes, as seen within intermodal freight transport. However transporting containers in this way is typically avoided due to the cost of doing such and the lack of availability of planes which can accommodate such awkward sized cargo.

**Securing and security**

**Securing containers and contents**

Main article: [Load securing](https://en.wikipedia.org/wiki/Load_securing)

There are many established methods and materials available to stabilize and secure intermodal containers loaded on ships, as well as the internal cargo inside the boxes. Conventional restraint methods and materials such as steel [strapping](https://en.wikipedia.org/wiki/Strapping) and wood blocking & bracing have been around for decades and are still widely used. Polyester strapping and lashing, synthetic webbings are also common today. [Dunnage bags](https://en.wikipedia.org/wiki/Dunnage_bag), also known as "air bags" are used to help keep [unit loads](https://en.wikipedia.org/wiki/Unit_load) in place.

[Flexi-bags](https://en.wikipedia.org/wiki/Flexi-bag) can also be directly loaded, stacked in food-grade containers. Indeed, their standard shape fills the entire ground surface of a 20'ISO container.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | |  | | Containers can be horizontally connected with lashing bridge fittings |  |  | | --- | |  | | Dockworkers securing containers on a ship with steel lashing bars and [turnbuckles](https://en.wikipedia.org/wiki/Turnbuckle) |  |  | | --- | |  | | Polyester Lashing Application |  |  | | --- | |  | | Polyester Strapping and Dunnage Bag application |  |  | | --- | |  | | Application in container | |

**Security**

Intermodal containers can be the target of break-ins and burglary when left unattended since they often contain valuables. In these cases, a security system consisting of a motion detector and panel can trigger a siren, strobe, or light to deter intruders. Many panels have wireless communication so that security guards can be alerted if an alarm is triggered.

Motion detectors can be used as a security method (although items that were packed incorrectly may come loose and cause a false response from motion detectors). However, many break-ins occur by criminals cutting through a wall of the container, so the obstructed sensor becomes useless. [Tomographic motion detectors](https://en.wikipedia.org/wiki/Motion_detector#Sensor_technology) work well in intermodal containers because they do not require a line of sight to detect motion. The entire container is covered by a volumetric sensing mesh that is not blocked by equipment or inventory. Tomographic motion detection is not prone to misdetection due to dirt buildup as is the case for beams and infrared sensors.

**Non-shipping uses**

**Containerized equipment**



File:Hammelmann Diesel unit – built into container

Container-sized units are also often used for moving large pieces of equipment to temporary sites. Specialized containers are particularly attractive to militaries already using containerization to move much of their freight around. Shipment of specialized equipment in this way simplifies logistics and may prevent identification of high value equipment by enemies. Such systems may include command and control facilities, mobile operating theatres or even missile launchers (such as the Russian [3M-54 Klub](https://en.wikipedia.org/wiki/3M-54_Klub#Launch_platforms) surface-to-surface missile). Complete water treatment systems can be installed in containers and shipped around the world. Electric generators can be permanently installed in containers to be used for portable power.

**Repurposing**



Container City in [Cholula](https://en.wikipedia.org/wiki/Cholula,_Puebla#Landmarks), Mexico uses fifty old sea containers for 4,500 m2 (48,000 sq ft) of workshops, restaurants, galleries, etc., as well as some homes.

Containers have long been used for other purposes, typically but not always at the end of their voyaging lives. US military often used their Conex containers as on-site storage, or easily transportable housing for command staff and medical clinics. Nearly all of over 150,000 Conex containers shipped to Vietnam remained in country, primarily as storage or other mobile facilities. Permanent or semi-permanent placement of containers for storage is common. A regular forty-foot container has about 4,000 kg (8,818 lb.) of steel, which takes 8,000 [kWh](https://en.wikipedia.org/wiki/Watt-hour) (28,800 [MJ](https://en.wikipedia.org/wiki/Megajoule)) of energy to melt down. Repurposing used shipping containers is increasingly a practical solution to both social and ecological problems.

[Shipping container architecture](https://en.wikipedia.org/wiki/Shipping_container_architecture) employs used shipping containers as the main framing of modular home designs, where the steel may be an integrated part of the design, or be camouflaged into a traditional looking home. They have also been used to make temporary shops, cafes, and [computer datacenters](https://en.wikipedia.org/wiki/Modular_data_center), *e.g.*, the [Sun Modular Datacenter](https://en.wikipedia.org/wiki/Sun_Modular_Datacenter).

Intermodal containers are not strong enough for conversion to underground bunkers, as the walls cannot sustain much lateral pressure, and will collapse. Also, the wooden floor of many used containers could contain some fumigation residues, rendering them unsuitable as confined spaces, such as for prison cells or bunkers. Cleaning or replacing the wood floor can make these used containers habitable, with proper attention to such essential issues as ventilation and insulation.

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