



Using containers & ULDs

Forwarders will usually try to use containers whenever possible. This reduces the chance of loss, damage or pilferage (as they can be sealed). Shipments that are not "containerized" may be split up by the air carrier and could arrive piecemeal at the destination.

ULDs

What is a ULD?

A ULD or "Unit Load Device" are "containers" or "pallets" that are actually part of the aircraft structure that are removable. As such, the FAA must certify them as "airworthy". Any damaged containers must be repaired by an FAA approved repair facility.

Locks

ULDs are secured to the aircraft by means that hold the lip of the ULD (pallet or container) and keep it from moving in any direction.



of "locks" in the floor that hold the lip of the ULD (pallet or container) to the floor of the aircraft and

Containers

Both containers and pallets have height limitations depending on whether they are configured for "main deck" or "lower deck" on an aircraft. **Lower deck containers and pallets have a height limitation of 64 inches** and are commonly prefaced with the initials "LD" for lower-deck, as in "LD-3" 3 which is the most common cargo container used on widebody aircraft.

Structural containers are a single molded unit

These containers (see illustration) are usually a single molded unit with a door or doors that open or are removed and require no additional restraints.



Lower Deck Type 3 Structural ULD 1

Non-structural containers require a net

Some containers are not strong enough to operate without the benefit of a net²³.



²³ Commonly referred to as a "cargo net", they can be webs of straps or ropes; these too must be FAA approved

Non Certified containers

Some common air freight “containers” are actually large boxes, usually made of fiberboard²⁴ that are not FAA approved and thus must be strapped down to an approved pallet or loaded in a container before being carried on the aircraft.

Common containers are “D” and “E” containers



Pallets

Pallets come in various base dimensions and can be built up to various heights and contours depending upon the aircraft in which they will be loaded. Some are called “contoured” meaning they fit to the curvature of the aircraft as they go up in height and some are just rectangular.



²⁴ Fiberboard: Cardboard

Lower Deck Pallets

These are flat on the top as they are usually flush up against the ceiling of the belly hold.



Lower Deck Containers (i.e. an LD-3 container)





Templates

Sometimes, cargo handlers will use a template that matches the contour of the aircraft the ULD will be loaded on to ensure that available space or “cube” is utilized, and that pallets are not built up too high and thus may be bumped²⁵ from the flight if they don’t fit.

Some forwarders make templates to ensure that the pallet is contoured properly and not built up too high. Or just get a tall guy to stand next to it...



Jim Powell as pallet template...

²⁵ “Bumped” means denying boarding to freight that was scheduled to ride a particular flight.



The importance of “widebody” aircraft

One important concept that a good cargo agent needs to understand is the importance of widebody aircraft, and to know which models of aircraft are considered widebody. In international terms they are sometimes referred to as “high capacity”.

Widebody aircraft and ULDs

- *ONLY widebody aircraft can carry ULD's in the lower deck.²⁶*
- *This means that on the majority of available flights, which are passenger aircraft, the only ones on which you can load a container or pallet are the widebody passenger flights.*

Limitations of “narrowbody” or conventional aircraft

- *Narrowbody aircraft generally cannot accommodate ULDs on the lower deck*
- *Narrowbody freighters can carry ULDs on the main deck*
- *Some narrowbody aircraft are “combi’s” (i.e. 737) carrying passengers and cargo on the main deck.*

How to memorize the narrowbody and widebody aircraft types

It's easy, since there are only a few widebody aircraft in existence when compared to the hundreds of “conventional” aircraft, you need only to memorize the widebodies... and they are:

Boeing

747, 767, 777

Douglas

MD-11, DC-10

Lockheed

L-1011

Airbus

A300, A310, A330, A340, A380 (not in svc yet)

²⁶ For every rule there is an exception... there are a few “narrowbody” aircraft such as the A319, and A320 that can carry special undersized ULDs in the belly; but these are rare instances.



Illyushin

IL-86, IL-96

There will be a chart in the Cargo OAG that shows aircraft codes and the widebody aircraft will have a “W” next to them.

Take a look at page A11 in the OAG Air Cargo Guide and note the “W” in the “type” column

Using the Passenger OAG to determine if it’s a widebody

Since, in the passenger OAG they wouldn’t have any reason to care whether it’s a widebody or not, they don’t give you these codes, however, they do give you aircraft diagrams.

You can use these diagrams to determine if the aircraft is a widebody.

Any aircraft that has more than one aisle for passengers is a widebody!

Let’s take a quick look at United Airline’s aircraft diagrams on page B80 and B81 of the passenger OAG (“OAG Desktop Flight Guide – North American Edition”).

The 737’s on page B80 have one aisle, while the 747’s on page B81 have two.

Loading restrictions of ULD’s

While we’re going over some of the terms and definitions it may be helpful to review the Air Freight Containers diagram in the Worldwide supplement to the cargo OAG on page 66 and 67.

Type

Common designator for the container

Owner

Distinguishes between airline provided and shipper owned containers.

Participating Carriers

Carrier’s who have provided information regarding these containers; it does not imply, though, that they are the only ones who handle them. For example, A1 containers are handled by a lot more than carriers than AZ and LH.

IATA classification

IATA may use different codes for these containers, especially in interline message procedures (IMP).



Cubic Capacity

How much can they hold (volume)?

External dimensions and cubic displacement

What size are they and how much space to they take up (versus what they can hold inside)

Weight

Minimum chargeable pounds

Minimum chargeable weight for this container

Maximum gross weight

The maximum total loaded weight of the container or pallet with all the cargo, nets, etc. ULDs are certified for a certain maximum gross weight – i.e. for many LD-3's it is around 3300 pounds for some main-deck containers on large aircraft it may be 20,000 pounds.

Handling features for shippers

Miscellaneous info such as whether the containers are “forkable” or not.

Other Definitions and Terms

Tare Weight

The weight of the ULD itself. Many times this amount is deducted from the chargeable weight is a ULD shipment has per-pound (or kg) rates.

Payload

The is the “useable” weight that can be loaded in or on a ULD that is determined by subtracting the tare weight from the gross weight

Position

The term “position” usually refers to the location of a ULD on an aircraft, or two the approximate space the cargo will take on an aircraft. I.e. “that shipment will probably take up two positions...”

Half-pallet

Usually found on older narrow-body freighter aircraft, these are ½ the size of a regular pallet. I.e. on a DC-8 freighter with 108x88 pallets, a half-pallet would be 54x88 and is usually turned



“lengthwise”²⁷ on an aircraft in the furthestmost aft²⁸ position in the tail-cone area of the fuselage²⁹.

“Forkable” and “Non-forkable” ULD’s

This refers to containers that have a built-up base with “fork holes” to accommodate the blades of a forklift so that it can be lifted securely.

“Non-forkable”

Containers are ALL pallets and any containers that do not have fork holes. These ULD’s must NEVER be handled with the bare fork blades... I know what you’re thinking – but those are the rules. They must be handled on a roller system.



²⁷ Lengthwise and crosswise refer to orientation along the longitudinal axis or horizontal axis of a plane (or truck). In plain English... take your pen or pencil and line it up on top of your middle finger from the fingernail to the base with the tip at one end and the eraser at the other – that’s lengthwise. Rotate it 90 degrees so it’s straddling or balancing on your finger – that’s “crosswise”.

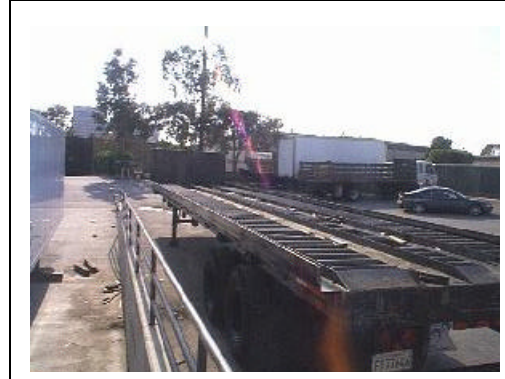
²⁸ Aft: Rear

²⁹ Fuselage: The body of the aircraft



Rollerbed truck

A specially equipped truck bed with rollers to accommodate ULDs. Very often these rollers are hydraulic so that they can be lowered into the floor for transport so the ULDs will not roll around while the truck is in motion.



Build-up station

Locations in a freight terminal where ULD's are "built" that is, loaded. At more advanced terminals these stations use hydraulic lifts to actually lower the pallet into the floor, as the cargo is loaded higher and higher (and increasingly out of reach of the cargo handlers).

Wings (no illustration)

These are wing-like attachments that fit onto the base of a pallet to expand the loading area by extending up and out from the base of the pallet. This allows the base to still fit into the locks³⁰ and the rails³¹ of the aircraft, but taking advantage of the space above the siderails.



Ball Mat

A ball bearing like floor section located in the door position of a freighter that allows pallets to swivel (rotate) and slide under the rails and back into the aircraft.

Or located in a transfer area from truck to warehouse such as this "bypass" area at KLM in LAX.



Bulk load (no illustration)

Sometimes refers to an aircraft that does not have a roller bed to accommodate ULDs; instead the cargo is moved into position manually or with the aid of a pallet-jack³²

³⁰ Locks are the fasteners (usually four) that secure the ULD to the floor of the aircraft.

³¹ The siderails of the aircraft floor that usually have a lip or flange that keeps the ULD close to the floor and slide along the rollers in a straight line. The rails restrain lateral movement and the locks restrain longitudinal movement.

³² Pallet jack: Sometimes referred to as a lift truck, this is a small fork-lift device that lifts slides into a wooden "skid", is "jacked up" a few inches and then rolled along the floor either manually or by battery power.



Pallet or “skid”

There is another type of “pallet” and that is a wooden or plastic platform that is a basic materials handling tool for all modes of warehousing and transport. Also referred to as a “skid” these are usually in the dimensions approximately 44 (L) by 40 (W) (these dims may vary widely).

Four Way Skid

Has four “holes” to accommodate forklift blades either from the sides or each end.





Calculating the cubic volume of your shipment

Very often you will need to have an idea of how much volume your shipment will take up.

While you may know the ‘dim weight’ or “volume weight” of a shipment, it helps to know the actual volume

This is easily determined by multiplying the Length x width x height of each piece and adding it all up to get the total cubic volume for the shipment.

This is the exact same process you go through to calculate the volume weight.

The end result of LxWxH is the volume in cubic inches.

To convert that to cubic feet just divide it by 1728 (which is 12x12x12).

Example:

Pcs	Length	Width	Height	Meas- ure	Volume (in3)	Div by	Vol (ft3)
4	23	32	13	in	38272	-	-
1	45	25	9	in	10125	-	-
7	12	11	12	in	11088	-	-
4	35	35	20	in	98000	-	-
					157,485	1728	91.13715

Based on these calculations this shipment would fit in an LD-3, which has a useable cubic capacity of 150 cubic feet³³.

So even though this method is not exact (for example, you may have pcs that don't take up much cubic volume but are lengthy and may not fit inside the container door dimensions) it can give you a rough idea of how much space will be required.

³³ Many of these figures may vary, depending upon whether the LD-3 is “forkable” or not.