



Maersk Line Lashing Guide: Loading and Lashing Cargo



NOTICE

This document is for general guidance only and to assist and remind customers and shippers of the importance of correct securing of cargo to ensure safe shipment by sea.

Nothing in this document is intended to replace or supplant any relevant or applicable regulation, guideline or code of practice whether or not referred to in this document. Do note that this guide concerns only the basic procedures and is not exhaustive. No express or implied warranties or guarantees are made and whilst we assume that the information and content provided by us in this guide is true and correct, it may, nevertheless, contain errors or inaccuracies. Please note that Maersk Line does not assume any liability for the accuracy of the information and contents provided in this guide, or for any consequences resulting from using the information and content provided in the guide.

For your convenience and guidance, we draw your attention to the following procedures in respect of the stuffing and securing of cargo on our Maersk Line flatracks. Please note that the information provided is for general guidance only and not to be considered as a definitive guide. Requirements may differ, depending on the specifications of the cargo involved. Ultimately, it is the sole responsibility of the shipper / customer to ensure their cargo is safe for carriage by sea and comply with all applicable regulations

We reserve the right to inspect all flatracks prior to loading. We also reserve the right to refuse loading of cargo in certain circumstances. These include, but are not limited to circumstances where the master deems that the cargo or situation renders transit unsafe.

We kindly remind our customers and shippers of their obligations in respect of lashing / securing of cargo. In particular we refer customers and shippers to the obligations and recommendations set out in the IMO/ILO/UNECE CTU Code of Practice and IMO Code of Safe Practice for Cargo Stowage and Securing, as may be amended from time to time. Kindly note that both resources should be referred to for a more detailed guide to cargo securing.

Carriage of cargo is subject always to Maersk's terms & conditions <https://terms.maerskline.com/Carriage> and nothing herein contained is intended to alter or amend these.

Stuff and Secure your own cargo



This helpful guide was crafted for our customers who will be securing their cargo independently. Please comply with the listed procedures for smooth lashing and stuffing on our Maersk Line flatracks. It is important that your goods are placed in the right manner, as vessel movements during ocean transport need to be considered.

Remember the following before stuffing a flatrack



Use this Prevention Tasks checklist, which follows CTU packing rules:

- Have a valid CSC/ISO placard (containing date of validity)
- Check the corner castings and structures
- Check locks and endwalls
- Check of floor, clean, nails, holes, and for any traces of contamination
- Check of lashing points, nos, and condition
- Check of lashing equipment
- Check of cargo weight distribution, and the correct stowage position

Your helpful guide when stuffing and lashing cargo

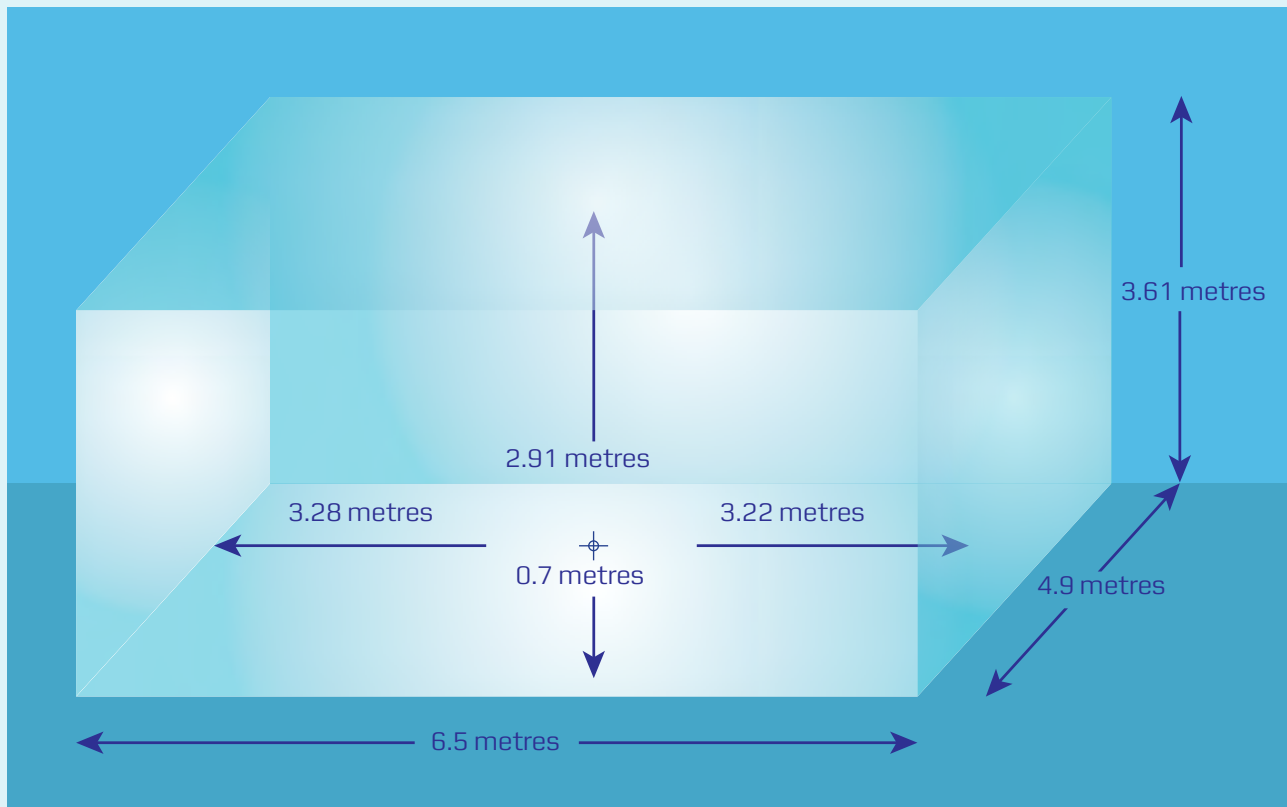


At Maersk Line, we prioritize safety of our people, as well as the cargo that come onboard our vessels. Study the following information diligently, to ensure secure stuffing on our flat racks.

Know your cargo's center of gravity

The Center of Gravity is the mean location of all the mass in a system. It is the point at which all of the weight of an object appears to be concentrated. You need to indicate this with the international mark on every piece of cargo, especially on boxes and crates. (⊕)

The center of gravity is what determines how stable your cargo is. If it's too high, or even a little bit too low, your cargo could topple over or lose balance and fall as soon as the ship tilts to another direction. The ideal center of gravity is one that is low, since these are considered more stable and safe for transport on a flat rack.



Please make sure that when positioning the cargo on the flat rack, your center of gravity is not too far off-center.

Weight Distribution

Our Maersk Line flatracks were constructed to carry heavier, more concentrated loads compared to the standard equipment. This is why the main strength of our basic flatrack is in the two outer-bottom rails.

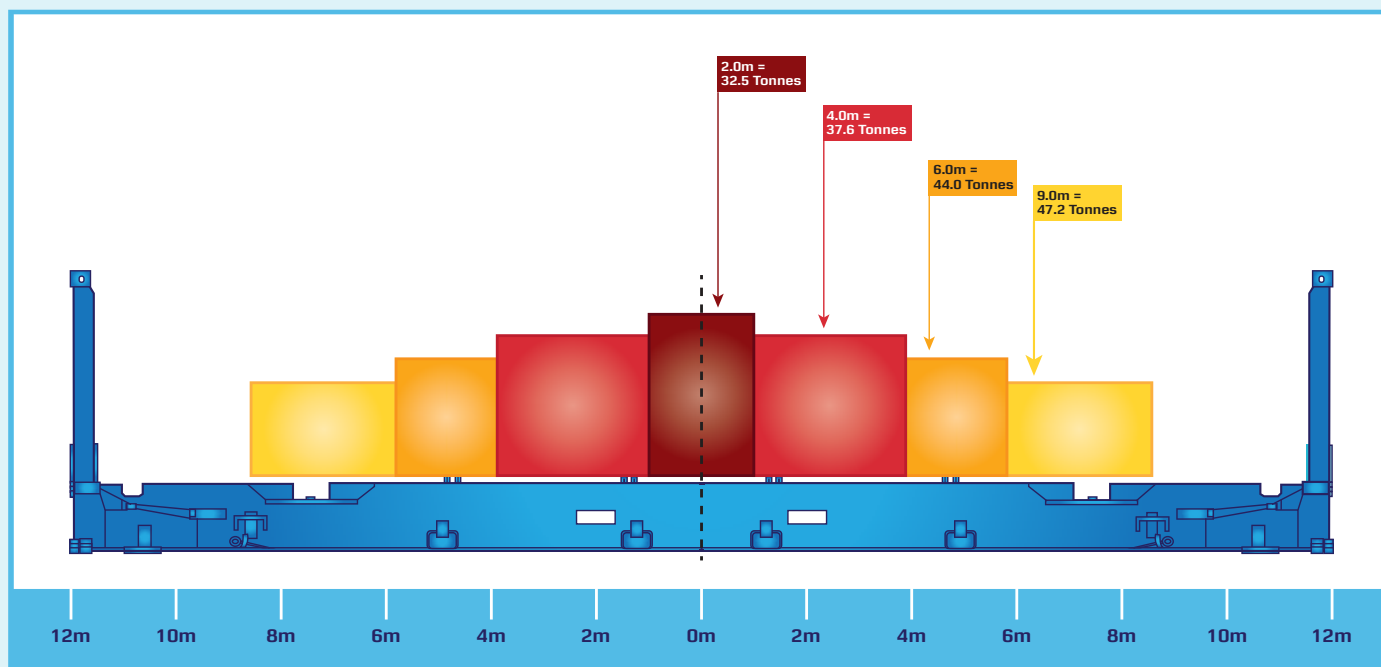
It is important that the load limits are followed and the cargo weight is distributed across the floor area of the flat rack.

The diagram below gives a quick guide on how to distribute the weight across the floor, and as illustrated, the permissible weight decreases as the cargo length decreases. As per the floor load limits in the diagram very dense cargo may need additional dunnage to distribute the weight as evenly as possible.

The maximum payload is marked on each flatrack for your reference, but note that the maximum weight can also depend on the length of the cargo that rests on the bottom rails.

NOTE:

Payload is the max accepted cargo weight on a container.



Note: This diagram is only a guidance and it is important each cargo is individually evaluated as per specific details around pressure points, weight distribution etc.

Definition of Stuffing

In terms of stuffing cargo, please make sure that your cargo is positioned properly on the flatrack, in a manner that justly distributes weight along length and width. Check that the center of gravity is not too far off-center.

Due to cell guide structures, over-width cargo and respective blocking and bracing materials should not be stowed within 30cm (12") of the front end of a flatrack, as this prevents loading under deck. This type of cargo would need to be loaded on deck, with additional cost.

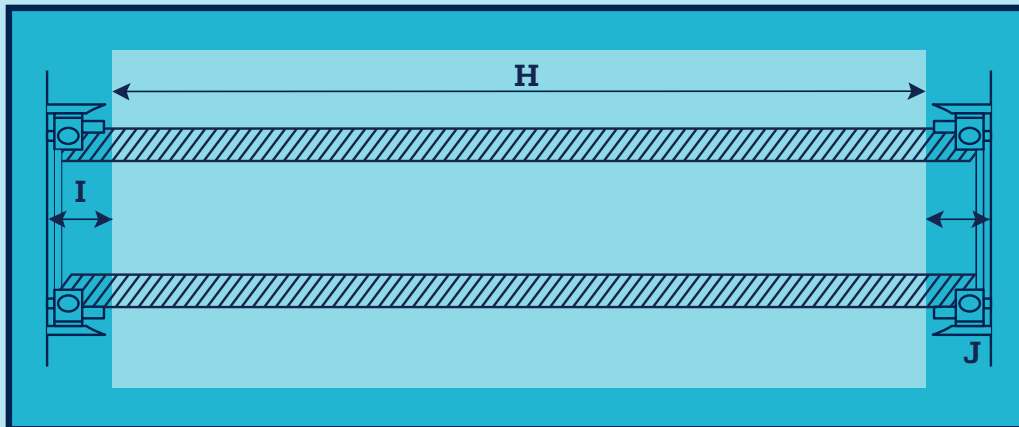
Meanwhile, Cargo stuffed against the headers of flatracks are only suitable for deck loading. Please see the following diagrams, for your compliance and guidance.



NOTE:

When your cargo is over-width on one side only, this means your cargo is loaded over-width on one side because the center of gravity is not in the center of the cargo.

The guide diagram below only shows the dimensions for 40' flatracks. As of now, we do not have 20ft flats in our fleet. However, we do accept Shippers Owned Containers. Please be guided accordingly.



No.	Explanation	20' Flat	40' Flat
H	Max. allowed length for over wide cargo	550 cm	1160 cm
I	Min. distance to flatracks outer end	30 cm	30 cm
J	Cell guides of the vessel under deck		

Always prioritize accurate out-of-gauge measurements, and include the lashing equipment as well. This is because any incorrect declaration can lead to a misrating and short shipment, which can cause you unexpected delay.

NOTE:

Out of gauge cargo are shipments which exceed the dimensions of standard containers by being over height, over length, and/or over width. But, it is also one that still fits within the Maersk Line House Rules, or referred to as our pricing guidelines. Exceptional pricing outside these guidelines can be done on a case by case basis.



In-gauge cargo means that the dimensions of the cargo are smaller, or equal, to the container dimensions. Cargo more than 244cm wide on a flatrack is considered out of gauge.

Lashing in General



Lashing is the securing of cargo for transportation, with the goal of minimizing shifting when in transit. Items used for lashing cargo down include ropes, cables, wires, strapping, and nets. These items are anchored down to the container, and tensioned against the cargo so it minimizes unnecessary movement.

All cargo must be secured by using materials which are suitable for the size, construction and weight of the load.

Web lashings require edge protection on sharp edges. We do not recommend the mixing of different lashing materials like wires and web lashing on the same cargo, at least for securing in the same lashing direction. This is because different materials have different elasticity and create unequal lashing forces.

However, knotting in web lashing should be avoided as breaking strength is reduced by at least 50%.

Turnbuckles and shackles should be secured, so that they will not spin off. The strength of a lashing system is given by different names like breaking strength (BS), lashing capacity (LC) or maximum securing load (MSL). For chains and web lashings the MSL/LC is considered 50% of the BS.

The manufacturer will provide you with linear BS / MSL for direct lashing like cross lashings and/or system BS / MSL for loop lashings. Every part in a lashing system must have the similar MSL.

Otherwise the weakest can be counted only. Remember that bad lashing angles, sharp edges or small radii will reduce these figures.



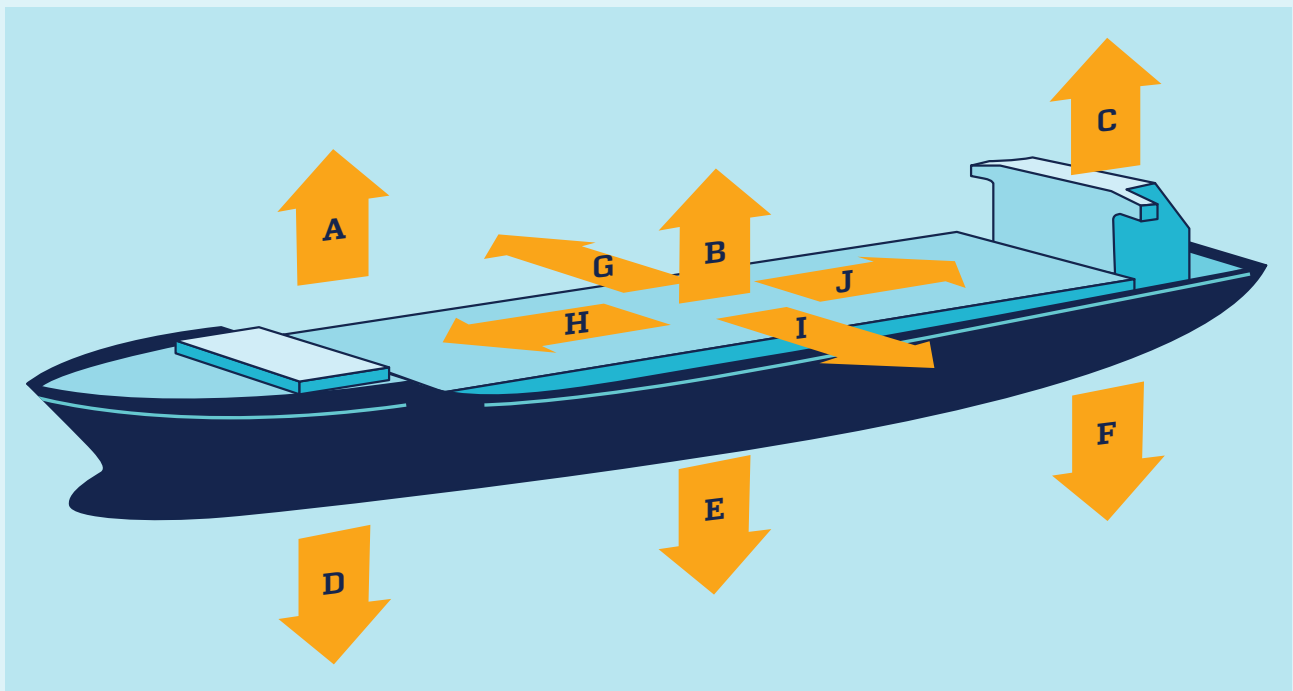
Lashing forces

The International Maritime Organization recommends this general rule of thumb when it comes to lashing/securing cargo for sea transport:

The total MSL of the securing devices on each side of a unit of cargo (port as well as starboard should be equal the weight of the unit).

For your reference:

- The MSL (Maximum Securing Load) = 50% of the BL (Breaking Load).
- The lashing eyes of the flatracks (in general) have a capacity of 5.000kgs and are consequently the weakest link if the lashing device has more capacity.
- See the diagram below for the interaction of forces on a vessel during a voyage overseas.



Legend:

A.	Up to 1.0 g	F.	Up to 1.0 g
B.	Up to 0.5 g	G.	Up to 0.8 g
C.	Up to 1.0 g	H.	Up to 0.4 g
D.	Up to 2.0 g	I.	Up to 0.8 g
E.	Up to 0.5 g	J.	Up to 0.4 g

Bedding

Cargo must be positioned on the flat with its center of gravity in the middle, in length and cross direction.

Heavy weights are not allowed to be placed entirely on the wooden floor of the flats. The bedding needs to be laid out across the flat, and it needs to reach the main girders. This is so the bedding avoids point pressure.

Anti-slip material

Wood dunnage or similar anti-slip materials (rubber) must be placed between cargo composed of metal, and the flatrack bottom rails.

This is because when we use anti-slip material with high friction, the resulting coefficient decreases the number of lashings required.

A detailed table of friction factors between a wide variety of materials can be found in the CTU code Annex 7 (Appendix 2 and 3) IMO as required.

General Warnings



For any anti-slip material, it is important to note that any contact between metal to metal **must be avoided**.

We **do not allow** any kind of welding, drilling holes, or modification of our flatrack's structure.

With regards to bedding, heavy weights are not allowed to be placed exclusively on the wooden floor of the flats.

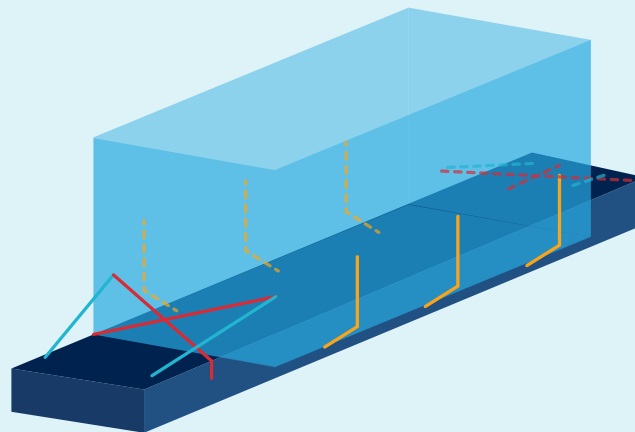
Various lashing methods for cargo with lashing eyes



Maersk Line flatracks are fitted with lashing eyes/facilities (D rings) with a capacity of SWL 5000kgs. Remember that the main point of lashing is to make sure the cargo does not move against the side and length directions, so it doesn't tip to the side.

For lashing methods with lashing eyes, cross lashing is the most efficient method. Additionally, direct lashings downwards to increase friction and lengthwise to stop moving in length direction need to be installed.

For calculation purposes, use the linear MSL figures for each direct lashing. See the diagram below as an example.



Direct Lashing ■ across ■ length ■ down

As for lashing methods for non over-width cargo that do not have lashing eyes, we recommend the vertical half-loop lashings, horizontal half loop lashings and the cross-head lashings. See diagrams below for more details.



The simple top over lashings can be used as well, but we do not recommend it to be used alone. Please do combine it with one of the above methods. For calculation purpose, use the system of MSL figures provided by the lashing material manufacturer



For lashing methods in over-width cargo without lashing eyes, transverse, we recommend the horizontal half-loop lashings and the cross-head lashings in combination with the top-over lashings. But please do not install top-over lashings alone; combine it with other compatible lashing methods except for vertical half-loop lashings.



As for top-over lashings, a calculation must be made using the applied tension values as supplied by the manufacturer, along with friction and acceleration factors.

Lastly, for lashing methods that involve no lashing eyes, lengthwise, secure cargo via blocking and bracing with timbers, or by a lashing system. Timber bracing is more common when cargo is crated. The heavier the cargo, the stronger the bracing needs to be. Blocking should be braced against corner posts. If a lashing system like the horizontal half-loop lashings can be installed, then no further bracing is necessary.

NOTE:

Timber beams (wooden beams) are used to support the heavy footprint of the cargo. This is to ensure that the dense weight is better distributed across the special equipment.



Lashing angles should be varied to prevent all directions of movement. These can affect the SWL.

Webbing slings or ratchet lashings should, as much as possible, remain dry. Wet webbing slings or ratchets can lead to a large loss of SWL. Possible Reduction in SWL due to wetting should be considered.

Avoid the use of lashing wires where possible, but if required the shipper should remember that the turn radius and angles will reduce efficiency.

All lashings should be checked for correct markings and serial numbers. This includes the shackles used. Previous experience has shown that shackles of poor quality, or are unmarked, will compromise the entire system. All lashings should be certified and these certificates must be passed to the ship for stowage in the cargo securing manual while the cargo is on board. Remember that the ship is only as strong as its weakest part.

Your promise. Delivered.