



# VEER MARITIME PVT. LTD.

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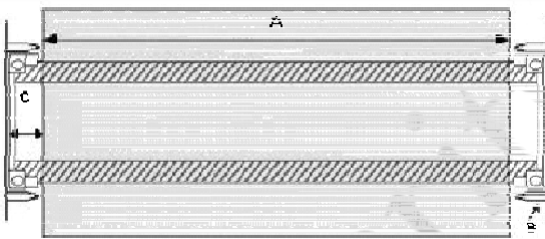
## A Guide for the Loading and Lashing of Cargo on Flat Racks

This guide is for information and guidance during stuffing and securing of cargo on Flat Racks. It contains only basic requirements, which may differ from cargo to cargo. In case of questions please contact Veer Maritime's Operations Department.

In the interest of crew, handlers and vessel safety, Veer Maritime reserves the right to inspect flat racks prior to loading and to refuse loading in cases where stowage and or securing is not within SOLAS requirements or not deemed safe.

**Stuffing:** Cargo should be positioned on the flat rack to ensure suitable weight distribution both along the length and width of the Flat Rack, to ensure that center of gravity is not too far "off-center".

Over- width cargo and respective blocking and bracing materials should not be stowed within 30cm (12") of the corner posts of a flat rack as this prevents the flat racks being loaded under deck. Any such cargo would have to be loaded on deck at additional cost.



No.	Explanation	20'Flat	40'Flat
A	Max. allowed length for over wide cargo	550cm	1160cm
C	Min. distance to flat racks outer end	30cm	30cm
B	Cell guides of the vessel under deck		

It is important that out of gauge measurements are accurate and include the lashing equipment. Incorrect declaration can result in mis-rating and short shipment. The width of the floor is less than the container's outer width (244cms; 96"). Therefore, cargo might overlap the flat racks floor, but still be in-gauge. Only those parts of the cargo or lashing materials which overlap a virtual horizontal line between the outer edges of the corner posts need to be counted as over-wide.

**Welding.** Any kind of welding, drilling holes or modifying flat rack's structure is strictly forbidden.

**Weight distribution:** Veer Maritime's Container lines flat racks are designed to carry heavier and more concentrated loads than standard equipment. The main strength of a flat rack lies in the two bottom rails, so cargo must either rest on these rails or have weight transferred to the rails by cross timbers. Although a maximum payload is marked on each flat rack, the maximum weight they each can carry is also dependent on the length the cargo is resting on the rails. The

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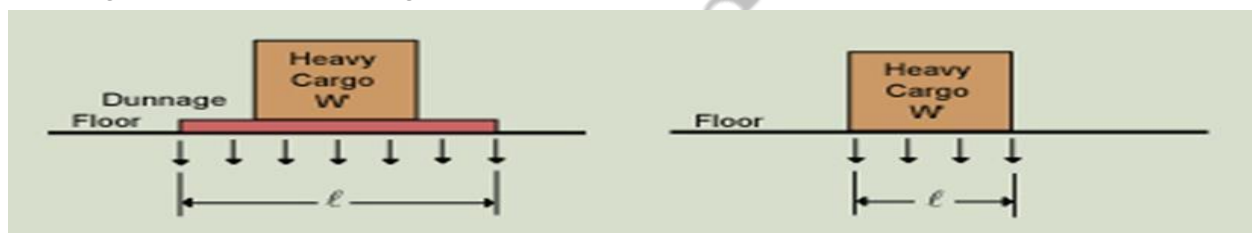


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maximum payload can only be utilized when the cargo is spread over the complete length of the flat rack's bottom rails. Only half of payload is allowed for very short cargo, for example standing on about 1m length only. Please check with Veer Maritime for specific requirements and or bedding advice.

**Bedding.** Any bedding must be laid out across the flat and needs to reach the main girders. Heavy weights are not allowed solely to be placed on the wooden floor of the flats. Cargo is to be positioned on the flat with its centre of gravity in the middle of the flat, length-wise and across. The floor is not designed for heavy selective loads. IF the cargo is shorter or stands on a shorter length on the floor, the permitted load is lower. The maximum floor load is 5.4t per running meter for a 20' (31mt Payload) and 4.0t per running meter for a 40' (47mt payload). Floor load = cargo weight/length of cargo. If cargo is shorter and heavier wooden beams are used length wise for distributing the loads and achieve the above floor loads.



**Antislip material** . Any contact of metal to metal should be avoided. Wood dunnage or similar anti-slip materials (rubber sheets) should be placed between cargoes of metal material and the flat rack bottom rails. Using anti-slip material with high friction coefficient decreases the number of lashings required.

**Lashing eyes.** Flat Racks are fitted with numerous lashing eyes (D rings) with a capacity of 5000kgs

**Lashing in general.** 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. Lashing materials like wires and web lashing are to be avoided on the same cargo. Different materials have different elasticity and create unequal lashing forces. **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 don't spin open. 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 /

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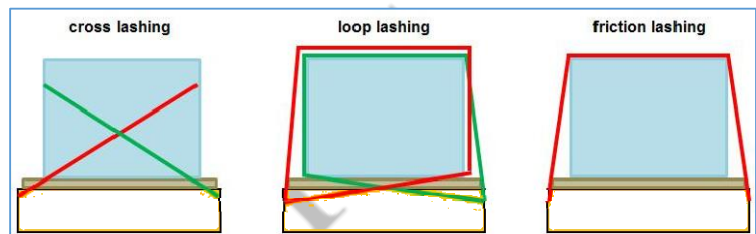
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MSL for loop lashings. It must be emphasized that bad lashing angles, sharp edges or small radii will reduce these figures.

**Securing in length direction.** Securing cargo in length direction can be achieved by 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. Unpacked cargoes with suitable lashing points can be secured in length direction more effectively with direct lashings and no further bracing is necessary.

### Securing in transverse direction.

For securing against transverse and tipping forces, the best recommended lashing method is securing with **cross lashings**. This requires lashing eyes on the cargo for direct lashing systems.



For calculation purposes

use the linear MSL figures. The preferred lashing method for cargo without lashing eyes is the (half) **loop lashing**, also called C-lashing system. Every lashing must be installed in pairs, with one half of the pair starting and returning to the same side. The other half of the pair starts and returns from the opposite side. For calculation purposes use the system MSL figures provided by the lashing material manufacturer. **Friction** or "over the top" **lashings** are not recommended as this system does not prevent transverse motion. But they are acceptable especially for over wide cases.

**Lashing calculation.** As a recognized "Rule of Thumb" the number of lashings on each side of the cargo multiplied by the linear or system MSL, must be higher than the weight of cargo. This is valid for optimum lashing system and the number of lashings must be increased when the lashings have bad angles, are bend around narrow radii (wire) or when there are other aspects of less than optimal lashing methods.

**Lashing example:** A wooden case of 18 tons is to be secured with web lashings, with 8500daN (8.5 tons) system BS and loop lashings system. Then the system MSL will be 4.25 tons. 18 tons divided by 4.25 tons is 4.2. Rounding-up, a minimum 5 pairs of loop lashing are required each side for a total of 10 lashings.

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