Container Loading Plan for Gym Equipment: How to Pack, Secure and Document a Factory-Direct Order

Commercial Fitness · Buyer's reference · A4 printable

A container loading plan is the most overlooked document in gym equipment sourcing. Buyers spend weeks negotiating the unit price and almost no time on how the container will be packed — yet the load plan determines whether the freight is economical, whether the machines arrive undamaged, and whether the shipment clears without a documentation hold.

This guide covers the execution layer that most supplier quotations leave out: choosing the container, building a weight-balanced stuffing plan, meeting the SOLAS weight-verification rule, securing the cargo, and assembling the document set. For the cost arithmetic behind these decisions — density, break-even thresholds, and DDP versus CIF — see our gym equipment shipping and import costs guide →, which this article complements rather than repeats.

> **Printable loading plan — free PDF.** This guide is also available as a printable A4 reference you can send to your supplier or take to the factory. Download the container loading plan PDF → (includes every loading table and the source references).

Key Takeaways

- **Gym equipment is weight-limited, not volume-limited.** A container of steel machines hits its weight limit with a quarter to a half of its volume empty, so the plan must be built around weight distribution, not around filling the cube.
- **The load plan is a design decision, not a packing task.** Decide where each item sits and in what sequence before the container arrives; the factory should execute your plan, not invent one on the loading dock.
- **SOLAS VGM is mandatory.** Since 1 July 2016 the shipper must declare the container's verified gross mass by weighing the packed container or by adding up cargo, packaging and dunnage plus the tare weight. No VGM, no loading.
- **Securing is where damage claims are won or lost.** Heavy items go low and against the walls, every gap is blocked or braced, and the finished load is photographed before the doors are sealed.
- **Documents cause holds, not just customs duty.** A packing list with per-carton weights, a VGM, and a timely ISF filing prevent the most common and most expensive shipment delays.

Choosing the Container

The first decision is which container to book. The three standard dry containers differ in volume but share roughly the same maximum gross mass, which is exactly why the high cube is often poor value for dense gym equipment.

Container	Usable volume	Typical max gross	Typical tare	Practical payload for gym equipment
20-foot (20GP)	roughly 28–33 m3	30,480 kg	about 2,200–2,400 kg	about 20,000–28,000 kg
40-foot (40GP)	roughly 67 m3	30,480 kg	about 3,700–4,000 kg	about 26,000–30,000 kg
40-foot high cube (40HC)	roughly 76 m3	30,480 kg	about 3,800–4,000 kg	same payload, more empty air

Figures are indicative; ISO 668:2020 minimum door openings are **2,286 × 2,261 mm** on standard 20- and 40-foot units and **2,286 × 2,566 mm** on a high cube, while carrier spec sheets show actual door heights near 2,280 mm and 2,585 mm respectively. Actual payload depends on the container's own plate, the carrier and destination road rules — confirm it on the specific unit you book.

The implication is straightforward. A high cube gives you about nine extra cubic metres for a similar payload; since a load of racks, plates and machines will hit the weight limit before it fills a standard 40-foot, that extra space is usually air you pay to move — and on most routes a high cube is charged the same FEU rate as a standard 40-foot, so it is not a price premium, just

space you may not use. Where the high cube genuinely earns its keep is **door height**: commercial multi-jungles and half racks from major brands stand 2.31–2.54 m tall (a Hammer Strength HD Elite half rack at 2.44 m, a Rogue RM-4 at 2.54 m). A machine 2.4 m tall will not pass through a 2.28 m standard door even though it fits inside the box — if your order includes anything over about 2.2 m crated, book the high cube. Our MOQ and lead time guide → covers how minimum order quantities interact with the choice between a 20-foot and a 40-foot container.

The limit that actually binds is often the road, not the container. In the United States the federal gross vehicle weight cap is 80,000 lb (36,287 kg) under 23 CFR 658.17, with a 20,000 lb single-axle limit and a Bridge Formula that can bite before the gross cap — especially on short 20-foot chassis. Deducting a day cab (roughly 18,000–20,000 lb), a 40-foot chassis (5,000–7,000 lb) and container tare (about 8,000–8,400 lb for a 40-foot) leaves a realistic cargo figure near 44,000 lb (about 20 tonnes) before a tri-axle or permit is needed; a 20-foot on a standard two-axle chassis is often limited to 36,000–38,000 lb. Port states issue narrow overweight permits: California allows 95,000 lb only on two short freeway corridors between Los Angeles and Long Beach, and Texas issues port-zone permits up to 100,000 lb that cannot be used on interstate highways. A container loaded to its rating but over the road limit sits at the port until someone pays for a transload. Ask your forwarder for the usable road weight before the factory builds the load plan.

Building the Stuffing Plan

A stuffing plan is a sequence and a diagram. It states which items go in first, where each sits, and how each is held in place. It should exist before the container is stuffed and be approved by you, not produced by the loader at the last minute.

Weight distribution

The governing rule is simple: heavy items low and forward, light items high and aft, and weight spread evenly across both sides of the container. An uneven load is a safety problem on the road and a handling problem at the terminal, and it can trigger a weighing or re-stow charge.

Load zone	What goes there	Why
Floor, against the walls	Cast iron plates, dumbbells, weight stacks	Maximum density at the lowest centre of gravity
Lower half	Steel racks, plate-loaded frames, benches	Heavy, rigid, can be blocked and braced together
Mid-section	Treadmills, cross trainers, upright bikes	Medium density; lay on their side where the design permits
Upper layer	Small accessories, cables, mats, upholstery, spare-parts kit	Low density; uses the volume left above the weight-limited load

Keep the weight balanced side to side: a container that is heavy on one side can shift under braking and is a common cause of damage claims that no insurance will pay. If you are unsure how the cargo will sit, ask the factory for a load plan drawing with a weight estimate per zone before they begin.

Planning figures by equipment type

Published manufacturer specifications show how widely crated volume varies, even within one category. These are planning figures from 2023–2026 spec sheets; confirm against the actual packing list before you book space:

Equipment	Crated volume	Gross weight	Typical units per 40HC
Commercial treadmill	1.1–3.0 m3	150–250 kg	18–27
Selectorized single station	0.46–2.4 m3	180–280 kg	25–80
Plate-loaded machine	1.2–1.8 m3	295–390 kg	26–40
Power rack, knocked down	0.25–0.72 m3	100–320 kg	60–160
Dumbbell set with rack	1.6–2.6 m3	550–750 kg	23–38

Equipment	Crated volume	Gross weight	Typical units per 40HC
Plate pallet (banded)	about 1.1 m3	about 1,000 kg	22–24 pallets

The spread matters: a knocked-down rack ships at a fraction of an assembled one, while a plate pallet consumes weight, not volume. A good mixed load pairs dense free weights with bulky cardio so that the cardio fills the air above the plates instead of shipping air on its own.

The unscripted check

The moment that reveals most about a supplier is a random carton opened from an already-packed container. Ask for it. The carton should contain the model and specification you approved, with the expected paperwork inside. This is the same principle used in a factory audit →: a supplier confident in its process will agree to an unscripted check without hesitation.

Securing the Cargo

The international reference for packing cargo transport units is the **CTU Code** — the IMO/ILO/UNECE Code of Practice for the Packing of Cargo Transport Units. It is a non-mandatory code of practice, but it is the standard that carriers, insurers and surveyors refer to when a packed container is disputed. The practical principles are:

- **Block and brace.** Prevent movement by placing rigid blocking against the cargo and bracing it to the container structure; never rely on friction alone for heavy steel items.
- **Fill the gaps.** Any empty space lets a load shift. Use dunnage, airbags or timber to take up slack between units and between cargo and walls.
- **Protect vulnerable points.** Pad frames at contact points and wrap high-wear finishes; a scratched powder coat is a warranty claim before the machine is even installed.
- **Distribute the load.** Spread weight across the floor rather than concentrating it near the doors or on one side.

Two costs are worth distinguishing here. The spare-parts kit that rides in the empty volume above a weight-limited load costs nothing extra in freight and turns a six-week wait for a cable into a same-day fix; our spare parts availability guide → covers what to stock. Proper dunnage and bracing, by contrast, is a small cost that prevents a large claim — the international warranty and shipping damage guide → explains what happens when the evidence of a secure load was never recorded.

The SOLAS VGM Requirement

Since 1 July 2016, SOLAS has required the verified gross mass of a packed container to be provided to the carrier and the terminal representative before the container is loaded onto a vessel. The responsibility sits with the shipper named on the bill of lading or sea waybill, and a container without a VGM cannot be loaded.

There are two approved methods:

Method	How it works	When it suits
Method 1 — weigh the packed container	Weigh the container after stuffing, on scales calibrated and certified to national standards	FCL shipments where a certified weighbridge is available at origin
Method 2 — calculated weight	Weigh all cargo, packaging and dunnage, then add the container tare weight	LCL or sites without a certified weighbridge; requires disciplined per-item records

Whichever method is used, the figure must be signed by the responsible party and delivered by the carrier's documentation cut-off. The requirement comes from IMO Resolution MSC.380(94), adopted 21 November 2014 and effective 1 July 2016, with implementation guidance in MSC.1/Circ.1475. SOLAS itself sets no international tolerance — enforcement is national. China's Ministry of Transport applies ±5% or one tonne (whichever is smaller); the UK's MCA uses ±5% or 500 kg (whichever is larger). Confirm the margin that applies at your origin and destination. In practice, the cleanest approach for a factory-direct container is Method 1 with a weighbridge ticket retained in your shipment file — it is a single number that matches what the terminal will weigh, and it removes an argument before it starts.

Documents That Hold Up a Shipment

The loading plan is only as good as the paperwork behind it. Most customs and terminal holds are not about duty rates; they are about a missing or inconsistent document.

Document	What it must contain	Common failure
Commercial invoice	Seller and buyer, description, values, Incoterm	Values that disagree with the packing list
Packing list	Per-carton contents, net and gross weight, dimensions	One aggregate weight instead of per-carton weights
Bill of lading	Shipper, consignee, notify party, cargo description	Description too vague for the destination broker
SOLAS VGM	Verified gross mass, method, responsible signatory	Missing or submitted after cut-off
Certificate of origin	Origin declaration for preferential treatment	Not issued, or issued too late to use
ISF 10+2 (US imports)	Eight core elements filed at least 24 hours before vessel loading; stuffing location and consolidator before arrival	Confusing loading with departure, or an ISF bill number that does not match the carrier's AMS number; penalties reach $5,000 per violation under 19 CFR 113.62
Product documentation	CE declaration, EN ISO 20957 test reports where applicable	Generic certificate not matched to the shipped models
Spare-parts box	Each free spare listed on the invoice at fair value, marked "No Charge — Value for Customs Purposes Only"; generic parts classified under their own HTS headings	Declared at zero, or folded into the machine line; a material omission can draw penalties under 19 USC 1592

The rule that prevents most holds is consistency: the same description, weight and value should appear on the invoice, the packing list, the VGM and the bill of lading. A discrepancy triggers a VACIS scan or a CES manual unpack, and the drayage and storage costs fall on the importer. Our import gym equipment from China guide → walks through how these documents interact with customs clearance, and the factory-direct versus distributor comparison → sets out who normally owns each document under each sourcing model.

From Plan to Proof

A loading plan is only useful if the finished load matches it. Require the factory to send, before the doors are sealed:

- A photograph of each load zone, taken inside the container.
- The weighbridge ticket or the signed Method 2 calculation sheet.
- A copy of the completed packing list matched to the carton labels.
- A short video that moves continuously from the front to the doors, so the zones can be verified in sequence.

These records cost almost nothing and become decisive if a shipment arrives short, damaged or misdescribed. They are also the practical bridge between this plan and the contract: put the agreed load plan, the inspection right and the document set into the order terms so that the standard you defined before shipping is the standard that is enforced after it.

Sources and Verification

The regulatory and technical references in this guide are current as of November 2026. Primary sources are cited first; industry advisories are used only to confirm how rules are applied in practice.

Regulation and official guidance

- SOLAS verified gross mass requirement — IMO Resolution MSC.380(94), adopted 21 November 2014, effective 1 July 2016, with implementation guidance in MSC.1/Circ.1475: https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MSCResolutions/MSC.380(94).pdf and https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/MSC.1%20Circ.1475.pdf
- CTU Code — IMO/ILO/UNECE Code of Practice for the Packing of Cargo Transport Units, 2014 edition, packing plans and cargo securing in Chapter 9 and Annex 7: https://www.unece.org/fileadmin/DAM/trans/doc/2014/wp24/CTU_Code_January_2014.pdf
- US federal road weight limits — 23 CFR 658.17 and FHWA Bridge Formula Weights: https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-658/section-658.17 and https://ops.fhwa.dot.gov/Freight/publications/brdg_frm_wghts/index.htm
- California sea-container permit (95,000 lb on defined corridors) — Caltrans: https://dot.ca.gov/programs/traffic-operations/transportation-permits/sea-container
- ISF 10+2 timing and penalty — 19 CFR 149.2 and 19 CFR 113.62: https://www.ecfr.gov/current/title-19/chapter-I/part-149 and https://www.ecfr.gov/current/title-19/chapter-I/part-113/subpart-G/section-113.62
- Commercial invoice contents and free-spare valuation — 19 CFR 141.86 and 19 CFR 152.101: https://www.ecfr.gov/current/title-19/chapter-I/part-141/subpart-F/section-141.86 and https://www.law.cornell.edu/cfr/text/19/152.101
- Spare-parts classification — USITC HTSUS Chapter 95 notes and Section XV note 2: https://hts.usitc.gov/reststop/file?release=currentRelease&filename=Chapter%2095

Standards and equipment specifications

- ISO 668:2020 — minimum dimensions and door openings for series 1 freight containers (1AA door 2,261 mm; 1AAA door 2,566 mm); verified against the standard's preview.
- Carrier container specifications — CMA CGM Dry Cargo, Hapag-Lloyd and Maersk spec sheets for real-box door heights and payloads: https://www.cma-cgm.com/assets/public/page-complex-documents-cnc/Dry%20Cargo.pdf and https://www.hapag-lloyd.com/content/dam/website/downloads/pdf/17038_Update_Container_Specification_engl_sRGB.pdf
- Per-machine crated volumes — manufacturer specification sheets from Precor, DHZ, Primal, ARGO and others, cross-checked against 2023–2026 listings.

Applied practice

- US overweight container drayage and state permits — TruckPacker: https://www.truckpacker.com/newsletter/overweight-container-trucking-us-road-weight-limits-shipping-containers
- Packing and securing damage statistics — TT Club "Perils of Packing": https://www.ttclub.com/fileadmin/uploads/tt-club/131009%20Perils%20of%20Packing%20FINAL.pdf

Standards, ratings and filing rules change. Confirm the current requirement with your carrier, broker or destination authority before it becomes a contract term.

---

ntaifitness.com → · Read the live guide → · https://www.ntaifitness.com/guides/pdf/container-loading-plan-gym-equipment.pdf