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Export packaging and marking

The three layers and main types of packaging, strength for sea, road, rail and air, how ISPM 15 works for wood packaging in Türkiye, shipping, information and handling marks, palletising, moisture and condensation, consistency with documents and common mistakes

Author: Özgür Konakcı · Level: Beginner–Intermediate · Version: 17 November 2026

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SHORT ANSWER

Export packaging has to withstand the mechanical, climatic and biological stresses of the journey; under the CTU Code this is the consignor's responsibility. In emergency braking on the road, cargo is pushed forward with a force of 0.8 times its weight; at sea it can be pushed sideways with up to 0.8 times its weight. In Türkiye, solid wood packaging must be heat-treated at a permitted facility and carry the ISPM 15 mark, a traceability mark and a QR code under the Ministry of Agriculture and Forestry's 2024 regulation. Packages get a shipping mark, an information mark and any necessary handling marks (ISO 780) on at least two sides; marks, package counts and weights must match the packing list and transport documents.

A short note first

This page gives a general overview of export packaging and package marking. Turkish rules on wood packaging can change; check the current text and the list of authorised facilities with the Ministry of Agriculture and Forestry (Türkiye). Dangerous goods are subject to separate packing and labelling rules. Sentences marked "in our view" or "in our experience" are opinion.

Why packaging matters: three layers, from product to unit load

Export packaging has to protect the goods all the way from the factory to the buyer's warehouse. On the way, the load is braked hard in a truck, lifted by cranes in port, rolled about at sea for days and carried through hot and cold climates. The transport information service of the German Insurance Association (GDV) groups the stresses on packaging into four kinds: mechanical, climatic, biological and chemical. The same source notes that packaging is often where savings are made to cut total cost, and that such packaging frequently fails to stand up to what is asked of it.

Poor packaging also matters for insurance: under the usual cargo insurance clauses, loss caused by insufficient or unsuitable packing is excluded. See Cargo insurance.

The **CTU Code** (IMO/ILO/UNECE, 2014), the international code of practice for packing containers, trailers and wagons, describes packaging with a few key terms. A practical three-layer split follows from them:

1. **Product packaging:** the packaging around the goods themselves, which often stays with them to the point of sale (bottle, box, bag).
2. **Transport packaging (carton, case, drum):** in the CTU Code, *packaging* is the receptacle and components that hold the goods, and a *package* is the packaging with its contents, ready for transport. Package marks go on this layer.
3. **Unit load:** a palletised load or pre-assembled unit with a pallet-sized footprint, ready to be loaded into a container. An enclosure a single shipper uses to combine several packages is an *overpack*.

Under the CTU Code, the consignor must make sure that packages and unit loads can withstand the stresses expected in transport, and must tell the packer about anything unusual, such as an off-centre centre of gravity or temperature limits. How the packages are then packed and secured inside the container is a separate subject: Container packing and weight distribution.

Types of packaging: cartons, cases, crates, drums and bags

The table draws on the stowage guidance in the CTU Code and on the GDV packaging handbook. Some of the notes in the last column are from our own experience and are marked as such.

Packaging	Typical use	Watch out for
Fibreboard carton	Light and medium consumer goods, spare parts, textiles	Moisture weakens cardboard: according to the CTU Code it can lose up to 75% of its stability as humidity rises, and stacks can collapse. Stack cartons so the load from above bears on the vertical walls of the carton below.
Wooden case	Machinery, heavy and sensitive parts	A closed wooden case on its own is not enough protection against corrosion; machinery needs its own protection (GDV). Solid wood falls under ISPM 15.
Crate	Bulky but less sensitive items, framed machine parts	An open frame does not protect against rain, dust or theft; in our view it needs extra covering outside a container.
Drum	Liquids, powders and granules	The CTU Code describes upright (soldier) and offset stowage; offset is more effective for small drums. Dangerous goods require UN-approved packaging.
Bags and bales	Agricultural produce, chemical raw materials, cotton	According to the CTU Code, cross-tie stacking forms a solid block. Cargoes such as coffee and cocoa give off moisture, so watch for condensation.
Palletised unit load	Wherever packages are combined for handling	See Palletising and unit loads below.

Packaging by transport mode: sea, road, rail and air

How strong the packaging needs to be depends on the forces the load will meet on the way. For calculating cargo securing, the CTU Code gives acceleration coefficients for each mode of transport. The coefficient shows what share of the cargo's own weight pushes on it in each direction (in g).

Mode	Forward	Backward	Sideways	Note
Road	0.8 g	0.5 g	0.5 g	The largest force comes in emergency braking, pushing forward.
Rail (combined transport)	0.5 g	0.5 g	0.5 g	For short shocks of 150 milliseconds or less, use 1.0 g lengthwise.
Sea, area A (significant wave height ≤ 8 m)	0.3 g	0.3 g	0.5 g	At sea the largest force is sideways: as the ship rolls, the cargo is pushed to the sides. The higher the waves, the larger the coefficient.
Sea, area B (8–12 m)	0.3 g	0.3 g	0.7 g	
Sea, area C (> 12 m)	0.4 g	0.4 g	0.8 g	

Source: CTU Code, section 5.3. The coefficients are applied together with the 1 g downward pull of gravity. **Example:** under emergency braking, a 1,000 kg case on a truck is pushed forward with a force of about 800 kg (0.8 × 1,000 kg). The case, the blocking inside it and its securing must be designed to take that force.

- **Sea, FCL:** packages inside the container must withstand both braking on the inland legs and sideways forces at sea. A closed container moving between climates also brings a risk of condensation (see below).
- **Sea, LCL:** the cargo is packed into a container together with other shippers' goods at a container freight station (CFS) and separated again at destination. In our experience an LCL package is handled more than an FCL one and may have someone else's cargo stacked on top, so stacking strength and marking matter even more.
- **Road and rail:** the coefficients in the table apply. On curtain-sided vehicles, rain and dust also need to be considered. Vehicle types and pallet capacities are covered in Road vehicle types.
- **Air:** air cargo is accepted as individual or palletised pieces and loaded onto the aircraft in pallets and containers called ULDs. The charge is based on the greater of gross weight and volumetric weight, so oversized packaging directly raises the freight. For the calculation see How is volumetric weight calculated?

Wood packaging: how ISPM 15 works in Türkiye

What ISPM 15 is and why it is required is outlined in Wood packaging: ISPM 15. This section sums up how it is applied in Türkiye, as far as an exporter needs to know.

The rules and the authority. In Türkiye the subject is governed by the Ministry of Agriculture and Forestry's regulation *Ahşap Ambalaj Malzemelerinin Isıl İşleme Tabi Tutulması ve İşaretlenmesine Dair Yönetmelik* (in Turkish; Official Gazette, 26 July 2024, No. 32613). It replaced the 2019 regulation; some articles took effect on 1 January 2025 and the rest on 1 July 2025. The penalty article was updated by an amendment of 30 December 2025 (No. 33123). Marking permits and inspections are handled by the Ministry's plant quarantine directorates

and provincial directorates of agriculture and forestry; the database is kept by the General Directorate of Food and Control.

Scope. The regulation covers wooden items used to support, protect or carry goods, such as pallets, cases, boxes and cable reels. The following do not need heat treatment or marking:

- Wood packaging 6 mm thick or less
- Wood products fully processed with glue, heat or pressure: plywood, particleboard, fibreboard, OSB and veneer-based boards
- Wine and spirit barrels heated during manufacture; processed, pest-free wine, cigar and gift boxes
- Wood shavings and wood wool
- Wooden parts permanently attached to vehicles and containers

Treatment. The regulation defines two heat treatments: **HT**, in a conventional kiln, reaching at least 56 °C at the core of the wood for at least 30 minutes; and **DH** (dielectric heating), by microwave or radio frequency, reaching at least 60 °C for at least one minute in wood no thicker than 20 cm.

Marks. Treated wood carries three separate marks:

- **ISPM 15 mark:** the IPPC wheat-ear symbol, the country code **TR**, the facility's permit number (in the form 00-000, where the first two digits are the province's vehicle registration code) and the treatment code (**HT** or **DH**). Facilities permitted before 1 July 2025 keep their existing numbers.
- **Traceability mark:** kiln number, batch number and year of treatment, placed outside the ISPM 15 mark on at least one surface.
- **QR code:** a two-dimensional code linked to the treatment record in the Ministry database; black only, applied with a digital stamping device and outside the ISPM 15 mark.

The mark goes in a visible place on at least two opposite faces; red and orange are to be avoided.

What it means for exporters.

- The names and numbers of permitted facilities are published on the Ministry's website. Under the regulation, wood packaging used for export must be sourced from facilities on that site that hold a permit or a supplier registration (art. 15). Check that your pallets and cases come, with an invoice, from a facility on that list.
- If repairs are needed, in our view have them done by a permitted facility as well: ISPM 15 requires each piece of wood added in a repair to be treated and marked in its own right. We found no repair-specific provision in the Turkish regulation; confirm the details with your supplier and the provincial directorate.
- Marked wood that arrived with imports can be reused for export together with its heat treatment certificate, under the conditions in the regulation; the importing user keeps those documents for five years.
- In our view the most common problem is not the case itself but unmarked blocking and bracing timber inside it. The CTU Code also requires securing materials to meet plant health standards; every piece of solid wood used to secure the cargo should be marked.

Package marks: the shipping mark and the information mark

Based on the German standard DIN 55402-2, the GDV packaging handbook divides complete package marking into three parts: the shipping mark, the information mark and handling marks. Correct marking helps prevent mishandling, misdelivery, losses and customs penalties.

The shipping mark

- **Identification mark:** for example the initials of the consignee or shipper, or the consignee's company name.
- **Identification number:** for example the consignee's order number.
- **Total number of packages** and the number of this package: for example "6/12" (the sixth of twelve).
- **Place and port of destination.**

Recommendation No. 15 of the UN Economic Commission for Europe ("Simpler Shipping Marks") likewise recommends a short, standard shipping mark on packages. In our experience, for valuable or theft-prone goods it is safer not to put the brand name or the contents on the package and to make do with a short code.

The information mark: weight, dimensions and origin

- **Country of origin:** may be mandatory under some countries' rules.
- **Weight:** according to the GDV handbook, weight must be marked on packages with a gross weight of 1,000 kg or more; standards recommend marking lighter packages too. The handbook's example shows net and gross weight together, in kilograms.
- **Dimensions:** in centimetres.

Gross, net and tare. Net weight is the weight of the goods without packaging; the weight of the packaging is the tare; gross weight is the two together. The weight declared to the ship for a container is a different figure: the VGM adds pallets, securing material and the container's own tare to the gross weight of the packages. The gross and net weight of each package on the packing list should match the figures on the package.

How to apply the marks

- Mark at least two sides of the package; GDV notes that marking all four sides makes handling much easier.
- Text should run parallel to the bottom edge and be readable with the package in its normal transport position.
- Stencilling is preferred; labels may be used if they stay legible and in place for the whole journey. Old marks must be completely removed.
- The handbook lists letter heights of 12.5, 25, 45, 70 and 100 mm; on rough-sawn timber letters should be at least 20 mm. The shipping mark is written larger than any other text.
- Colour: black paint; where a background is needed, black on white.

Handling marks (ISO 780)

Handling marks show how a package should be handled and stored, in pictures that need no shared language. The international standard is **ISO 780:2015** (Packaging — Distribution packaging — Graphical symbols for handling and storage of packages). According to ISO's page, it was reviewed and confirmed in 2026 and remains current. It does not cover handling instructions for dangerous goods.

The guidance annexed to the CTU Code lists the most common symbols with reference to ISO 780. We do not reproduce the symbols; the descriptions below explain their meaning and placement in our own words.

Mark	Meaning	Where it goes
Fragile (a wine glass)	The contents can break; handle with care.	On all four upright sides, near the top corner
This way up (two upward arrows)	Keep the package in this position at all times.	Beside the "fragile" mark where both are needed
Keep away from rain (an umbrella in the rain)	Keep the package dry.	On visible sides
Keep away from sunlight	Do not leave the package in direct sun.	On visible sides
Temperature limits	The lowest and highest temperature the package can take.	On visible sides
Centre of gravity	Where the package's centre of gravity is, to keep it balanced when lifting and stacking.	At the exact spot; ideally on all six sides, at least on the four lateral sides
Sling here (a chain)	Where the lifting sling should go.	At the exact spot, on at least two opposite sides
Clamp as indicated / do not clamp as indicated	Which faces a clamp truck may grip.	On the two opposite faces not being gripped
Use no hand hooks (a crossed-out hook)	Do not handle the package with hooks.	On visible sides
Use no forks / do not use hand truck here	Do not use the handling equipment shown.	On the relevant side
Do not roll	Do not move the package by rolling it.	On visible sides
Stacking limit (by mass / by number) and **do not stack**	How many kilograms or packages may be stacked on top, or none at all.	On visible sides
Protect from radioactive sources	The contents are sensitive to radiation.	On visible sides

Rules. According to the CTU Code guidance, symbols are preferably stencilled directly onto the package or applied as labels, and each symbol should have only one meaning. Symbols should be black; if black would not show, use a white background panel. Avoid red, orange and yellow so that they are not confused with dangerous goods labels. Standard symbol heights are 100, 150 or 200 mm. The same guidance adds an important caveat: symbols do not guarantee good handling, and proper protective packaging comes first. The GDV handbook likewise allows only the handling marks the goods actually need.

Dangerous goods. Package marks for dangerous goods (UN number, proper shipping name, hazard labels and the UN packaging approval mark) are governed not by ISO 780 but by transport rules such as the IMDG Code, ADR and IATA DGR. See UN number and packing group and Limited quantity.

Palletising and unit loads

Combining packages on a pallet saves handling them one by one, but the pallet is transport packaging too. The main points from the CTU Code stowage guidance:

- **A regular block.** A palletised load should be regularly shaped, with roughly vertical sides and a level top, and secured without damaging the packages.
- **Load-bearing strength.** Lower packages must be strong enough to carry those stacked on them. Where layers could shift, put fibreboard, plywood or pallet sheets between them.
- **Stretch and shrink film.** Film alone secures a pallet only if it is strong enough. Repeated heavy handling in bad weather can weaken it.
- **Standard pallets.** Standard-sized pallets cut the space wasted in containers and vehicles. The basic unit of European road freight is the Euro pallet (1.20 × 0.80 m). To see how many pallets fit in a container, use the Pallet loading calculator.
- **Dry timber.** Wet planks, blocking, pallets or packaging should not be used. The CTU Code puts the moisture content of dry dunnage, pallets and packing material at 12–15%. Some countries require bark-free timber.
- **ISPM 15.** Solid wood pallets must carry the marks described above. Packaging made of processed wood such as plywood or OSB is out of scope.

Weight distribution and securing of palletised cargo inside the container are covered in Weight distribution and Other basic rules.

Moisture, condensation and desiccants

Moisture in containers and "container rain" are outlined in Moisture and condensation. From a packaging point of view, the CTU Code's annex on condensation adds the following:

- **Dew point.** When air cools to the temperature at which its relative humidity would reach 100% (the dew point), moisture condenses on cold surfaces. In a GDV example, air at 20 °C and 50% relative humidity has a dew point of about 9 °C.
- **Two different risks.** Container sweat: as the container cools in the late afternoon, water condenses under the roof and drips onto the cargo. Cargo sweat: when a closed container from a cold region is opened in a warm, humid climate, moisture condenses on the cold cargo. The CTU Code calls the latter particularly damaging for metal products and machinery.
- **Thresholds.** Above 40% relative humidity there is a risk of corrosion; above 75%, of mould.
- **Hygroscopic cargo.** Coffee, cocoa, grain, paper and wood take up or give off water depending on the surrounding humidity. The CTU Code asks for organic cargo to be packed "container-dry".

- **Desiccants.** According to the CTU Code, desiccants or active drying should be combined with sealed plastic wrapping, and their absorption capacity should be calculated. If the cargo or packaging is already damp, desiccants will generally fail.
- **At destination.** Leave covers in place until the cargo has adjusted to the ambient temperature; if packages are well ventilated after unpacking, drying outpaces mould.

In our view the most common mistake is to load with wet pallets and assume a few desiccant bags hung in the container will fix it. Desiccants handle the swings during the voyage in a box that was packed dry; they cannot absorb the water brought in by wet packaging.

Consistency with documents and common mistakes

The GDV handbook is clear: package marks must match the shipping documents, and differences can lead to objections from customs. The CTU Code also requires the container number, the correct gross mass and the seal number to be entered in the relevant documents, and cargo information to be passed along the supply chain. The main fields that must match:

- **Number and type of packages:** the packing list, commercial invoice, bill of lading or CMR and customs declaration must all show the same figure. The number of packages on a bill of lading also affects the carrier's liability limit at sea: Why the number of packages matters.
- **Shipping mark:** the mark on the package must be identical to the "marks and numbers" field in the documents.
- **Weights:** the gross and net weight of each package and the totals must be the same on the packing list and the documents.
- **Dimensions:** package dimensions drive the volume calculation and, in air cargo, the chargeable weight.

Common mistakes

This list is based on our experience; sourced rules are given in the sections above.

1. Using wooden pallets, cases or blocking that are unmarked or come from an unpermitted facility.
2. Stacking high without allowing for cardboard losing strength in humidity.
3. Loading with wet pallets and packaging and relying on desiccants.
4. Marking only one side of the package, or a side hidden in the stow.
5. A mismatch between the number of packages on the packing list and on the bill of lading; leaving it unclear whether "pallets" or "cartons" are being counted.
6. Adding unnecessary or contradictory handling marks; using red, orange or yellow for handling marks.
7. Writing the brand and contents on packages of valuable goods.
8. Reusing a box without removing marks from an earlier shipment.

Pre-shipment checklist

- Is the packaging strong enough for the forces of the transport mode and for stacking?
- Do solid wood packaging and blocking carry the ISPM 15 mark, traceability mark and QR code, and is the supplier on the Ministry's list?
- Are the shipping mark, information mark and necessary handling marks on at least two sides?
- Do the number of packages, weights and marks match the packing list, invoice and transport document?
- On a long route through changing climates, have condensation precautions been taken?
- If there are dangerous goods, have the separate packing, labelling and declaration rules been applied?

Where to go next in the guide

- Packing the container, weight distribution and securing: Container packing and weight distribution
- Dangerous goods classes, packaging and documents: Dangerous goods: IMDG and ADR
- Container types, VGM and pallet layout: Shipping container types and dimensions
- Volumetric weight and ULDs in air cargo: Air cargo: AWB and chargeable weight
- Cold chain and temperature-controlled cargo: Reefer and cold chain
- Keeping the packaging and giving notice after a loss: Cargo claims process
- Pallets, stock and dispatch in the warehouse: Warehousing and inventory management
- The document set for a first export: Which document, from whom and when?

Which courses cover this topic?

In the curricula we reviewed, packaging, load securing and loading is taught as a dedicated course in 6 programmes and within another course in 24. Some examples:

- Ministry of National Education (Türkiye), Maritime field — Deck Operations branch (vocational high school) — Cargo Operations (Yük İşlem)
- Akdeniz University, Finike Vocational School — Transport Services, maritime and port programme (associate degree) — Cargo Operations and Ship Stability (MDLİ 205)
- Akdeniz University, Vocational School of Social Sciences — Civil Air Transportation Management (associate degree) — Load, Balance and Communication (SHU 213)
- Chartered Institute of Logistics and Transport (CILT UK) — Level 5 Professional Diploma in Logistics and Transport (certificate) — Movement of Goods
- Chartered Institute of Logistics and Transport (CILT International) — International Diploma in Logistics and Transport, Level 5 (certificate) — Movement of Goods (PD06)

Test yourself

1. A machinery case is made of OSB board, but the blocking inside is solid pine. Where is an ISPM 15 mark needed? *(Answer: OSB is a processed wood product and out of scope; the solid wood blocking must be ISPM 15 treated and marked.)*
2. A 1,200 kg case is going to the port by truck. Roughly what force pushes it forward under emergency braking? *(Answer: with the CTU Code road coefficient, 0.8 × 1,200 kg ≈ a force of 960 kg.)*
3. A package is marked "6/12". What does that mean? *(Answer: The shipment consists of 12 packages and this is the sixth.)*
4. Paper reels were loaded into a container on a rainy day using pallets that had been standing outside, and desiccant bags were hung in the container. Why is that not enough? *(Answer: According to the CTU Code, desiccants generally fail if the cargo or packaging is already damp; wet timber should not be used and hygroscopic cargo should be packed dry.)*

Frequently asked questions

Do plastic or plywood pallets need an ISPM 15 mark?

The Turkish regulation exempts wood products fully processed with glue, heat or pressure (plywood, particleboard, fibreboard, OSB) from heat treatment and marking. Plastic pallets are not wood, so they are out of scope. The destination country may have its own rules, so confirm with the buyer.

What does the ISPM 15 mark show?

In Türkiye the mark contains the IPPC symbol, the country code TR, the facility's permit number (the first two digits are the province code) and the treatment code (HT or DH). There is also a traceability mark showing kiln, batch and year, and a black QR code.

Who decides the shipping mark?

In our experience the buyer often specifies the shipping mark in the order or in the letter of credit terms; if not, the shipper decides. What matters is that the mark is written identically in every document.

Are ISO 780 marks mandatory?

ISO 780 is a standard. In our view its use usually comes through the contract, the buyer's requirements or trade practice; even so, everyone in the transport chain recognises the symbols. Use only the marks the goods actually need and avoid colours that could be confused with dangerous goods labels.

Is a desiccant needed in every container?

No. It helps on long routes through changing climates and with moisture-sensitive cargo. According to the CTU Code, desiccants should be combined with sealed plastic wrapping and their capacity calculated; in a container packed with wet cargo or packaging they are generally ineffective.

SOURCES

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Regulation "Ahşap Ambalaj Malzemelerinin Isıl İşleme Tabi Tutulması ve İşaretlenmesine Dair Yönetmelik" (Official Gazette, 26.07.2024, No. 32613) — copy of the Official Gazette text (Alanya Chamber of Commerce and Industry) (in Turkish) — https://www.altso.org.tr/wp-content/uploads/2025/07/07082024-ispm-yonetmelik.pdf
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