

Product Type		Standard Package	Category		External preservation product codes	Packing Duration (From packing closure date)	Maximum Packing Duration	Storage code	Notes		
Main item	Sub-item		Standard	Alternative							
Machine Skid	GT Skid	Thermoshrink (Triple Layer - For T<-20°C refer to ITN54750.02 package type 3)	BP1	BP3	A1, A5, A7, A10, A11, C17	12 Months	12 Months	D			
	CC Skid			BP3							
	ST Skid			BP3							
	TEX Skid			BP3							
	RC Skid			BP3							
	Pump Skid			BP3							
Auxiliary Skid	GT Auxiliary			BP3	A1, A5, A7, A10, A11, C17	12 Months	12 Months	D			
	Lube Oil			BP3							
	Scrubber			BP3							
	Fuel Gas Treatment			BP3							
	Fire Fighting			BP3							
	Vorecon Skid			BP3					Guarantee the installation of cables for check of vorecon internal conditions as per manufacturer's indications.		
	Seal Gas Skid			BP2					Alternative packing if lifting points are not available once packed. With alternative packages barrier bag (C16) shall be used.		
Transformers						BP3	A1, A5, A10, A11.1, C17	12 Months	12 Months	D	Authorization required for barrier bag use.
Fan Cooler						BP3	A1, A11.1	12 Months		D	Thermoshrink shall be single layer . Lifting lugs shall remain available for lifting and lashing.
Filter House Modules		Wooden Base + Thermoshrink (Single Layer - For T<-20°C refer to ITN54750.02 package type 3)	BP2	BP3	A1, A5, A11.2	24 Months	24 Months	D	If metallic supports are available wooden base is not needed. If insulating material is present shall be used barrier bag (C16).		
Ducts	Inlet			BP3	A1, A5, A11.2	24 Months	24 Months	D	If metallic supports are available wooden base is not needed. If insulating material is present shall be used barrier bag (C16).		
	Exhaust			BP3				D	If metallic supports are available wooden base is not needed. If insulating material is present shall be used barrier bag (C16).		
	Ventilation			BP3 BP7				D	If metallic supports are available wooden base is not needed. If insulating material is present shall be used barrier bag (C16). If alternative package is used and some duct exceed the containers dimensions BP2 packing category shall be used.		
				BP3				D	If metallic supports are available wooden base is not needed. If insulating material is present shall be used barrier bag (C16).		
Carpentry	Structures			BP3 BP7	A1	24 Months	36 Months	D			
	Ladders							D			
	Platforms							D			
	Grid Platforms							D			
	Walkaway							D			
Electrical Motor						BP3	A1, A5, A10, A11.2, A14, A15, C16, C17	12 Months	12 Months	D	Termoshrink covering shall be triple layer . With alternative packages barrier bag (C16) shall be used.
Electrical Generator						BP3	A1, A5, A10, A11.2, A14, A15, C16, C17	12 Months	12 Months	D	Termoshrink covering shall be triple layer . With alternative packages barrier bag (C16) shall be used.
Ventilation Fan						BP3	A1, A5, A10, A11, C17	12 Months	12 Months	D	If alternative package is used barrier bag (C16) shall be used.
Tanks						BP3	A1, A5, A10, A11	12 Months	24 Months	D	Saddle is needed if the item gemetry is cylindrical. With alternative packages barrier bag (C16) shall be used.
Volume Bottles						BP3	A1, A5, A10, A11	12 Months	24 Months	D	Saddle is needed if the item gemetry is cylindrical. With alternative packages barrier bag (C16) shall be used.
Heat Exchangers						BP3	A1, A5, A10, A11	12 Months	24 Months	D	Saddle is needed if the item geometry is cylindrical. With alternative packages barrier bag (C16) shall be used.
Tube Bundle				BP3	A1, A5, A10, A11	12 Months	24 Months	D	With alternative packages barrier bag (C16) shall be used.		
Run-down Tank				BP3	A1, A5, A10, A11.2	24 Months	24 Months	D	Lifting lugs shall remain available for lifting and lashing. With alternative packages barrier bag (C16) shall be used.		

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-Electronically Approved Drawing-Checked:Ferri, I.,Approved:Carugi, C.- Internal DT-'N'

Product Type		Standard Package	Category		External preservation product codes	Packing Duration (From packing closure date)	Maximum Packing Duration	Storage code	Notes	
Main item	Sub-item		Standard	Alternative						
Bolting		Wooden Box + STIROFILM	BP3	-	A1, A5, A13.1, C16, C17	24 Months	36 Months	D		
Hardware				-	A1, A5, A13.1, C16, C17	24 Months	36 Months	D		
Threaded Rods				-	A1, A5, A13.1, C16, C17	24 Months	36 Months	D		
Foundation Material				-	A1, A5, A13.1, C16, C17	24 Months	36 Months	D		
Cylinder Cabinet				-	A5, A10, A11.2, A13.1, C16	12 Months	24 Months	B		
Control Panel				-	A5, A10, A11.2, A13.1, A14, A15, A16, A17, C16	12 Months	24 Months	A	Storage can be B if conditions of note 2 of the storage code table (ITN54750.00) are followed. <1>	
Electrical Panel				-	A5, A10, A11.2, A13.1, A14, A15, A16, A17, C16	12 Months	24 Months	A	Storage can be B if conditions of note 2 of the storage code table (ITN54750.00) are followed. <1>	
Battery Charger				-	A5, A10, A11.2, A13.1, A14, A15, A16, A17, C16	12 Months	24 Months	A	Storage can be B if conditions of note 2 of the storage code table (ITN54750.00) are followed. <1>	
Electrical Motor				-	A1, A5, A10, A11.2, A14, A15, A16, A17, C16, C17	12 Months	12 Months	B	This packing category is intended for small dimension off-skid motors.	
Seal Gas Panel				-	A1, A5, A10, A11.2, A13, C16	24 Months	24 Months	D		
Filter Cartridges					BP7	A13.1, C16	See notes	See notes	B	THE EXPIRY DATE IS 36 MONTHS AFTER THE DATE OF MANUFACTURE INDICATED ON THE CARTRIDGES. When alternative package is used, lashing shall be feasible and cartridges shall have their own package.
RC Cylinders					BP2	A1, A5, A11.2, A13.1, C16, C17	12 Months	12 Months	D	If alternative package is used, termoshrink covering shall be triple layer .
RC Crankcase					BP2	A1, A5, A11.2, A13.1, C16, C17	12 Months	12 Months	D	If alternative package is used, termoshrink covering shall be triple layer .
Insulating Material	Hood				-	A11.2, C16	24 Months	24 Months	D	
	Panels				-	A11.2, C16	24 Months	24 Months	D	
Sketch Tubes/Pipes					-	A1, A5, A11.2	24 Months		D	Apply STIROFILM on the crate's lid.
Gearbox (off-skid)					-	Ref. to manufacturer's preservation procedure	12 Months	12 Months	See notes	Storage as per manufacturer's indication.
Vorecon (off-skid)					-	Ref. to manufacturer's preservation procedure	12 Months	12 Months	See notes	Storage as per manufacturer's indication. Guarantee the installation of cables for check of vorecon internal conditions as per manufacturer's indications.
Lifting tools					BP2	A1, A5, A11.2, A13.1, C16, C17	24 Months	48 Months	D	
Special Tools					-	A1, A5, A11.2, A13.1, C16, C17	24 Months	24 Months	D	
Batteries		Wooden Box	BP4	-	-	24 Months (see note)	24 Months (see note)	F	Homologated Wooden box shall be used. IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions. THE EXPIRATION OF PRESERVATION IS LINKED TO SUPPLIER INDICATIONS FOR THE REQUIRED RECHARGES DURING STORAGE PERIOD.	
Electrolytes				-	-	24 Months	24 Months	F	Homologated Wooden box shall be used. IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions.	
IMO Material				-	-	24 Months	24 Months	F	Homologated Wooden box shall be used. IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions.	
Paintings				-	-	24 Months (see note)	See notes	F	Homologated Wooden box shall be used. IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions. THE EXPIRATION OF PRESERVATION IS LINKED TO PRODUCT EXPIRATION.	
Solvents				-	-	24 Months (see note)	See notes	F	Homologated Wooden box shall be used. IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions. THE EXPIRATION OF PRESERVATION IS LINKED TO PRODUCT EXPIRATION.	
Flammable Material				-	-	24 Months	24 Months	F	IMO certification required. The use of the barrier bag (C16) must comply with the provisions for the packaging of dangerous goods and the supplier's instructions.	

Product Type		Standard Package	Category		External preservation product codes	Packing Duration (From packing closure date)	Maximum Packing Duration	Storage code	Notes
Main item	Sub-item		Standard	Alternative					
Gaskets		Wooden Box	BP4	-	C16	24 Months	36 Months	B	
Spare Parts				BP6	A5, A10, A13.1, C16, C17	24 Months	24 Months	B	Alternative package shall be used if own container is expected.
Spare Rotors				BP6	A5, A10, A11.1, A13.1, C16, C17	24 Months	24 Months	D	Alternative package shall be used if own container is expected. If pressurized storage shall be B.
Spare Diaphragms				BP6	A5, A10, A11.1, A13.1, C16, C17	24 Months	24 Months	D	Alternative package shall be used if own container is expected. If pressurized storage shall be B.
Valves				-	A1, A5, A11.2, A13.1, C16, C17	24 Months	24 Months	B	
Couplings + Accessories				-	A1.1, A5, A13, C16	24 Months	24 Months	B	
Electrical/Electronic Material				-	A11.2, A13.1, C16	24 Months	24 Months	B	
Instruments				-	A11.2, A13.1, C16	24 Months	24 Months	B	
Exciters				-	A13.1, C16	24 Months	48 Months	R	
Dry Gas Seal (DGS)				-	A13.1, A16, A17, C16	12 Months	24 Months	B	
Full Assembled Modules		Without Package	BP5	BP1	Ref. to project's preservation procedure	12 Months	12 Months	D	Covering (thermoshrink, flanges, ...) for all openings shall be expected.
ST Condenser				BP2	-	12 Months	24 Months	D	Saddle.
GT regenerators				BP2	-	12 Months	24 Months	D	Saddle.
Control Cabinet		Own Container	BP6	-	A1, A5, A10, A11.2, A13.2, A16, A17	12 Months	12 Months	D	
Volume Bottles Container					A1, A5, A10, A11.2, A13.2, A16, A17	12 Months	12 Months	D	
Fire Fighting Container					A1, A5, A10, A11.2, A13.2, A16, A17	12 Months	12 Months	D	
E-house Modules					Ref. To Manufacturer/Project preservation procedure	See notes	See notes	See notes	Preservation duration and storage as per manufacturer's indication. Covering in thermoshrink and plywood shall be expected. If presents, manufacturer's packing specification shall be followed.
Gas Generator					Ref. To Manufacturer preservation procedure	See notes	See notes	See notes	Preservation duration and storage as per manufacturer's indication.
HSPT Modules					Ref. To Manufacturer preservation procedure	See notes	See notes	See notes	Preservation duration and storage as per manufacturer's indication.
Commercial pipes		Bundle	BP8	-	-	24 Months	48 Months	D	For pipes plastic caps are required.
Commercial bars					-	24 Months	48 Months	D	
Laminates					-	24 Months	48 Months	D	
Electrical Cable		Coil	BP9	-	Ref. to ITN20175.08	24 Months	48 Months	D	



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1. INTRODUCTION

This ITN covers the general requirements set down by GE Oil&Gas concerning the packing of boxes containing plant materials and machines using wood, cardboard and containers, during their period of storage and subsequent shipment to the site. The supplier is required to observe the general requirements in this ITN when packing any materials not produced by GE.

Applicable documents

- ISO668 - ISO780
- MIL-PRF-131-J - MIL-D-3464-D
- MIL PRF131K class 1
- DIN55473
- UNI9151
- IMDG-ADR-IATA-RID-IMO-IMDG
- IPPC FAO ISPM-15
- ITN02175.00
- ITN54701.10
- ITN54750.00
- ITN54750.05
- ITN54750.06
- ITN54750.07

2. WOODEN AND CARDBOARD PACKAGING AND CONTAINERS

2.1. Purpose

This specification defines the type and the physical, qualitative and construction characteristics of packing for GE Oil&Gas products, based on the place of destination, means of transport, number of transshipments, period of storage and environment.

The main function of this type of packing is to provide mechanical protection against outer and inner stress for materials during loading/unloading, transport and storage, foreseeing damage caused by blows, weight from stacking, piling, inertia and acceleration forces.

2.2. Applicability

This specification covers the products created by or on behalf of GE Oil&Gas and must be applied when indicated in ITN54750.00.

2.3. General packing provisions

2.3.1. Supply limitations <6>

Min/max temperature recommended for packing to be subjected to -20°C / +50°C*.

Max longitudinal acceleration 1.5g

Maximum transversal acceleration: 0.5g

Max vertical acceleration: 0.5g

Stackability of packs: 500 Kg/m² (cover surfaces)

Piling of packs: 1000 Kg/m² (cover surface)

* Plastic materials or polyethylene must not be put on crates at temperatures below -20°C. If the materials to be shipped cannot be exposed to temperatures above -20°C, the crates must be built in accordance with ITN54750.05.

For very tall materials with small bases which cannot be laid horizontally, must be created a packing where length and width of the base must be equal to at least half the height of the packing (Length and Width >= Height/2).

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The machines, parts or accessories (heat exchangers, pressure vessels, pipes, reducers, valves etc.) must, as a whole, be at a distance of between 2 and 5 cm from walls and covering joists.

For electric and instrumental panels, a blocking system using cushioning material must be prepared inside the crate as shown in fig 14.

All packing must be treated, controlled, marked and certified as established by the domestic plant certification laws in force. When plant treatment is required, Ge Oil&Gas complies with the international FAO standard ISPM-15; this consists in subjecting wooden elements to high temperature - HT - treatment.

2.3.2. Characteristics of the recommended packing materials

2.3.2.1. Timber and plywood

The timber and plywood used to make the crates must be sawn fir wood with the following quality requirements:

a) Timber

The sawn timber may be a light pinkish colour but must not show any signs of degradation.

b) Plywood

The type to be used is with phenolic gluing, category C+/C with no leafing. The size and thickness of the planks and plywood must comply with the values in table 1 taken from UNI9151.

c) Planks

These must be between 8 and 20cm in width.

d) Bark

The timber and plywood must have no bark.

e) Cracks/Woodworm

Cracks are allowed at the ends of the sawn materials provided that they do not exceed 25 cm in length and 0.2cm in width. No transversal cracks and woodworm are allowed.

f) Burls

Rule valid for wood, not applicable to plywood. Burls must be limited in number and size, intact, solid with planks or pluggable using glued wooden plugs if this does not compromise the strength of the sawn wood.

Groups of burls must not exceed 1/3 of the width of the sawn wood and the single burl must not exceed 5cm in diameter.

2.3.2.2. Nails and staples (Fig. 2a, 2b, 2c, 2d, 2e, 2f)

The nails and staples to be used are shown in the following figures:

2a) nail with smooth round shank; 2b) helical nail with square shank; 2c) clamp with square or rectangular legs; 2d) 2e) self-tapping screws, 2f) fully threaded self-tapping screws

The nails and staples must be in carbon steel and have the mechanical characteristics referred to in UNI9151.

Nailing criteria (Fig. 3)

The nails must be inserted starting from the thinnest element and going towards the thickest one. The nails must have a flat head and be long enough to permit lapping, whenever possible.

Where riveting is possible, the nails should protrude from the element by a

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minimum of 0.6 cm. The operator must wear hand protection when lapping the nails.

Where riveting is not possible, nails must be long enough so that a third of their length is for the narrower part to be connected and the remaining two-thirds are for the thicker one to be fixed (e.g. for connecting a 1 cm plywood panel to a 3 cm plank, the nail must be 1+2=3 cm long).

The nail section must be able to withstand cutting.

2.3.2.3. Metal supports (bands, brackets, plates and angles, bolts and tie-rods)

a) Bands

When required, the following types of band must be used:

- in synthetic material
- in hardened and painted steel
- in surface-treated hardened steel (e.g. copper-plating or galvanising)
- in stainless steel.

Annealed material cannot be used. Bands must be applied crosswise to hold the cover (one on the end and the other on the side), fastened on securely using the specific device, and blocked with a steel strip surface-treated like the band or made of the same material as the band.

b) Brackets (Fig 4)

All cases that weigh more than 5,000 Kg and plywood cases with a gross weight of over 2,000 Kg must have carbon steel angular brackets in the corners measuring a minimum of 0.05 cm in thickness and placed at a maximum distance of 100 cm; in any case, there should be one for each outer horizontal stiffening crossbeam.

c) Steel plates and angles (Fig 5a and 5b)

Crates with a gross weight of over 2,000 Kg must have carbon steel plates at the slinging points to avoid safety problems and to prevent wear of the handling equipment. The plate (fig. 5b) must not have sharp edges that could damage the ropes or chains; the steel angle pieces on the top corner must also not have sharp edges that could abrade and damage the ropes. The minimum thicknesses are given in table 3.

d) Bolts and/or tie-rods (see table 1)

Bolts and/or tie-rods must be used to join end beams measuring 8 cm or more with the supporting beams at the bottom of the crate and to create saddles.

2.3.2.4. Air grating <6>

The crates must be equipped with air grates in alternated positions, at the top and bottom, on the case's smaller sides, and of the number specified in table 4. The grates should preferably be in galvanised carbon steel with anti-rain wings and protection net to prevent the intrusion of insects or foreign bodies.

The free surface of each single grate must measure no less than 80 cm². Grates made of metal or plastic are allowed.

2.4. Types of packing

The types of packing required by the standard ITN54750 are:

- Crates with supporting and NON supporting base with a wood structure in fir wood and panelling in plywood with phenolic gluing (fig 6, 7, 8, 9, 15)
- Cages with supporting base and NON supporting base in fir wood (fig. 10, 18).
- Special crates for dangerous goods
- Wooden pallets
- Cardboard boxes
- Bands, straps and lagging (fig 11, 12)
- Wooden saddles (fig 13a and 13b)

2.4.1. Wooden and plywood crates

2.4.1.1. Wooden and plywood crates with supporting base

General regulations: figure. 6.

Construction regulations: table 1

A crate with a supporting base is one where the base guarantees physical/chemical protection and that can be lifted.

This type of box must also satisfy the general requirements in point 2.3, the dimensions defined in ITN54750.00 and the characteristics of the materials used in point 2.3.2.

This type of crate is used for items that do not have their own base enabling them to be lifted/moved. The structure of the crate must be such that it can be moved with a forklift truck; it must be equipped with spacers or underbeams that allow the forks to pass under it perpendicularly on the larger side. The planks of the base must be simply laid adjacent to each other. The bottom must not be coated. This is to permit airing and, above all, fast disposal of any water that enters the crate.

For crates weighing more than 15,000 Kg, the packing must comply with the general construction characteristics mentioned in these specifications, and its preparation must always be assessed by the supplier of the packaging.

The walls of the crates must be made of plywood and the frame in fir wood; the plywood makes the crate waterproof so there is no need for an inner layer of tar paper. In the crates, the material must always be wrapped in polyethylene a minimum of 150 micron in thickness.

a) Bottom beams (fig. 7 mark 4)

Crates with bottom beams parallel to the longitudinal axis must be used.

Their section and distance must be based on the construction, size and weight characteristics.

b) Underbeams (fig. 7 mark 6, Fig. 7/1)

Transversal underbeams must be put under the longitudinal beams of the crate; these can act as ledges for the lifting ropes and allow the crate to be handled using a forklift truck.

Alternatively, longitudinal skids (Fig. 7/1) can be used, when necessary, to help handle the crates and put these in the containers. The skid section must be no less than that indicated in table 1 (skid section) and the surface that comes into contact with the bottom beams (fig 7 mark 4) must guarantee that the maximum compression value, allowable transversal to the fibres, is not exceeded.

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c) Bottom: floor, end beams, load separators.

The bottom planks (Fig. 7 mark 2) must be nailed to the bottom beams (Fig 7 mark 4) and must be a minimum of 2.5 cm thick.
They can be reinforced with end beams (fig. 7 mark 3) placed on the ends of longitudinal beams and load separators (fig. 7 mark 1) at the points where the base comes under the most stress. The end beams must be bolted to the longitudinal beams if the thickness equals or is greater than 8 cm.

d) Sides and ends (fig. 6 mark a, b) <6>

The sides and ends must have an inner structure (frame) and uprights and crossbeams of the minimum dimensions indicated in table 1; the structure must be nailed to the plywood coating. The plywood makes the crate waterproof so there is no need to coat it with tar paper inside. Moreover, it makes the frame resistant to diagonal stress, so no diagonal reinforcements are required.
The crate is covered with plywood panels of the minimum thicknesses given in table 1. When required due to the type of material (note 23), the ends and sides must be screwed on rather than nailed down.

e) Auxiliary uprights (fig. 6 mark 3, 4)

These must be fixed vertically on the inside to reinforce the sides and support sustaining loads transmitted by the cover through its supporting elements.
Their section must take into account the height of the crate and the maximum allowable loads for stacking.

f) Cover (fig 8) <6>

Together with the underlying stiffening joists (see table 2), the cover must be able to withstand the stacking load foreseen and guarantee an adequate level of protection for the type of crate concerned.
The cover must be made of plywood of the thickness indicated in table 1, with a sheet of plastic material inserted between the plywood and the frame. It should overlap the edges of the cover by about 10-15 cm and fixed with staples to the walls and ends of the crate. For storage outdoors, stiro-film high resistance polyethylene film must be put on the cover, overlapping the corners by 10-15 cm on each side, and stapled onto the walls and ends of the crate.
The cover must be fixed to the crate with screws so that it can be removed without damaging it.

2.4.1.2. Wooden and plywood cases with non-supporting base (see fig. 15)

A crate with non-supporting base only guarantees physical-chemical protection. This type of crate is used for items with their own base enabling them to be lifted/moved. The construction characteristics of the crate must comply with the dimensions indicated in ITN54750.00 and the requirements in points 2.3.1, 2.3.2 and 2.4.1.1 of these specifications.
An exception is made for the base that must have the characteristics described below.
Bottom beams (fig. 7 mark 4) parallel to the longitudinal axis, measuring a maximum of 20cm x 6cm and with a minimum centre to centre distance of 90cm to 100cm, and numbering a minimum of 3 per base. The layout of the bottom beams and the construction of the base must guarantee that the base can stand on a transport flatbed a minimum of 2.5 m in width without its structure collapsing.

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The bottom planks must be nailed to the bottom beams and must be a minimum of 2.5 cm thick.

The base must be firmly fixed to the machine's metal structure using tie-rods.

The following condition must also be complied with: the openings for access to the cleats or lifting plates must be sealed with a steel sheet, while guaranteeing correct access to these for moving the skids.

It must be moved with its cleats or lifting plates which are an integral part of the base(s) of the machines and/or auxiliaries.

There must always be a lifting diagram (Shipping Sketch) on the outside of the crate. The wood and plywood crates with non-supporting base are not stackable; they must be marked with the ISO780 symbol indicating that they CANNOT be stacked. Inside the crates, the material must always be covered with a polyethylene cap a minimum of 150 micron thick.

2.4.1.3. Prefabricated plywood crates (commercial crates) (see fig. 9)

These are mainly used as prepacking or to pack loose parts.

The sides and cover must be in plywood (phenolic) comprising a minimum of 5 layers and a base made of planks or plywood with beams underneath for lifting. The corners of the crate are joined with pre-treated or varnished angular metal profiles, riveted to the crate.

2.4.2. Cages

2.4.2.1. Cages with supporting base (see fig. 10)

A cage with supporting base is non-uniform packaging that only guarantees physical-chemical protection. The construction criteria for wooden cages are the same as those for plywood crates in section

The cages must be made of planks between 12 and 20 cm wide set no further apart than one and a half times their width.

In the cages, the material must always be wrapped in white anti-UV heat shrinkable polyethylene a minimum of 250 micron in thickness. When shrink wrapping is not feasible, use an anti-UV polyethylene cover a minimum of 150 micron thick. The cover must be put on in such a way as to prevent the stagnation of water.

(If using several covers, overlap their edges as you would the tiles on a roof). For safety reasons, the cages must NOT exceed 15000 Kg in weight. Reinforce the cage with angular brackets (see fig. 4).

2.4.2.2. Wooden crates with non-supporting base (ONLY AirCoolers by Vibo) (fig. 16)

A cage with non-supporting base is non-uniform packaging that only guarantees physical-chemical protection. The construction characteristics of the cage must comply with the dimensions indicated in ITN54750.00 and the requirements in points 2.3.1, 2.3.2 and 2.4.2 of these specifications.

An exception to the provisions above is the base that must have the following characteristics: the bottom planks must be nailed to the bottom beams; the bottom planks and beams must be a minimum of 2.5 cm thick; the uprights and crossbeams, ends and cover must be a minimum of 2.5 cm thick.

The following condition must also be observed: it should be handled only by means of the lifting plates provided that form an integral part of the AirCoolers. There must always be a lifting diagram (Shipping sketch) on the outside of the crate.

The crates can be stacked, as indicated in point 2.3.1, by putting under-cover beams directly on the frame of the AirCooler rather than on the reinforcement structure of the cage.

2.4.3. Special boxes (for dangerous goods)

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Products classified as dangerous for transport, according to the relative MSDS - Materials Safety Data Sheet - (e.g. bottles or containers under pressure, paints, electrolytes, batteries, sealing substances, etc.), must be packed and labelled based on the international regulations IMDG (International Maritime Dangerous Goods) - ADR (Accord Dangerous Route) - IATA (International Air Transport Association) - RID (regulation on the international transport of dangerous goods by rail) respectively for shipment by sea, road, air and rail. The products must be packed in approved containers for the purpose. The container will have a coloured danger label based on the class the substance belongs to as indicated in the relative MSDS, and will include all information required by the various international regulations that apply to the type of transport (e.g. N° ONU, Proper Shipping Name, etc...).

2.4.4. Pallets

The pallets, when required, must always be of the disposable type and can be made of poplar wood. Use standard wooden EUR-EPAL type pallets that are of a standard size (80x120x14cm) and capacity (max. 1500Kg).

In the case of non-standard requirements, the dimensions must be arranged with GE Oil&Gas.

The materials must all be kept within the perimeter of the pallet and strapped and held together.

2.4.5. Cardboard boxes

Normal corrugated cardboard boxes are used. The cardboard can be double walled and measure no less than 0.5 cm in thickness. It is closed using staples, adhesive tape and metal bands or synthetic material.

The weight of the material to be packed in cardboard boxes must not exceed 25 kg.

2.4.6. Bands and straps

Bands are made with binding in "U" profile brackets connected to threaded bars tensioned by screwing bolts up to 5,000 Kg of max weight per box.

The band material must be separated by rows using wooden joists to give the group a regular shape making efficient use of the space. The binding (crossbeams and tie-rods) must be placed at 1 m from the ends of the band and set a maximum of 3 m apart (fig. 11).

2.4.7. Bobbin lagging (fig. 12) <6>

Bobbins must be lagged using planks measuring a minimum of 2.5 cm, nailed to the flanges and supported by 2 parallel joists. Alternatively, the lagging can be replaced by a POLIFLEX covering attached with 2 parallel bands.

2.4.8. Saddles (figs. 13a and 13b) <6>

The saddles to be used are of the type in figures 13a and 13b. The structure must be calculated appropriately in relation to the loads to be withstood.

For all types of rotor and centrifugal compressor shipped without base, the saddles must instead comply with the provisions of ITN54701.10. When this type of saddle is used in crates, the packing for the latter must permit lifting taking into account the loads of the saddles. Even if used without final packing, information must be provided on the lifting procedure.

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2.5. ISO type international metal containers <6>

ISO type standard international containers can be used when required. These are not included in the types of packing in section 2.4 because they are not a form of industrial packaging but a method for grouping packaging for transport.

The following types of container can be used:

- Box 20'
- Box 40'
- Flat rack 20'
- Flat rack 40'
- Open top 20'
- Open top 40'

Table 1: Dimensions of the structural elements of the wooden crates

Net Weight	Centre to centre distance for forking. Fig.6 mar 1	Section of bottom beams Fig.7 mar 4		Section of head beams Fig.7 mar 3		Section of pads Fig.7 mar 6		Thickness of base planks Fig.7 mar 2	Section of frame Fig.6 mar 2		thickness of plywood Fig.6 mar 3	Bolts for head planks Fig.6 mar 4	Sect. of auxiliaries Fig.6 mar 5	
		b	h	b	h	b	h		b	H			b	h
[kg]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	[cm]	(mm)	[cm]	[cm]
up to 500	-	-	-	-	-	10	10	2.5	10	2.5	1	n.o.	n.o.	n.o.
500 to 2000	80	6	8	10	5	10	10	2.5	10	2.5	1	(a) Nailing	(b) 10	2.5
2000 to 4000	120	8	8	10	5	10	10	2.5	10	2.5	1	(a) Nailing	10	2.5
4000 to 6000	120	8	10	8	10	10	10	2.5	12	2.5	1	φ12	12	2.5
6000 to 10000	160	10	12	10	10	12	12	2.5	12	3	1	φ 12	12	3
10000 to 15000	180	12	15	10	12	12	12	3	12	4	1.3	φ 16	12	4

NOTE 1: The data in the table refer to the nominal thicknesses of the wood. The structural values in the table represent the minimum values that can be increased according to the dimensional characteristics of the material to be packed.

NOTE 2: Packing is required for crates weighing more than 15000 kg. A structure made of both steel and wood may be required for this kind of weight. The packing must comply with the general construction characteristics mentioned in these specifications, and its preparation must be assessed by the supplier of the packaging.

NOTE 3: The section of the load separators (Fig. 7, Mark 1) depends on the type, position and size of the loads and the distance between the transversal beams of the base. The section of the load separators is normally determined according to the following:

- Moments of support (in the case of 3 or more transversal base beams) and moments of span, and strength modulus required;
- Moment of inertia required in relation to the maximum elastic deformation that must not be exceeded;
- Maximum sizes
- Reaction on the transversal base beams and checking stress on the contact surface;
- If the condition persists, check the stress caused by the ropes and/or chains and the diametric pressure of the bolts on the edges of the holes (bearing pressure);
- Definition of the section that meets all the requirements mentioned above.

The load separators can be connected directly to the transversal base beams or put above the non-supporting cover of the floor, providing that they are fixed onto the transversal base beams. During calculation, it is possible to use steel load separators to meet the relative load conditions.

(a) For crates with a base greater than 2.5 m, the nails should be replaced with 10 mm bolts.

(b) The auxiliary uprights are for crates more than 1.5 m high.

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Table 2: Dimensions of the stiffening joists of the cover

Width in cm	Section in cm
0 to 100	5x10
100 to 150	5x10
150 to 200	10x10
200 to 250	10x12
250 to 300	12x12

Table 3: Thicknesses of Plates and Angles

GROSS WEIGHT kg	THICKNESS cm
2000 to 6000	0.3
6000 to 15000	0.6
15000 to 18000	0.8

Table 4: Sizing of Grates

VOLUME OF CRATE m ³	NO. OF GRATES
up to 2.	-
2 to 20	1 + 1
20 to 40	2 + 2
40 or more	4 + 4

Table 5: Examples of the Dimensions of Containers

20' Steel Dry Cargo Container

Exterior				
Length	Width	Height		
20'0"	8'0"	8'6"		
6,058 m	2,438 m	2,591 m		
Interior				
Length	Width	Height		
19'4 13/16"	7'8 19/32"	7'9 57/64"		
5,898 m	2,352 m	2,385 m		
Weight			Door Opening	
MGW	TARE	NET	Width	Height
52.910 lb	5.140 lb	47.770 lb	7'-8 1/8"	7'-5 3/4"
67.200 lb	5.290 lb	61.910 lb	2,343 m	2,280 m
24.000 kg	2.330 kg	21.670 kg	CU.M	CU.FT
30.480 kg	2.400 kg	28.080 kg	33.1	1.169
Purpose				
1. Used for all kinds of general cargo.				
2. Captioned units(MGW 30,480 KG) can be coordinated from EMCU 3204073 and EISU 3568118.				

40' Steel Dry Cargo Container

Exterior				
Length	Width	Height		
40'0"	8'0"	8'6"		
12,192 m	2,438 m	2,591 m		
Interior				
Length	Width	Height		
39'5 45/64"	7'8 19/32"	7'9 57/64"		
12,032 m	2,352 m	2,385 m		
Weight			Door Opening	
MGW	TARE	NET	Width	Height
67.200 lb	8.820 lb	58.380 lb	7'-8 1/8"	7'-5 3/4"
			2,343 m	2,280 m
30.480 kg	4.000 kg	26.480 kg	CU.M	CU.FT
			67.5	2.385
Purpose				
Used for all kinds of general cargo.				

20' Full Height Open Top Container

Exterior				
Length	Width	Height		
20'0"	8'0"	8'6"		
6,058 m	2,438 m	2,591 m		
Interior				
Length	Width	Height		
19'4 1/2"	7'8 1/2"	7'8 1/8"		
5,898 m	2,352 m	2,342 m		
Weight			Door Opening	
MGW	TARE	NET	Width	Height
44.800 lb	4.850 lb	39.950 lb	7'-7 47/64"	7'-5 1/8"
20.320 kg	2.200 kg	18.120 kg	2,330 m	2,263 m
CU.M			CU.FT	
32.5			1.148	
Purpose				
Suitable for sensitive cargoes which require top loading, such as sheet glass, timber and machinery.				

40' Full Height Open Top Container

Exterior			
Length	Width	Height	
40'0"	8'0"	8'6"	
12,192 m	2,438 m	2,591 m	
Interior			
Length	Width	Height	
39'5"	7'8 1/2"	7'8 1/8"	
12,034 m	2,352 m	2.33 m	
Weight			
MGW	TARE	NET	
67.200 lb	9.040 lb	58.160 lb	
30.480 kg	4.100 kg	26.380 kg	
CU.M			CU.FT
65.9			2.327
Purpose			
For the carriage of oversized, awkward and heavy cargos.			

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20 ' Flat Rack Container

Exterior		
Length	Width	Height
20'0"	8'0"	8'6"
6,058 m	2,438 m	2,591 m
Interior		
Length	Width	Height
18'6 7/16"	6'7 59/64"	6'9 39/64"
5,650 m	2,030 m	2,073 m
Weight		
MGW	TARE	NET
66.140 lb	6.150 lb	59.990 lb
30.000 kg	2.790 kg	27.210 kg
Purpose		
For the carriage of oversized, awkward and heavy cargos.		

40' Flat Rack Container

Exterior		
Length	Width	Height
40'0"	8'0"	8'6"
12,192 m	2,438 m	2,591 m
Interior		
Length	Width	Height
38'7 15/16"	6'7 59/64"	6'4 1/2"
11,784 m	2,030 m	1,943 m
Weight		
MGW	TARE	NET
99.210 lb	11.908 lb	87.302 lb
45.000 kg	5.400 kg	39.600 kg
Purpose		
Suitable for sensitive cargoes which require top loading, such as sheet glass, timber and machinery.		

Figure 1: Load profile for transport (Dimensions in mm)

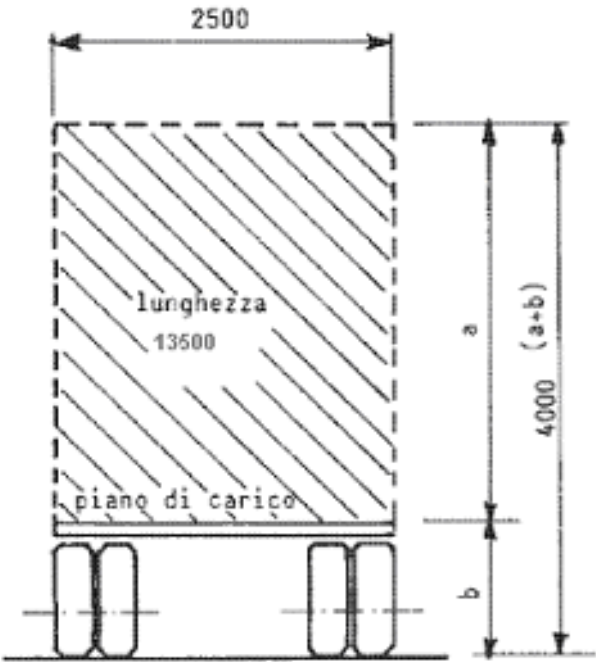


Figure 1a
Road gauge

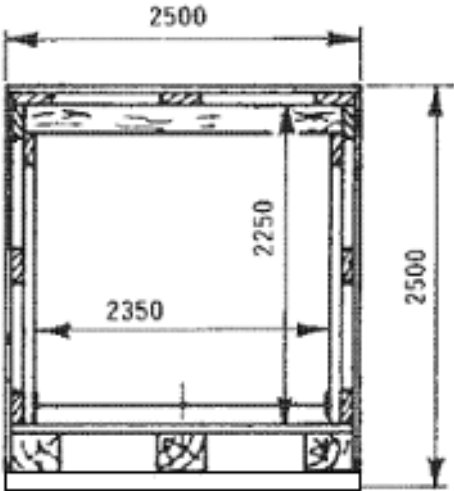


Figure 1b
Maximum internal dimensions for road transport

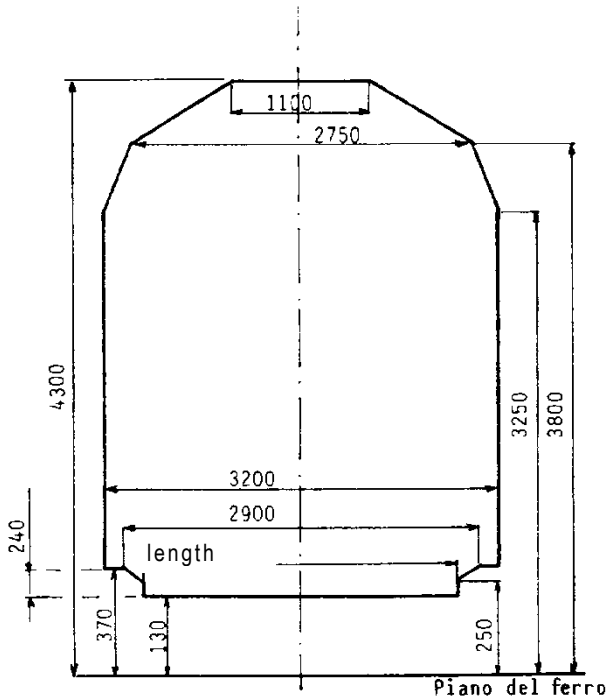


Figure 1c
Gauge of Italian railway line

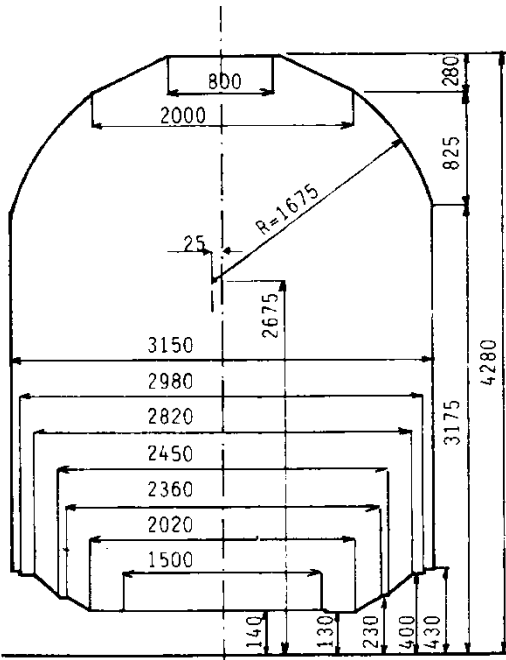


Figure 1d
Gauge of international railway line

Figure 2: Nails, staples and screws

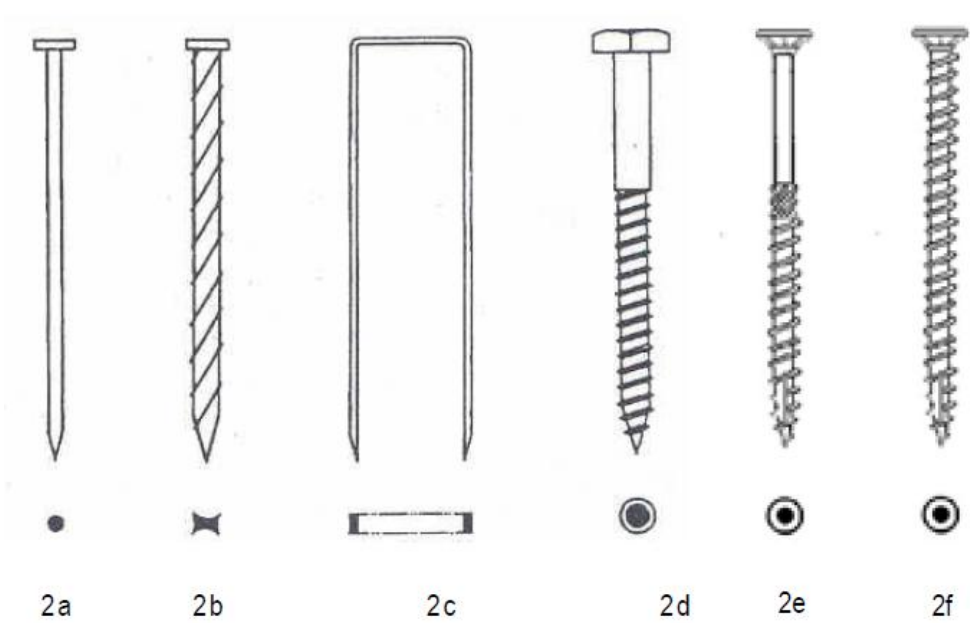


Figure 3: Nailing criteria

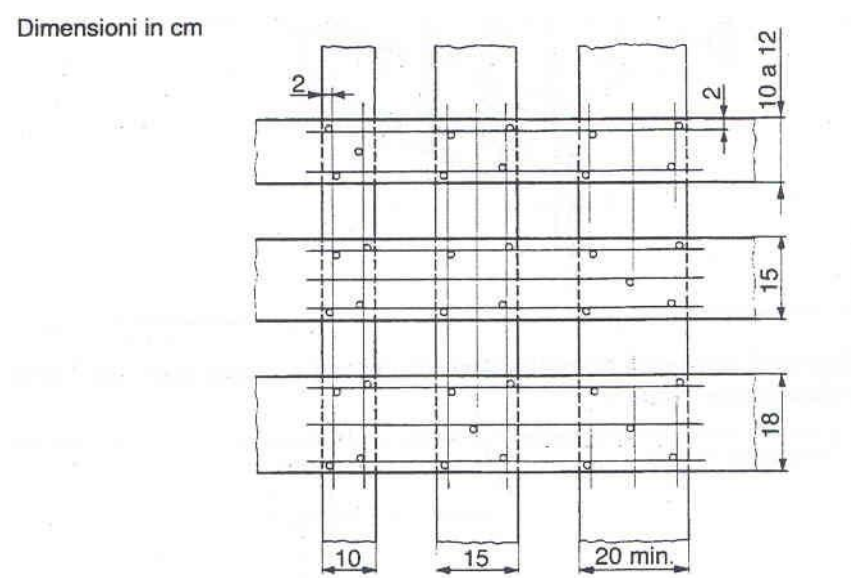


Figure 4: Corner bracket

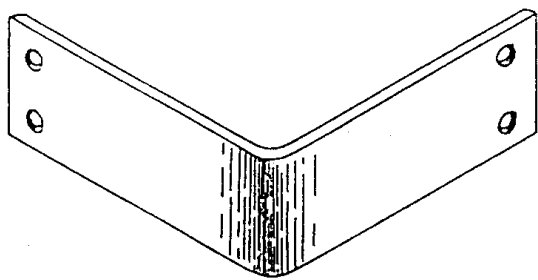


Figure 5a: Plates

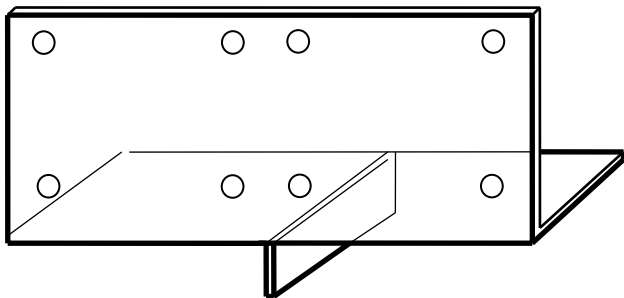
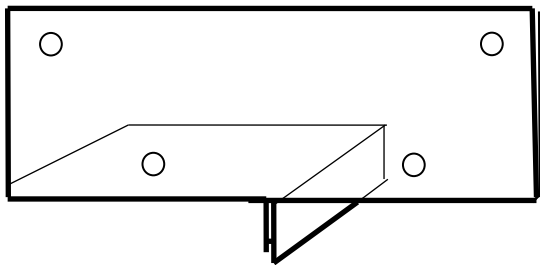


Figure 5b. Angles

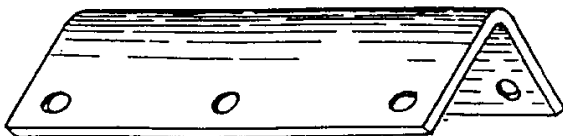


Figure 6: Support structure of plywood crates

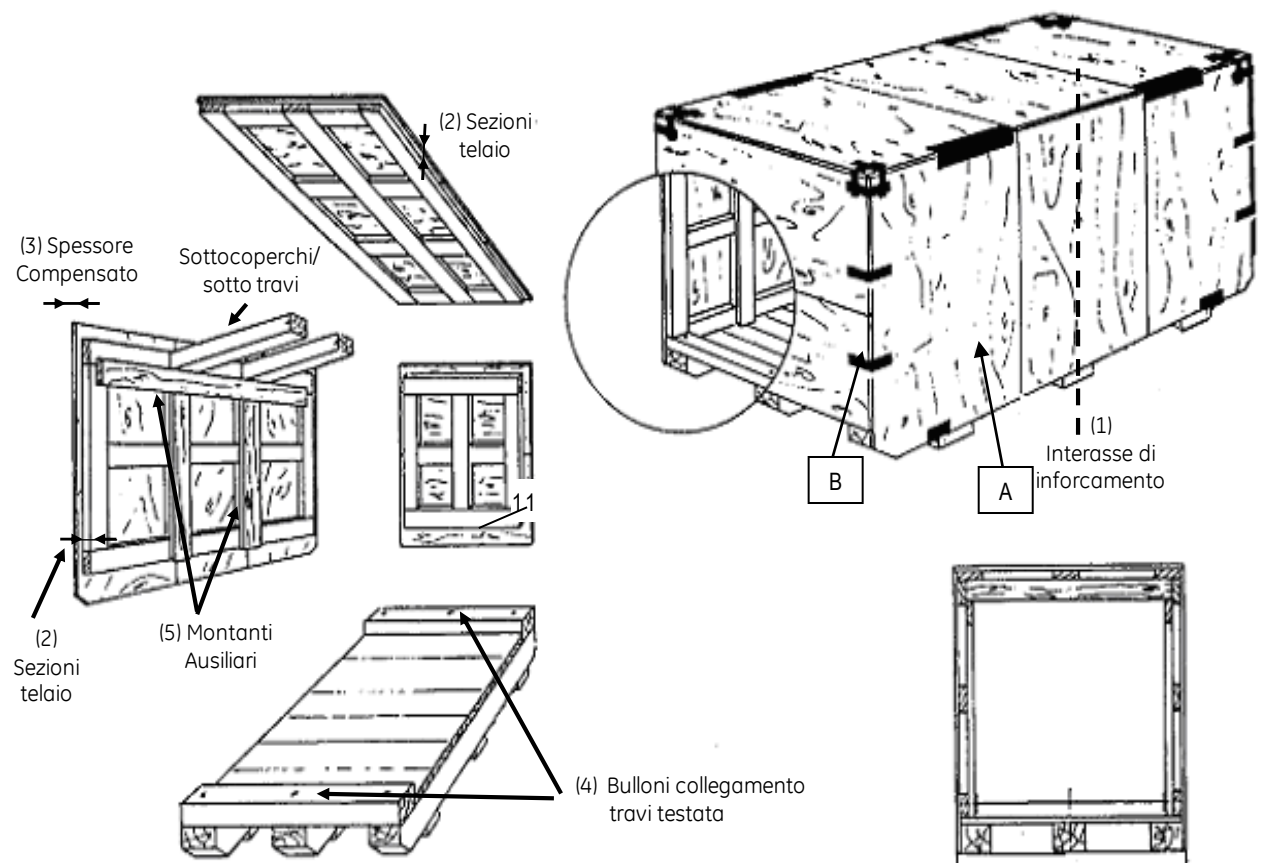


Figure 7: Base of wooden and plywood crates with support structure with transversal underbeams

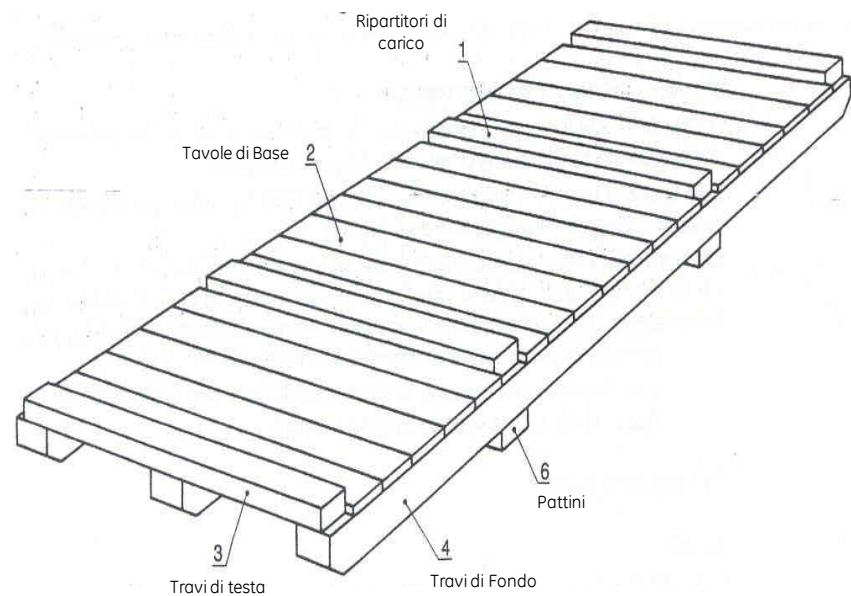


Figure 7/1 Base of wooden and plywood crates with support structure with longitudinal underbeams

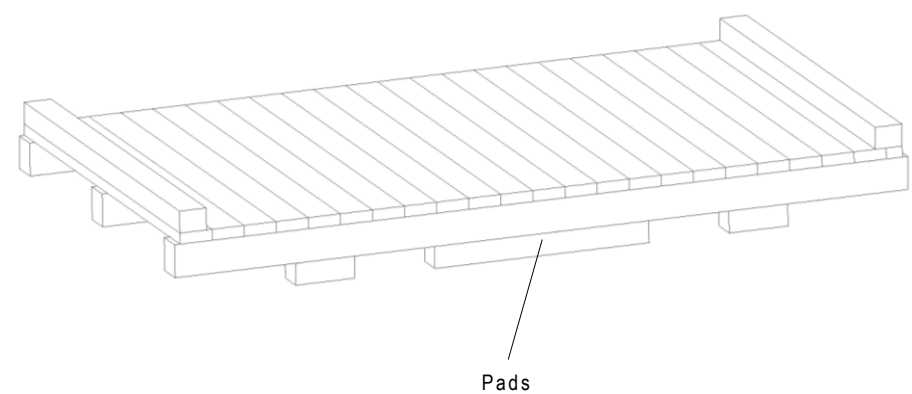


Figure 8: Cover with single layer covering for plywood crates.

- 1 Pannello compensato
- 2 Strato di materiale impermeabile

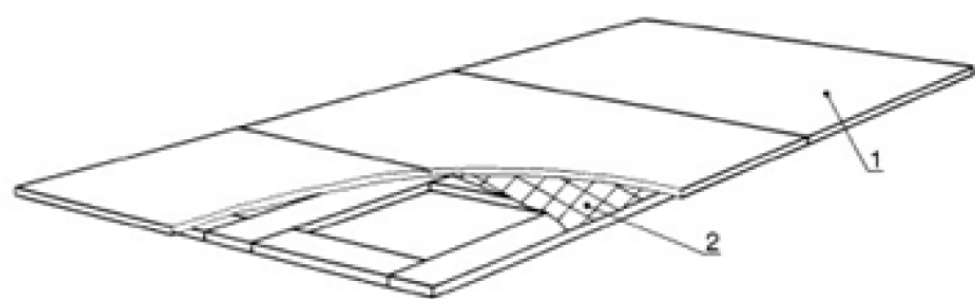


Figure 9: Prefabricated plywood crates (commercial crates)

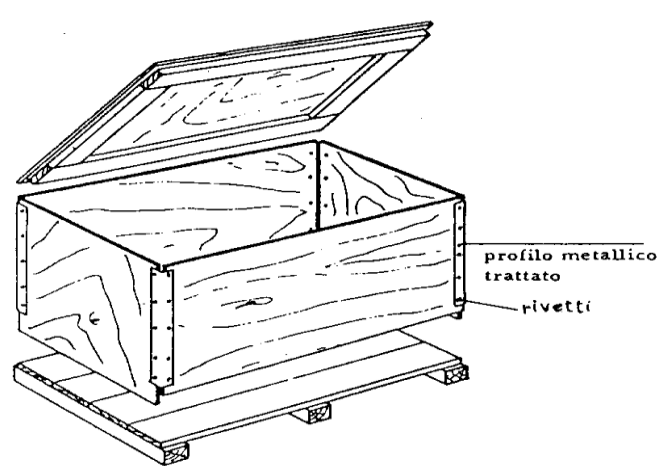


Figure 10: Cages with supporting base

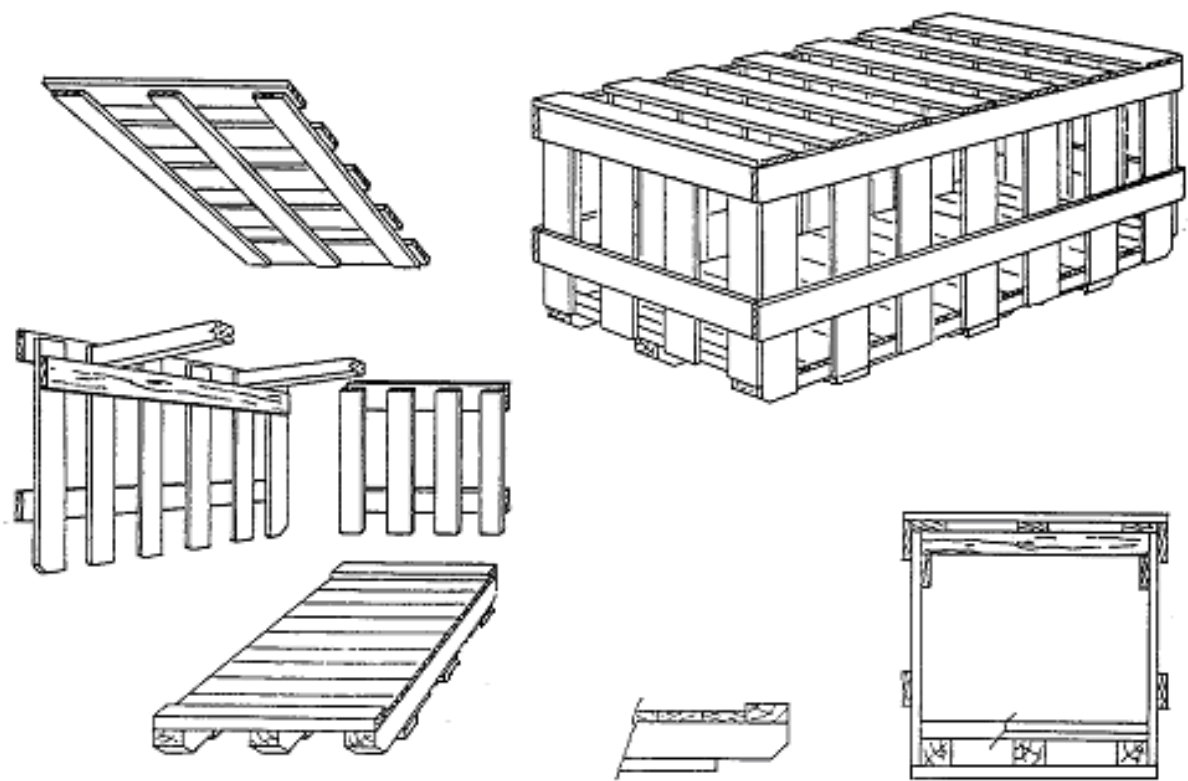


Figure 11: Bands

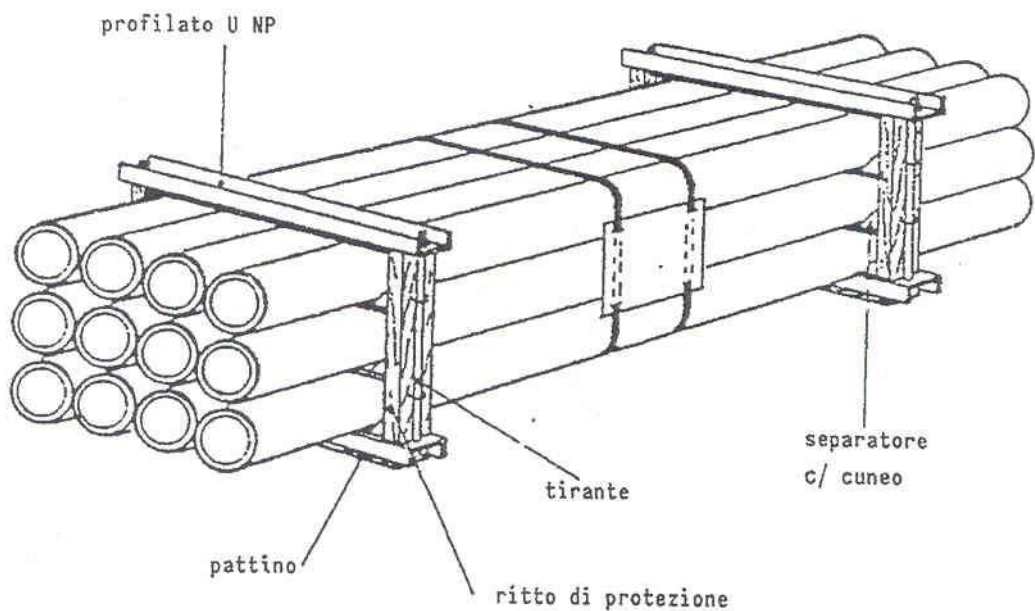


Figure 12: Bobbin lagging

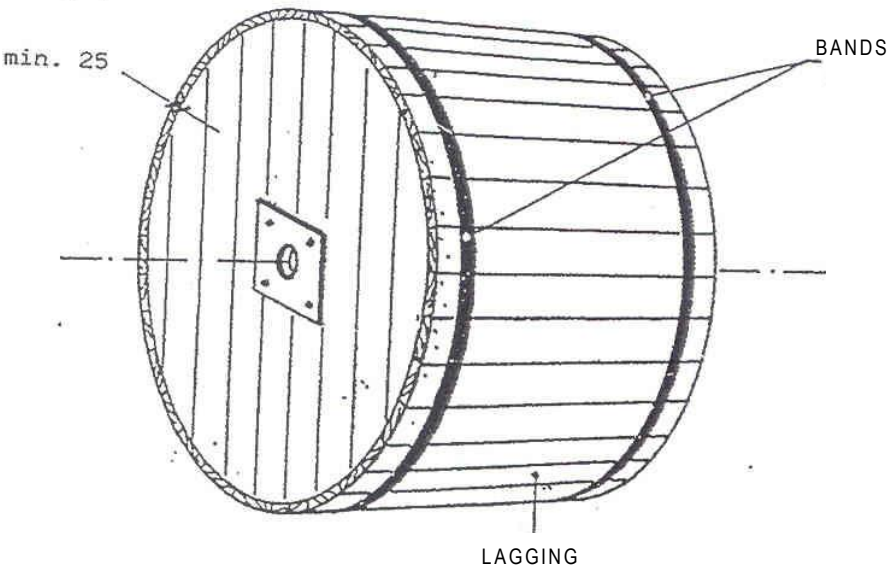


Figure 13a: Saddles

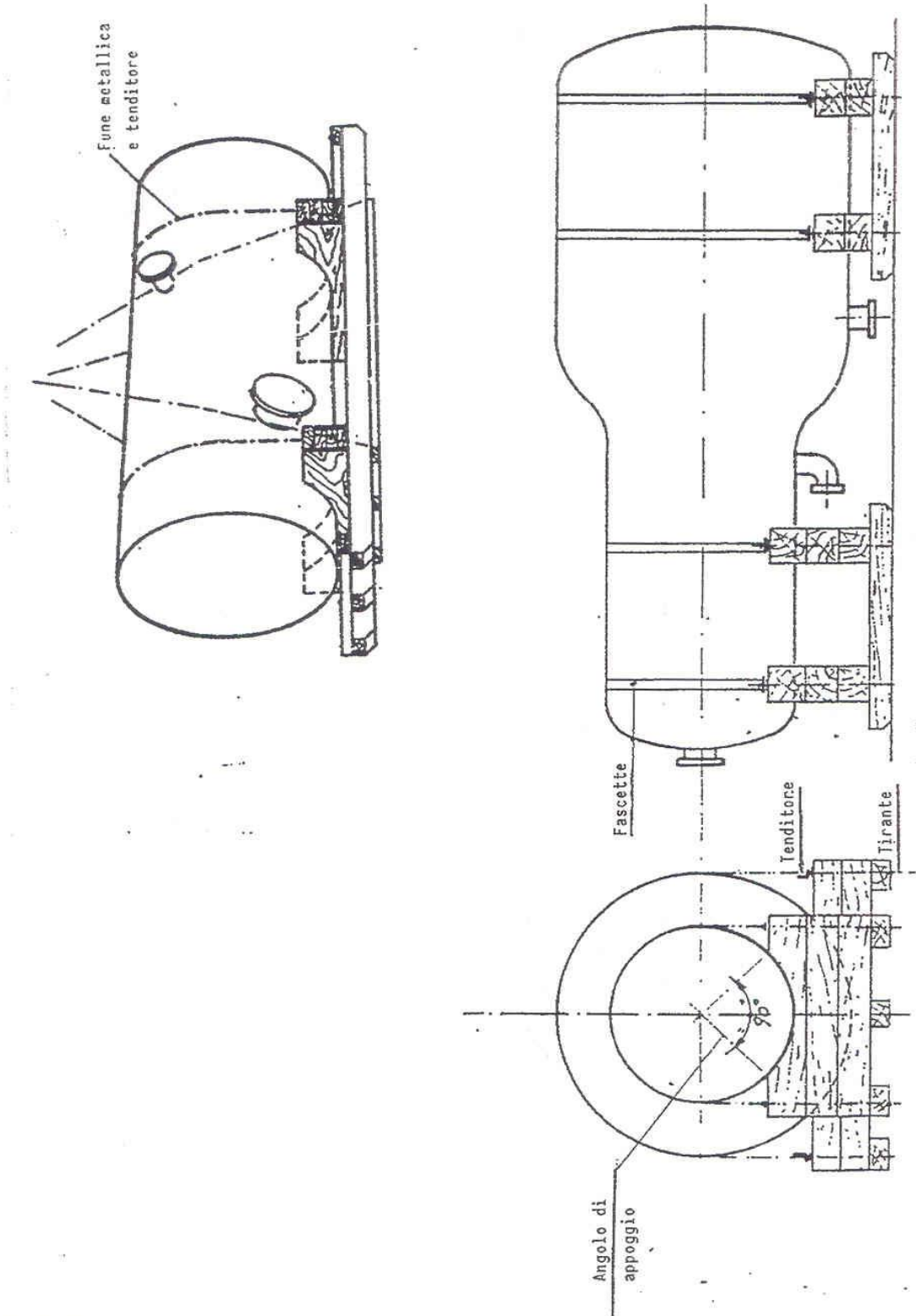


Figure 13b. Saddles

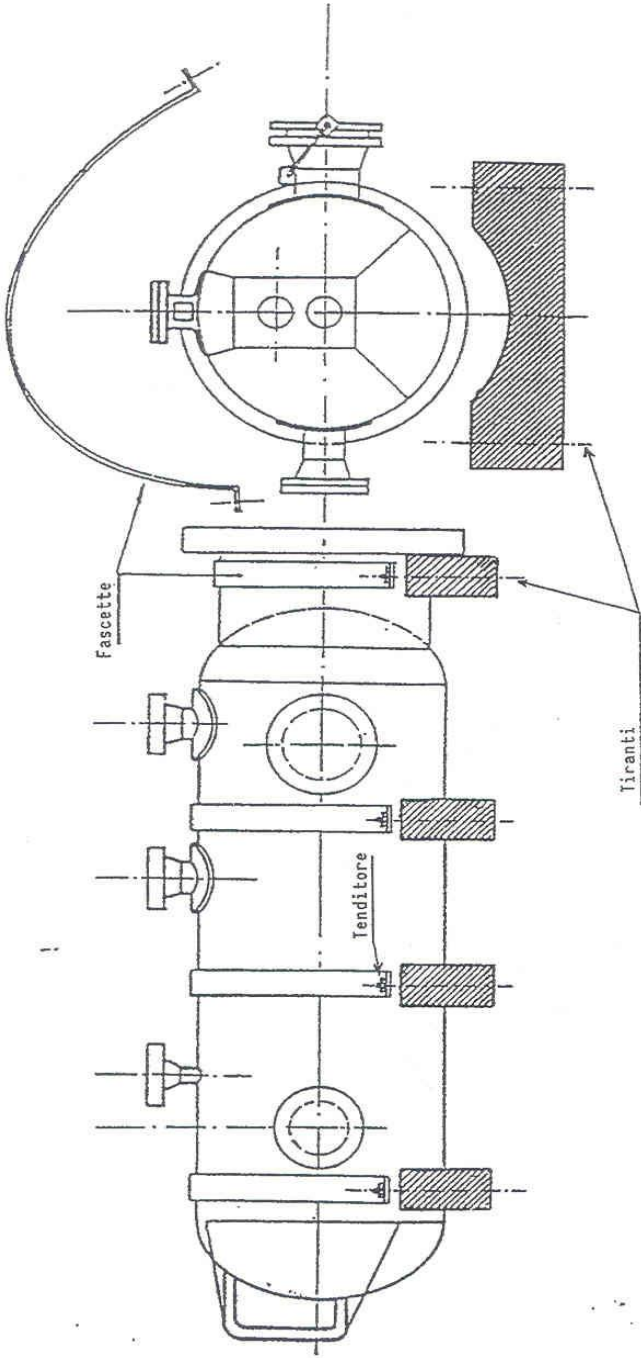


Figure 14: Anti-vibration structure

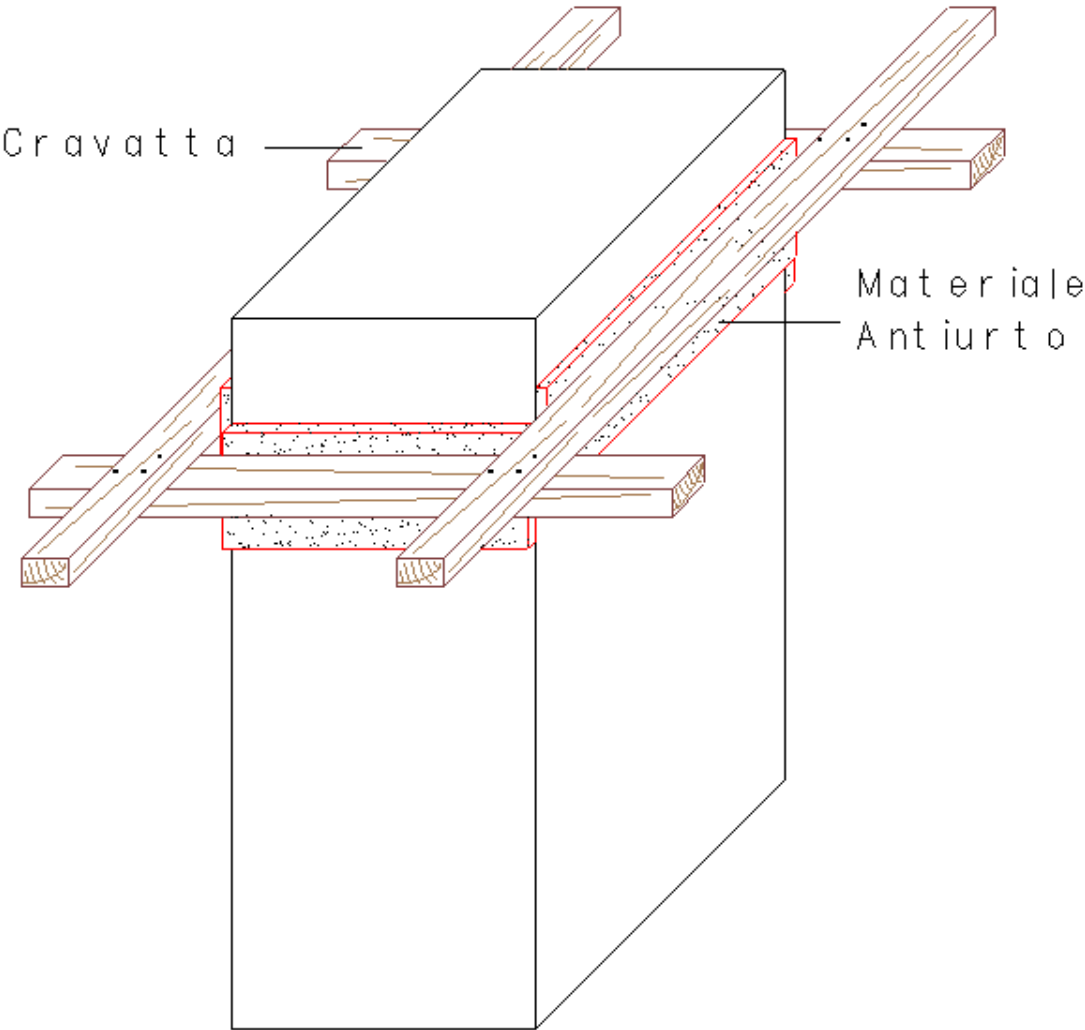


Figure 15: Wooden and plywood crate with non-supporting base

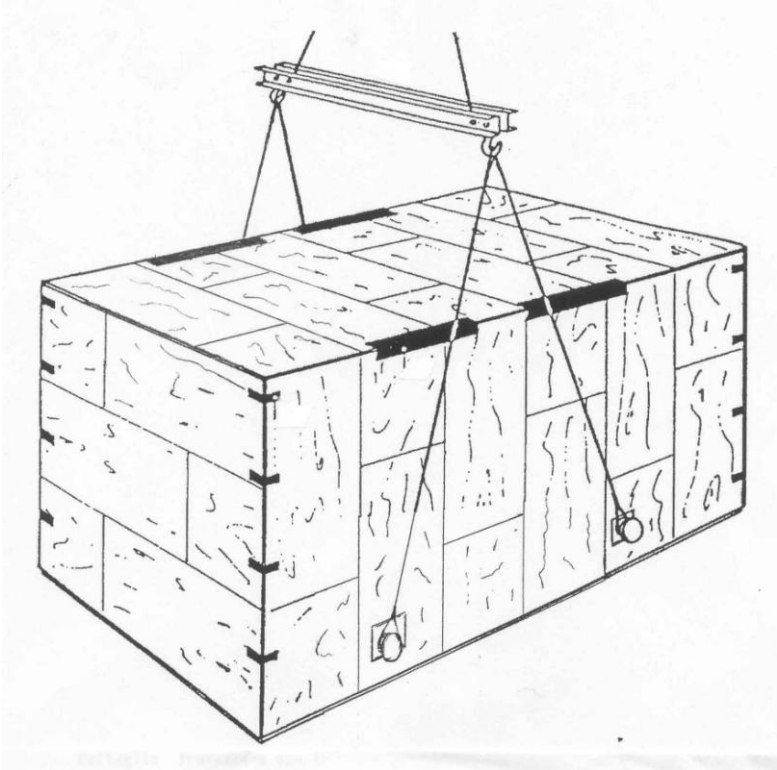


Figure 16: Wooden cage with non-supporting base (Only for AirCoolers by Vibo)

