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Packing, Marking and Shipping Procedure

Contract No. : 1400-102-18
Project : Tabriz 310 KTPA HDPE Plant
Owner : Tabriz Petrochemical Company (TPC)
Site : Tabriz Petrochemical Zone, East Azerbaijan Province, Iran

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Rev.	DATE (DD.MM.YY)	PURPOSE OF ISSUE	PREPARED	CHECKED	APPROVED	AUTHORIZED

Tabriz Petrochemical Company
310 KTPA HDPE Plant



Packing, Marking and Shipping Procedure



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1. SCOPE

This specification covers Packing, Marking and Shipping instruction for the equipment and materials under the PURCHASE ORDER (hereinafter called as “GOODS”), which are delivered by SUPPLIER.

2. PROJECT DESCRIPTION

2.1 Tabriz HDPE Plant Introduction

Tabriz Petrochemical Company (hereinafter referred to as “TPC” or “OWNER”) a company organized and existing under the laws of the Islamic republic of Iran, desires to establish and operate a High-Density Polyethylene (HDPE) plant hereinafter referred to as the PLANT for manufacturing of HDPE as products/services at Tabriz City, East Azerbaijan Province, Iran.

The PROJECT consists from main process units, utility distribution (as all required utilities will be supplied from existing facilities located in Tabriz Petrochemical Complex) and corresponding offsite facilities (i.e. product warehouse).

The PROJECT shall be capable to produce 310 KTPA of HDPE product with different grades as per corresponding process technology prepared by NPC Research & Technology (NPC-RT) as the Licensor.

2.2 Tabriz HDPE Units Description

Unit Code	Description
000	General
100	Powder Production Unit
200	Powder Workup Unit
300	Hexane Recovery
400	Auxiliary Production Unit
500	Pelletizing Unit
600	Pellet Homogenizing Unit
700	Bagging Unit
800	Utility Distribution & Safety System
900	Fire Fighting and Safety Systems

3. DEFINITIONS

- **PROJECT:** EPCC of Tabriz 310 KTPA HDPE Plant
- **OWNER:** Tabriz Petrochemical Company (TPC)
- **MC:** Namavaraneh Delvar Engineering & Construction (NDEC) Co.
- **CONTRACTOR:** Energy Industries’ Engineering and Design (EIED) Co.



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- **CONTRACT:** The binding agreement between OWNER and CONTRACTOR (Contract No. 1400-102-18)
- **SUPPLIER:** Any company or person, to whom with prior approval has subcontracted directly or indirectly at any level any part of PROJECT (as a Subcontractor), or the CONTRACTOR has bought directly or indirectly at any level any material or equipment (as a Vendor) which are part of PROJECT.
- **TPA:** Means 3rd Party Authorities who will supply inspection and certification services and is independent from OWNER, MC, CONTRACTOR, and SUPPLIER.
- **TERMS AND EXPRESSION.**
 - **Shall:** Use to express a requirement.
 - **Should:** Use to express a strong recommendation.
 - **HOMA®:** HOMA® is a web-based Electronic Integrated Engineering Documents (EIED) management system and deployed for handling of engineering documents and comment sheets in E, P and C phase of the PROJECT as well.
 - **Field:** The site of the Tabriz HDPE Plant, on which the work of the PROJECT shall be proceeded. The Tabriz HDPE Plant and its site office is located at Tabriz, East Azerbaijan Province, Iran.
 - **Work:** All products/services related to the PROJECT.
 - **Forwarder:** a person or organization that dispatches or delivers goods.



4. REFERENCES

5. RESPONSIBILITIES

We, Energy Industries Engineering and Design (EIED) as one of the major EPC contractors in Oil, Gas and Petrochemical Industries has been awarded a fast track and strategic project namely " Tabriz 310 KTPA HDPE Plant", which will be located in Tabriz Province, northwest Iran.

6. DELIVERY CONDITIONS

6.1 SUPPLIER's Inspection

Packing Inspection shall be made by SUPPLIER in accordance with the following procedure.

Any inspections shall not relieve SUPPLIER from any responsibilities or obligations under the terms and conditions of the PURCHASE ORDER.



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Any damage and defect of packaged equipment and materials / GOODS because of improper packaging, having concealed damage or any shortage at the time of unpacking at site of project shall be subject to rejection and be replaced at SUPPLIER's cost.

Packing Inspection shall be performed by SUPPLIER in accordance with the requirements of this instruction before the witness inspection stated hereunder.

All packing materials and procedures being utilized or to be utilized by SUPPLIER shall be subject to inspection.

- a) All packing, packaging and protective materials, shall be new, maintain its integrity and perform its intended function whilst being transported, handled, and stored.
- b) SUPPLIER shall confirm that the contents of Packing List perfectly be coincide with those on Tags attached to GOODS. SUPPLIER shall utilize the format of Packing List presented by CONTRACTOR and confirm that the contents shall not be handwritten.
- c) Waste space within packaging is a source of weakness as such, SUPPLIER shall ensure GOODS are nested and packed correctly.
- d) All timber used in the construction of packaging cases (boxes) and crates, etc., shall be sound and well-seasoned without evidence of rot, grazes, or crack and split. Knots shall be sound and not in excess of one quarter the width of board or timber section to be utilized.

6.2 Witness Inspection

In case the witness inspection is performed, the following conditions shall be fulfilled:

- (1) The representative of SUPPLIER shall attend the inspection.
- (2) Packaging materials inspection shall be completed.
- (3) Packing and marking shall be completed.
- (4) Individual packing list shall be completed.
- (5) Top panel of package shall be opened and interior condition (protection, fixation and etc.) of equipment or machines shall be visible for inspection and shall not be any restriction for fully inspection.

6.3 Modification of Package

If CONTRACTOR instructs SUPPLIER regarding modification of package or marking on or after CONTRACTOR's receipt of Packing Inspection Report or at the time of Witness Inspection, SUPPLIER shall at once do it on his own responsibility and expenses.



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In case any damages or unexpected expenses occur due to delay of shipment owing to the said modification, SUPPLIER shall be responsible for the said damages or expenses.

In this case, SUPPLIER shall submit CONTRACTOR Re-Inspection Report which proves the modification or reproduction.

6.4 Export License, Permission etc.

SUPPLIER shall obtain the necessary licenses and permissions for the readiness of the GOODS, complying with laws, regulations and instructions by Government and relevant Authorities.

6.5 Export Customs Clearance

SUPPLIER shall initiate customs clearance with necessary license, permissions obtained by SUPPLIER prior to the delivery of the GOODS in case of FOB, CFR and DDP and etc. contract between FORWARDER and SUPPLIER.

6.6 Insurance

SUPPLIER shall procure and maintain all necessary insurance on the basis of Delivery Condition for any damage or loss of the GOODS, his own, and third party's property and injuries or death of any person caused by carrier up to the delivery of the GOODS.

6.7 Special Devices and Lugs

SUPPLIER shall provide special lifting devices and lugs mounted on the GOODS for handling and securing the cargo during transportation if necessary.

6.8 Special Precaution for On-Deck Cargo

In case there is possibility that Oversize Material, which is equal to or greater than 20.0m long x 2.0m wide x 3.0m high, is loaded on the deck of an ocean vessel, preservation, painting, rust prevention, protection of openings for these items shall be performed perfectly. If special precaution which does not form part of the order is required, the CONTRACTOR should be notified.

The cargo shall be stowed inside the main hold under deck or adequately protected in the container (excluding open top containers) unless otherwise approved by CONTRACTOR/OWNER.

6.9 Air Transportation

In case of air transportation, CONTRACTOR's prior approval in writing shall be required.



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In such case, SUPPLIER shall follow CONTRACTOR's instruction in relation thereto.

6.10 Shortage, Defect, etc.

If any shortage, defect or damage is found in the GOODS due to any reason attributable to SUPPLIER, SUPPLIER shall bear all expenses for replenishment or replacement of the GOODS with delivery to the destination site.

In such a case, SUPPLIER shall contact Procurement Group of CONTRACTOR and shall arrange for the shipment again under the instruction of CONTRACTOR.

6.11 Dead freight, Demurrage

SUPPLIER shall be liable for any dead freight to demurrage consequent upon his failure to make the GOODS deliver by the designated date, after the expected date of cargo-readiness informed by SUPPLIER, while the carrying vessel has arrived at the port of shipment or the transportation equipment has been arranged at the designated place, without prior written approval by CONTRACTOR.

7. DELIVERY INFORMATIONS AND DOCUMENTS

7.1 Shipping Information and Documents- I

SUPPLIER shall submit the following document by Fax or e-mail within 30 days before the contract delivery date to CONTRACTOR/ FORWARDER for transportation planning, etc., in the manner specified below;

- DELIVERY SCHEDULE (Attachment-1)

7.2 Shipping Information and Documents- II

SUPPLIER shall submit the following documents in one (1) original plus one (1) copy within 30 days before the delivery date to CONTRACTOR/ FORWARDER for arranging ocean transportation and transportation plan etc., in the manner specified below;

- 1- Performa Shipping Invoice
- 2- Heavy and/or Bulky Cargo Sketch (FORM-2)

In case any cargo exceeds one or more of the below dimensions and weight

Gross Weight : 20.0

Ton Length : 11.8 Meter



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Width : 2.3 Meter

Height : 2.3 Meter

Note:

(1) In case of the heavy cargo over 40-ton G/W, SUPPLIER shall submit the shipping diagram describing point of skid, centre of gravity, special device (lifting beam, etc.), sling point, angular measure of lifting, etc. (available in any form)

(2) FORWARDER shall contact shipping company to adjust cargo plan and/or request them to discuss with SUPPLIER.

3- Hazardous Cargo Sheet and Material Safety Data Sheets

- As per "HAZARDOUS CARGO SHEET" – Attachment-2

In case of chemicals and/or dangerous cargoes falling under "IMDG Code" (International Maritime Dangerous GOODS Code), SUPPLIER shall submit "Hazardous Cargo Sheet" referring to Attachment-2 and "Material Safety Data Sheet" item by item.

4- Special Handling Instruction for Hazardous Cargo

- As per "SPECIAL HANDLING INSTRUCTIONS" – Attachment-3

Cargo handling and/or Storage Manual shall be made describing the handling manners, storage condition and temperature, etc. for the cargo which requires special attention for handling and/or keeping.

5- Other Document and/or Certificate

If necessary, CONTRACTOR/FORWARDER make request to SUPPLIER to submit other document, certificate or explanation letter, drawings for import customs clearance.

SUPPLIER shall make utmost cooperation to their instruction before and/or after Shipment.

7.3 Notice of Cargo Readiness

SUPPLIER shall send the Notice of Cargo Readiness Date 30 days before the delivery of GOODS to CONTRACTOR and FORWARDER for space booking of ocean going vessel or arrangement of transportation equipment, in the manners specified below.

- Containing;
- Project Name, CONTRACTOR Job No.
 - P.O. No.
 - Item No., Name of the GOODS



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- d) Contract Delivery Port
- e) Contract Delivery Date
- f) Expected Cargo Readiness Date
- g) Total Nos. of Package
- h) Total Gross Weight (Kg)
- i) Total Measurement (m³)
- j) Weight and dimensions for Heavy and/or Bulky Cargo in each package (if any)

Notice of Nominated Vessel

Within about two (2) weeks after receipt of the above Notice of Cargo Readiness Date, FORWARDER will inform the nominated vessel to SUPPLIER by fax or e-mail in order for SUPPLIER to proceed with the shipment considering the expected date of cargo readiness as follows.

The information from FORWARDER includes the following:

- a) Name of Vessel
- b) Loading Port
- c) Expected Loading Date
- d) Vessel's Company and Agent

7.4 Application for Packing Inspection & Report of Packing Inspection

SUPPLIER shall submit the Application for Packing Inspection at least

1 week in advance of the date of Packing Inspection.

SUPPLIER shall submit one (1) original of the following documents 7 days before the contract delivery date to CONTRACTOR for the confirmation, as the result of packing inspection,

Submittal of documents;

- 1- Packing Inspection Report with photograph of Packing

(Attachment-10)

- 2- Signed Final Packing List



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Upon CONTRACTOR receipt of SUPPLIER's Packing Inspection Report and Inspection Agency's Inspection Release Note, CONTRACTOR /FORWARDER shall notify SUPPLIER to deliver GOODS after checking the Packing Inspection Report and after confirming that Test & Inspection Report has been approved.

7.5 Shipping Advice

SUPPLIER shall inform the Shipping Advice within 2 days after the shipping date to CONTRACTOR /FORWARDER for the confirmation of the result of shipping with ocean Bill of Lading, Commercial Invoice and Packing List, in the manners specified below.

- Containing:
- a) Project Name, CONTRACTOR Job No.
 - b) P.O. No.
 - c) Item No., Name of the GOODS
 - d) Name of Vessel and Voyage No.
 - e) Loading Port
 - f) Actual Date of Sailing
 - g) Destination port
 - h) Expected date of Arrival
 - i) Total Nos. of Package
 - j) Total Gross Weight (Kg)
 - k) Total Measurement (m³)
 - l) Weight and Dimension for Heavy and/or Bulky Cargo With Package (if any)
 - m) Bill of Lading No. and Date
 - n) Invoice No. and Value
 - o) Agent name of shipping company with details as TEL/FAX No. at destination port

8 SHIPPING DOCUMENTS

SUPPLIER is obligate to provide and forward the following documents in the manner specified here in below immediately after delivery of each consignment of Equipment:

Note: Main Shipping Marks shall be clearly described in all shipping documents concerned.



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8.1 Commercial Invoice

Signed commercial Invoice issued by beneficiary in one (1) original and four (4) copies, original and one copy certified by Local Chamber of Commerce, declaring that material have been exactly in accordance with the offer and the prices are current export market prices for the merchandise described therein.

8.2 Packing List

SUPPLIER shall issue Packing List (Form-01) in one (1) original and four (4) copies. (Packing mode: standard export packing), indicating the weight (Gross & Net), size and contents of each package.

Note: Please make use of our blank form of Packing List and prepare on each package by typing up but not by hand-writing except cover sheet.

Special care shall be taken that all accessory parts, loose or detachable, belonging to the main item under dispatch, shall also be individually listed and indicated by (X) with accessories in the packing list. In the event these accessory parts are not listed in the packing list, they shall be considered by CONTRACTOR as not delivered.

In case the goods shipped or delivered as Partial shipment, it should be indicated by (X) Partial shipment in the packing list.

8.3 Certificate of Origin

SUPPLIER shall submit Certificate of Origin in one (1) original and three (3) copies, original and one copy certified by Chamber of Commerce and consulate of the Islamic Republic of Iran.

Certificate of Origin should contain:

- Name of Shipper: Actual name of SUPPLIER on behalf of CONTRACTOR.
- Name of Consignee:
- Commodity name and Quantity of GOODS
- Total number of package, Gross weight and Measurement
- Main Shipping Mark with package No.
- Name of loading and unloading port
- Origin of Country



8.4 Bill of Lading

SUPPLIER shall arrange to obtain clean negotiable FIATA multimodal transport Bill of Lading (B/L) evidencing Goods in route issued to the order of (Bank) Notify applicant in 3 original and 3 copies indicating name and address of the shipping Co.'s representative in Iran marked freight prepaid and/or full set clean on board ocean B/L issued to the order

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of (Bank) Notify applicant indicating name and address of the shipping Co.'s representative in Iran in 3 original and 3 copies, marked freight prepaid and/or clean Air Way Bill issued to the order of (Bank) Notify applicant bearing flight stamp in 1 original and 3 copies indicating name and address of the shipping Co.'s representative in Iran marked freight prepaid. All bill of ladings shall be "surrendered" and "shipper load & count".

Bill of Lading shall contain:

- a) Name of shipper: Actual name of SUPPLIER on behalf of CONTRACTOR
- b) Name of consignee:
- c) Name of ocean going vessel, voyage No., and sailed date with clean on board stamp
- d) Name of loading and unloading ports
- e) Total number of package, gross weight and measurement
- f) Main shipping mark
- g) Main description:

EQUIPMENTS & MATERIALS FOR OIL PRODUCTION PLANT

- h) Name of notify party: - to be informed later -
- i) Declaration that "FREIGHT PREPAID AND AS ARRANGED"

Note: Settlement is made between CONTRACTOR and SUPPLIER on the basis of Forwarder Certificate of Receipt (FCR), i.e. SUPPLIER shall Receive FCR from FORAWRDER as substitute of Bill of Lading.

8.5 Freight Invoice

SUPPLIER shall submit Freight Invoices issued by shipping co. or its authorized agent in one (1) original and 3 copies, original and one copy certified by Chamber of Commerce and consulate of the Islamic Republic of Iran.

Freight Invoice shall contain:

- a) Full name and address of SUPPLIER, and also full name of OWNER



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- Unit Price, Total Price, Quantity and Net Weight of GOODS itemized as same as “Packing List”
- Means of transportation: name of ocean-going vessel with date of sailing
- Invoice No. and the date of issue

8.6 Shipping Certificate

SUPPLIER shall submit Certificate from shipping Co. Or its authorized agent certifying shipment effected on classified vessel plying in regular liner service as per institute classification clause in one (1) original and Two (2) copies.

8.7 Inspection Certificate

SUPPLIER shall submit the original Inspection Certificate issued after the completion of inspection. Letterheads certifying that the goods shipped are in conformity with the Quality, and Quantity, and Packing for the Goods Loaded/Delivered are strictly complying with specifications of the Goods indicated in the relative Performa Invoice and all subsequent amendments.

Such inspection certificate shall verify that the Goods are in conformity with DIR-8527-1 acceptable standard(s) as mentioned in P/I and should be attested by the countries mentioned in item No.2 Chamber of Commerce, where it has been issued.

8.8 Factory Acceptance Test Certificate

SUPPLIER shall submit Factory Acceptance Test certificate issued by the SUPPLIER in Two (2) copies, along with the approval of the CONTRACTOR’s representatives.

SHIPPING DOCUMENTS FOR ATTACHMENT TO PACKAGING

- Two (2) Copies of Individual Packing List wrapped with polyethylene sheet or film shall be attached on the outside of packaging.
- Where applicable, FCL basis Freight Container List shall have Two (2) copies of Packing List placed in weatherproof envelopes and attached both to the internal wall.

9. PACKING

9.1 General instructions

Limit of dimensions and weight



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In course of packing planning all the necessary steps must be taken to limit the dimensions and the weight as defined in this Procedure.

Materials

For the wooden parts silver fir or another kind of timber that has an admissible stress to flection of at least 100 kg/cm² must be used; for the sheathing's phenolic plywood or OSB type 3 panels can be used. The humidity rate mustn't be over 20%.

Beams and boards must have neither passing or connected burls nor must big fissures; possible burls or partial fissures be closed with suitable products.

The nominal dimensions that are written in the paragraphs concerning the single packages have to be considered subject to the following tolerances: wooden parts: ± 3 mm for thickness up to 50 mm; ± 5 mm for higher thickness; phenolic plywood or OSB type 3 panels: ± 1 mm.

Joints

In the construction of cases, crates or pallets, if it isn't possible to get the longitudinal bottom beams from a single wooden part, one joint only of two pieces of equal section is allowed in the point of the beam where the lowest stress is expected. The joints can be made with the systems as described in the UNI 9151 norm.

9.2 Choice of the Type of Package

9.2.1 Choice criteria

Generally, the type of package that has to be prepared for the forwarding and the storage of any goods is chosen on the basis of the following information:

- 1 Product to be packed (such as machinery, fix equipment, measuring instruments, plants etc.)
- 2 Way of transport that has been chosen (road / railway / sea¹ / air)

¹ In certain cases the sea transport will be distinguished between conventional sea transport (package in accordance with specification sent just like that) and sea transport in container (package in accordance with specification put in container).



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3 Particular instructions those are relative to the specific case (for example particular requests of protection against humidity, availability of "one way"^y containers etc.)

As regards to point 1, SUPPLIER classifies its products in 7 GROUPS OF GOODS:

A Fix Equipment

B Rotary

C Packages

D Instrumental & Electrical Equipment (Sensitive to dust or humidity)

E Instrumental Laboratory and Electric Equipment (Insensitive to dust or humidity)

F Piping, Steel Structures, Plates

G Chemical Products

H Materials with limitation on shelf life

The choice of the way of transport (point 2) is normally suggested by the destination of goods; in any case the packer will receive this information directly from SUPPLIER or indirectly from the Supplier.

Analogously, SUPPLIER or its Supplier will inform the packer of possible specific packing instructions (point 3).

On that account the TYPE of package of SUPPLIER products can be defined on the basis of the following information:

- 0 Belonging group of goods of the product to be packed
- 1 Specific product within the group of goods
- 2 Way of transport
- 3 Possible particular specifications

9.2.2 Groups of goods

In the following table SUPPLIER products are classified for Groups of Goods (GG). The lists below have to be considered exemplifying, but not exhaustive.

^y They are ordinary reusable containers that, when they arrive at their last forwarding, are used as not returnable containers and so they are always sent to destination. Generally the one way containers ask a lower number of handlings of the contents, which sometimes allows (when explicitly specified) to prepare cheaper packages.



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The individuation of the belonging GG of the various products facilitates the choice of the types of package that have to be arranged (see paragraph 5.2.3).

GG	PRODUCTS
A	<p>Fix Equipment</p> <ul style="list-style-type: none"> • Steel vessels and heaters • Stacks • Ejectors • Extinguishers • Static filters • Reactors • Heat exchangers • Separators • Tanks and vessels (cylindrical and/or spherical, prefabricated or not)
B	<p>Rotary and Packages</p> <ul style="list-style-type: none"> • Air or steam generators • Pumps • Lift trucks • Mixers • Fans • Cranes and Hoists
C	<p>Packages</p> <ul style="list-style-type: none"> • Compressors • Generating sets • Furnaces • Boilers • Alternators • Water treatment units • Lifts and Goods lifts • Air conditioning systems • Fire fighting systems • Flare system
D	<p>Instrumental and Electrical Equipment (sensitive to dust or humidity)</p> <ul style="list-style-type: none"> • Various items of laboratory equipment • Analysers • Battery Chargers • Electric boxes with terminal blocks • Converters • Instrumental / Electric panels and cubicles



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	<ul style="list-style-type: none"> • Power transformers, dry type or not • Welding material • Electric motors with protection < IP 54 • Instrumental and electric components with terminals/contacts (pressure switches, thermostats, circuit breakers, etc.) • Distributed Control Systems (DCS), Programmable Logic Controllers (PLC), computers and various microprocessor systems etc.
E	<p>Instrumental & Electrical Equipment (Insensitive to dust or humidity)</p> <ul style="list-style-type: none"> • Electric motors with protection > IP 54 • Electric and instrumental cables • Thermometers • Pressure gauges • Electric boxes without terminal blocks • Orifice and rupture discs • Level indicators • Electric insulators • Cable glands • Cable trays • Instrument valves with or without actuators
F	<p>Piping, Steel Structures, Plates</p> <ul style="list-style-type: none"> • Bolts and Nuts • Steel structural works • Stairs, ladders, gangways, steps, gratings - whether shaped or not • Expansion bends • Flat and/or machined plates • Flanges • Gaskets • Stainless and special steel rolled sections and structural shapes • Fittings • Piping valves in general and relevant accessories • Supports • Steel pipes • Coated steel pipes • Non-metallic pipes
G	<p>Chemical Products</p> <ul style="list-style-type: none"> • Chemicals, whether dangerous or not • Refractory materials, gravel, sand, and cement • Compressed or liquefied gas cylinders



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	<ul style="list-style-type: none"> Epoxy resins Lube oils and greases
H	<p style="text-align: center;">Materials with limitation on shelf life</p> <ul style="list-style-type: none"> All materials with shelf life same as refractories, refrigeration gas, some gaskets, etc.

9.2.3 Choice of the generic type of package

The following table suggests the **generic** type of package that has to be prepared (for example case / crate / saddles etc.) on the basis of the group of goods, the specific product, the way of transport that has been chosen and, if necessary, of other particular specifications. It is a series of typical cases that define some general criteria of choice.

Then the definition of the type of package has to be completed with the choice of the specific type of package among possible different constructive versions (for example small-sized / reduced / standard crate); the following paragraph deals with this question.

GG	Products - Transport - Particular Specifications	Local	Foreign
A	Metallic Fix Equipment in general (for example filters, heat exchangers, tanks, etc.) <ul style="list-style-type: none"> without applied instrumentation or insulation volume > 5 m³ 	Saddles	Saddles
"	<ul style="list-style-type: none"> without applied instrumentation or insulation volume ≤ 5 m³ 	Saddles	Crate
"	<ul style="list-style-type: none"> with applied instrumentation (e.g. pressure gauges, electro valves, etc.) or insulated of any volume or dimensions 	Saddles	Case
A	Nonmetallic Fix Equipment in general (e.g. glass fiber reinforced plastic tanks, plastic constructions etc.) <ul style="list-style-type: none"> <u>conventional sea transport</u> / air transport of any volume or dimensions 	Saddles	Crate



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"	<ul style="list-style-type: none"> • <u>sea transport in container</u> / road transport / railway transport • of any volume or dimensions 	Saddles	Saddles
A	Accessories, parts, spares	Case	Case

B	Rotary in general (e.g. centrifuges, generators, pumps, lift trucks, mixers, cranes and Hoists, compressors, etc.) <ul style="list-style-type: none"> • road / railway transport • with possible intermediate storages 	Case	Case
"	<ul style="list-style-type: none"> • road / railway transport • without intermediate storages 	Crate	Crate
"	<ul style="list-style-type: none"> • sea / air transport 	Case	Case

C	Special parts of packages (e.g. turbines, compressors, generating sets, Flare system, furnaces, boilers, alternators, water treatment units, lifts and goods lifts, air conditioning systems, fire fighting systems, etc.) <ul style="list-style-type: none"> • sea / air transport 	Crate Or Case	Crate
"	<ul style="list-style-type: none"> • road / railway transport • with possible intermediate storages 	Case	Case
"	<ul style="list-style-type: none"> • road / railway transport • without intermediate storages • without instrumental equipment sensitive to dust or humidity 	Crate	Crate

D	Instrumental & electrical equipment <u>sensitive to dust or humidity</u> (e.g. electric motors with protection < IP 54, electric panels, transformer etc.)	Case	Case
---	--	------	------

E	Instrumental & electrical equipment <u>insensitive to dust or humidity</u> (e.g. electric motors with protection ≥ IP 54, pressure gauges etc.)	Case	Case
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E	Electrical cables wound in reels	Staved Reel	Staved Reel
E	Cable trays (with small parts pre-packed in small-sized cases)	Saddle	Crate

F	Plates	Saddle	Pallet
F	Bolts and Nut, Expansion bends, Flanges, Gaskets, Fittings, Piping valves and relevant accessories	Case	Case
F	Pre-fabricated steel structural works and structural shapes with sturdy carrying structure ≤ 5 mm thick Stairs, ladders, guards, parapets, handrails, steps, gratings whether - shaped or not -, chequered and/or pre-varnished plates and translucent plates, metal and/or pre-varnished panels window and door frames Calendared plates and bearings that can be easily piled up	Pallet	Crate
F	Pre-fabricated steel structural works and structural shapes with sturdy carrying structure > 5 mm thick	Pallet	Bundle
F	Not sheathed pipes and piping in general: conduit pipes, carbon steel pipes; stainless steel or other metal pipes; non-metallic pipes in general (PVC, fibre glass), pre-fabricated piping, • Up to DN80 (3")	Bundle	Crate for pipes
"	• From DN100 (4") up to DN250(10")	Bundle	Bundle
F	Bituminized pipes and piping in general • Up to DN80 (3")	Bundle	Crate for pipes
"	• From DN100 (4") up to DN600(24")	Bundle	Bundle
"	• Over DN600 (24")	Rope	Rope
F	Insulated pipes and piping in general • transport by sea	-	Case
"	• road / railway transport	Crate for pipes	Crate for pipes



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G	Products that are not dangerous (e.g. refractory, sand, cement, powders, resins, coal, gravel) and that are prepacked in metallic drums or sacks (seeds and selected seeds excluded) <ul style="list-style-type: none"> • road transport / sea transport in container • Hot & Cold Insulation • Painting Materials 	Pallet	Pallet
"	<ul style="list-style-type: none"> • air transport / conventional sea transport 	-	Case
G	Products that are not dangerous and that are prepacked in plastic drums Rock wool and fiber glass prepacked (e.g. in rolls)	Crate	Crate
G	Products that are not dangerous and that are prepacked in cartons Food industry products in general Seeds and selected seeds	Crate	Case
G	Dangerous products	Homologated package	Homologated package

* For Special items packing and marking shall be followed vendor's procedure. Specialty of item(s) shall be approved by CONTRACTOR.

* The packaging for electrical panels and instruments shall be provided with full protection against physical damage and atmospheric attack during transit and possible long period under adverse storage conditions, which may extend to two (2) years.

The cases, which are transported by sea, shall be marked "Hold Storage".

9.2.4 Choice of the specific type of package

The choice table of the preceding paragraph suggests the alternative use of package of main different constructive typology (for example cases / crates / saddles etc.).

Then - for example as in the case of cases and crates - different constructive or dimensional versions (e.g. small-sized / reduced / standard crate) are possible. The complete list of the single specific types of package with the respective use directions is written below.

N	PACKAGE	INDICATIONS
1	Small-sized Case (Plywood / OSB Sheathing)	<ul style="list-style-type: none"> • External volume up to 3 m³ • Net weight up to 500 kg



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2	Small-sized Case (Wooden Board	<ul style="list-style-type: none"> External volume up to 3 m³ Net weight up to 500 kg
3	Reduced-size Case (Wooden Sheathing) Board	<ul style="list-style-type: none"> External dimensions up to 800 x 250 x 250 cm Net weight up to 3.000 kg
4	Standard Case (Plywood / OSB Sheathing)	<ul style="list-style-type: none"> No limits of dimensions Net weight up to 30.000 kg
5	Standard Case (wooden board sheathing)	<ul style="list-style-type: none"> No limits of dimensions Net weight up to 60.000 kg
6	Small-sized Crate	<ul style="list-style-type: none"> External volume up to 3 m³
7	Reduced-size Crate	<ul style="list-style-type: none"> External dimensions up to 800 x 250 x 250 cm
8	Standard Crate	<ul style="list-style-type: none"> No limits of dimensions
9	Crate for Pipes	<ul style="list-style-type: none"> Pipes (see 5.2.3 - Choice table)
10	Saddles	<ul style="list-style-type: none"> Dimensions of the apparatus > 5 m³
11	Saddles on slides	<ul style="list-style-type: none"> Dimensions of the apparatus > 5 m³
12	Double Saddles	<ul style="list-style-type: none"> Pipes (see 5.2.3 - Choice table)
13	Bundle	<ul style="list-style-type: none"> Gross weight up to 8.000 kg
14	Pallet	<ul style="list-style-type: none"> (see 5.2.3 - Choice table)
15	Staved Reel	<ul style="list-style-type: none"> All Sizes
16	Homologated Package	<ul style="list-style-type: none"> Dangerous products

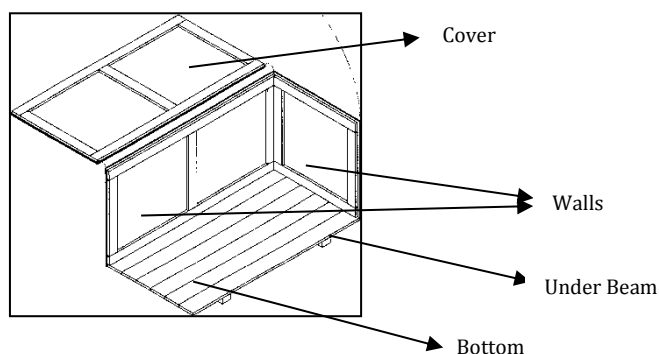
The constructive executions of the different specific types of packages are described and illustrated in the following chapter; besides, some useful directions to size the package that has been chosen are given (definition of the sections and the thickness of the structural and protective parts).

A rational choice of the specific type of package among the numerous possible options, as well as its correct sizing, permit the achievement of the highest **economy** of material and the condition of the greatest possible **safety** for the forwarding of the material to destination.

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9.3 Constructive Specifications

9.3.1 Small-Sized cases - Plywood / OSB Sheathing



Indications:

- External volume up to 3 m³
- Net weight up to 500 kg

SIZING

These cases can be used as main packing box - for any type of forwarding, but with external volume not less than 0.3 m³ - or as pre-packing boxes (e.g. for small parts or accessory components, without a minimum limit of volume) to be put, later, in bigger packing boxes. They are particularly suitable for air shipment; whose costs depend greatly on the weight of the package.

The bottom is made up of longitudinal adjoining boards, nailed to two or more transversal under beams; the walls and the cover are composed of an internal frame and an external sheathing (see the figure).

The sheathing is composed of adjoining panels with a basis of wood (phenolic plywood or OSB type panels).

Only the cover is waterproofed by a double polyethylene film coating (0.1 mm min. thick) that is put between the frame and the sheathing, and by closing the fissures between the panels with a suitable adhesive (e.g. polyvinyl acetate glue).

On the contrary, the bottom must permit and facilitate the drainage of possible condensation or liquids.

The minimum sections of the structural parts are written in the following table.

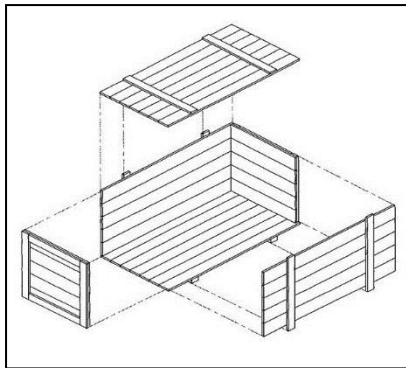
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MINIMUM SECTIONS		
Under beam section [cm]	Internal frame thickness [cm]	Sheathing panel thickness [cm]
8x10	2.5	0.8

9.3.2 Small-Sized Cases – Wooden Board Sheathing



Indications:

- External volume up to 3 m³
- Net weight up to 500 kg

SIZING

These cases can be used as **main packing box** - for any type of forwarding, but with external volume **not less than 0.3 m³** - or as **pre-packing boxes** (e.g. for small parts or accessory components, without a minimum limit of volume) to be put, later, in bigger packing boxes. Particularly in the case of **air shipment** you'd better use plywood or OSB sheathing cases (see 5.3.1) in order to reduce the total weight of the package and consequently the cost of the transport.

The bottom is made up of longitudinal adjoining boards, nailed to two or more transversal **under beams**; the walls and the cover are composed of **external crossbeams** nailed to an **internal sheathing** made up of wooden longitudinally adjoined boards (see the figure).

The sheathing boards must be from 12 to 24 cm in width.



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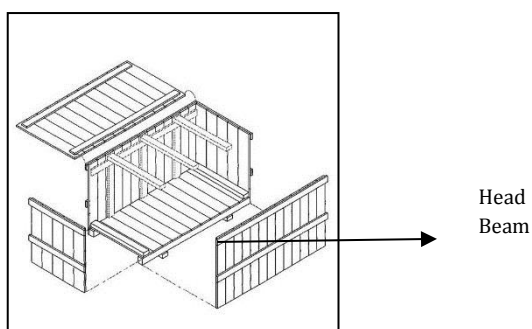
The **cover and the walls** are **waterproofed**, the cover by a polyethylene film coating (0.1 mm min. thick) and by an undulated or alveolar polypropylene coating (specific weight $250 \div 300 \text{ g/m}^2$), the walls by a polyethylene film coating (0.1 mm min. thick). These coatings are always applied to the internal side.

On the contrary, the **bottom** must permit and facilitate the **drainage** of possible condensation or liquids.

The **minimum sections** of the structural parts are written in the following table.

MINIMUM SECTIONS		
Under beam section [cm]	External crossbeam thickness [cm]	Sheathing board thickness [cm]
8 x 10	2.5	2.5

9.3.3 Reduced-Sized Cases (Wooden Board Sheathing)



Indications:

- External dimensions up too 800x 250x 250 cm
- Net weight up to 3.000 kg

THE BOTTOM

The bottom is made up of wooden adjoining **boards** that are fixed transversally to two or more **longitudinal** underlying **beams**.



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Some transversal or longitudinal **under beams** are positioned under the longitudinal beams and they are nailed to them. The under beams raise the bottom from the floor, so they allow the passage and the positioning of lifting ropes or forks.

The bottom is normally strengthened by two transversal **head-beams**, nailed on the boarding.

The **load distributors** are other further possible components of transversal strengthening for the bottom. They are used to strengthen the case bottom where the two lifting points are situated or to subdivide the load on the longitudinal beams.

The **minimum** sections of the bottom components are written in the following tables. They are valid as measures of reference with the following specifications:

- The number of the bottom beams is defined on the basis of a maximum centre distance of **100** cm;
- The section of the possible **load distributors** must be calculated on the basis of the stress that is generated in the bottom during the lifting operations;
- If the bottom is supplied with suitable load distributors, the boarding thickness can be always limited to 2,5 cm;

MINIMUM SECTIONS OF THE BOTTOM BEAMS			
Net weight [kg]	External length of the case [cm]		
	Up to 400	From 401 to 800	Over 800
Up to 1.000	8 x 8	8 x 10	8x10
From 1.001 to 3.000	8 x 10	10x12	10x12

MINIMUM SECTIONS OF THE OTHER BOTTOM COMPONENTS			
Net weight [kg]	Boarding [cm]	Under beams [cm]	Head-beams [cm]
Up to 1.000	2.5	10x6	10x4
From 1.001 to 3.000	2.5/3	10x8	10x6

A standard case with plywood / OSB sheathing or a standard case with wooden board sheathing will have to be used for contents that have a net weight over 3.000 Kg.

WALLS AND COVER

The **walls** (sides and heads) consist of an internal sheathing made up of wooden vertically adjoined boards and of external linking crossbeams that are placed horizontally.

The **cover consists of** an external sheathing made up of wooden transversally adjoined boards and of internal linking crossbeams that are placed longitudinally.

The boards must be from **12 to 24 cm** in width.



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The **cover and the walls** are **waterproofed**, the **cover** by a polyethylene film coating (0,1 mm min. thick) and by an undulated or alveolar polypropylene coating (specific weight 250 + 300 g/m²) that are placed between the external sheathing and the internal crossbeams; the walls by a polyethylene film coating (0,1 mm min. thick) that is applied to the internal side.

On the contrary, the **bottom** must permit and facilitate the **drainage** of possible condensation or liquids.

An **auxiliary frame** is put in the sidewalls. It consists of an upper horizontal crossbeam and of vertical struts. It strengthens the walls in order to give an appropriate superimposition load to the case.

MINIMUM SECTIONS OF WALL AND COVER COMPONENTS

Net weight [kg]	Crossbeams [cm]	Sheathing [cm]	Aux. struct, [cm]	Aux. struct, [cm]
Up to 1.000	12x2.5	2.5	10x2.5	10x4
From 1.001 to 3.000	12x2.5	2.5	10x2.5	10x4

The **minimum** sections of the wall and cover components and the minimum number of horizontal crossbeams are written in the following tables.

- The vertical struts of the auxiliary frame must be placed at a maximum centre distance of **125 cm**.

UNDERCOVER BEAMS

Every case must have **undercover beams**. They have to be placed transversally; they must be leaned against the auxiliary frame and nailed to the upper edge of the sidewalls.

These structural components have a double function:

MINIMUM NUMBER OF CROSSBEAMS FOR EACH WALL	
External height of the case [cm]	N°
Up to 200	2
Up to 250	3

- They give a suitable superimposition load to the case and make it walkable;
- Together with the cover they bear the transversal compression produced by the ropes during the lifting operations.

The undercover beams will have to be placed at a maximum centre distance of **100 cm** and they will have to comply with the minimum sections that are written in the following table.



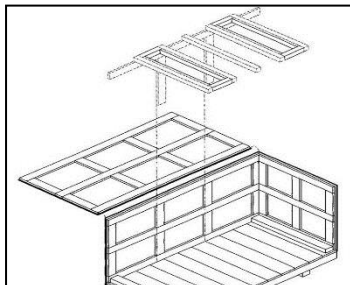
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UNDERCOVER BEAMS		
Net weight [kg]	External width of the case up to 120 cm	External width of the case from 120 to 250 cm
Up to 1.000	6 x 8	8x10
From 1.001 to 3.000	6 x 8	8x10

9.3.4 Standard CASES Plywood / OSB sheathing



Indications:

- No limits of dimensions
- Net weight up to 30.000 kg

THE BOTTOM

The bottom consists of wooden adjoining **boards** that are fixed transversally to two or more **longitudinal** underlying **beams**.

Some transversal or longitudinal **under beams** are positioned under the longitudinal beams and they are nailed to them. The under beams raise the bottom from the floor, so they allow the passage and the positioning of lifting ropes or forks.

The bottom is normally strengthened by two transversal **head-beams** that are fixed on the boarding by nailing - for thickness up to 6 cm or by bolting (for higher thickness).

The **load distributors** are other further possible components of transversal strengthening for the bottom. They are used to strengthen the case bottom where the two lifting points are situated or to subdivide the load on the longitudinal beams.

The **minimum** sections of the bottom components are written in the following tables. They are valid as measures of reference with the following specifications:

- The number of the bottom beams is defined on the basis of a maximum centre distance



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of **100** cm;

- Beams of a smaller dimensional category can be used for the packing of skid, that is plants, machineries etc. that have a self-load-bearing structure;
- The section of the possible load distributors must be calculated on the basis of the stress that is generated in the bottom during the lifting operations;
- If the bottom is supplied with suitable load distributors, the boarding thickness can be always limited to 2,5 cm;

MINIMUM SECTIONS OF THE BOTTOM BEAMS				
Net weight [kg]	External length of the package [cm]			
	Up to 400	From 401 to 800	Over 800	
Up to 1.000	8 x 8	8x10	8x10	
From 1.001 to 3.000	8x10	8x10	10x12	
From 3.001 to 8.000	10x12	12x15	12x15	
From 8.001 to 15.000	12x15	12x15	15x20	
From 15.001 to 30.000	15x20	15x20	20x20	
MINIMUM SECTIONS OF THE OTHER BOTTOM COMPONENTS				
Net weight [kg]	Boarding [cm]	Underbeams [cm]	Head-beams [cm]	Φ bolts [mm]
Up to 1.000	2.5	10x6	10x4	
From 1.001 to 3.000	2.5	10x8	10x6	-
From 3.001 to 8.000	3	12x8	10x8	10
From 8.001 to 15.000	4	12x10	12x10	12
From 15.001 to 30.000	4	12x10	15x12	16

WALLS AND COVER

The **walls** (sides and heads) and the **cover** consist of an internal frame and an external sheathing. The all frame is made up of horizontal crossbeams and vertical struts; the cover frame is made up of longitudinal crossbeams and transversal cut-down sizes. The wall and cover sheathing is formed by adjoining plywood or OSB type 3 panels (see the figure).

Only the **cover** is **waterproofed** by a double polyethylene film coating (0,1 mm min. thick) that is put between the internal frame and the external sheathing, and by closing the fissures between the sheathing panels with a suitable adhesive (e.g. polyvinyl acetate glue).

On the contrary, the **bottom** must permit and facilitate the **drainage** of possible condensation or liquids.

An **auxiliary frame** is put in the sidewalls. It consists of an upper horizontal crossbeam and of vertical struts. It strengthens the walls in order to give an appropriate superimposition load to the case.



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The **minimum** sections of the wall and cover components and the minimum number of horizontal crossbeams are written in the following tables.

MINIMUM SECTION OF WALL AND COVER COMPONENTS				
Net weight [kg]	Frame [cm]	Sheathing [cm]	Auxil. Struct, [cm] int. h. up to 200 cm	Auxil. Struct, [cm] int. h. over 200 cm
Up to 1,000	10x4	1	10x2,5	10x4
From 1,001 to 3,000	10x4	1	10x2,5	10x4
From 3,001 to 8,000	10x4	1	10x4	10x4
From 8,001 to 15,000	12x4	1.3	10x4	10x4
From 15,001 to 30,000	12x4	1.5	10x4	10x4

MINIMUM NUMBER OF CROSSBEAMS FOR EACH WALL	
External height of the case [cm]	N°
Up to 140	2
Up to 240	3
Up to 340	4
Over 340	5

The vertical struts of the auxiliary frame must be placed at a maximum centre distance of **125 cm**.

UNDERCOVER BEAMS AND STRENGTHENING STRUCTURES

Every case must have **undercover beams**. They have to be placed transversally; they must be leaned against the auxiliary frame and nailed to the upper edge of the sidewalls.

These structural components have a double function:

- they give a suitable superimposition load to the case and make it walk able;
- Together with the cover and the possible strengthening structures they bear the transversal

Compression produced by the ropes during the lifting operations.

The undercover beams must be placed at a maximum centre distance of **100 cm** and they must comply with the minimum sections that are written in the following table.

UNDERCOVER BEAMS				
Net weight [kg]	External width of the case [cm]			
	Up to 120	From 121 to 220	From 221 to 270	Over 270
Up to 1,000	6 x 8	8 x 8	8x10	10x12
From 1,001 to 3,000	6 x 8	8 x 10	8x10	10x12
From 3,001 to 8,000	8x10	8x10	10x12	12x15
From 8,001 to 15,000	8x10	10x12	12x15	12x15
From 15,001 to 30,000	10x12	10x12	12x15	12x15



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
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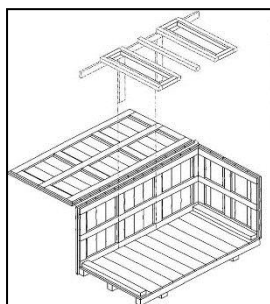
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The cases that have an external width over **270 cm** or a net weight over **10,000 kg** have to be provided with wooden additional strengthening structures able to support the transversal compression that is produced by the ropes during the lifting operations.

Each strengthening structure consists of a frame that is put between two successive undercover beams (see the figure). The longitudinal cut-down sizes, stressed to flections, have the same section of the undercover beams; the transversal listels, nailed to the undercover beams and subjected to compression, can have a smaller section (not less than half of the undercover beams).

9.3.5 Standard CASES - wooden board sheathing



Indications:

- No limits of dimensions
- Net weight up to 60,000 kg

THE BOTTOM

The bottom consists of wooden adjoining **boards** that are fixed transversally to two or more **longitudinal** underlying **beams**.

Some transversal or longitudinal **under beams** are positioned under the longitudinal beams and they are nailed to them. The under beams raise the bottom from the floor, so they allow the passage and the positioning of lifting ropes or forks.

The bottom is normally strengthened by two transversal head-beams that are fixed on the boarding by nailing - for thickness up to 6 cm or by bolting (for higher thickness).

The **load distributors** are other further possible components of transversal strengthening for the bottom. They are used to strengthen the case bottom where the two lifting points are situated or to subdivide the load on the longitudinal beams.

The **minimum** sections of the bottom components are written in the following tables. They are valid as measures of reference with the following specifications:



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
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- The number of the bottom beams is defined on the basis of a maximum centre distance of 100 cm;
- Beams of a smaller dimensional category can be used for the packing of skid, that is plants, machineries etc. that have a **self-load-bearing** structure;
- The section of the possible **load distributors** must be calculated on the basis of the stress that is generated in the bottom during the lifting operations;
- If the bottom is supplied with suitable load distributors, the boarding thickness can be always limited to 2.5 cm;

MINIMUM SECTION OF THE BOTTOM BEAMS

Net weight [kg]	External length of the case [cm]		
	Up to 400	From 401 to 800	Over 800
From 3,001 to 8,000	10x12	12x15	12x15
From 8,001 to 15,000	12x15	12x15	15x20
From 15,001 to 30,000	15x20	15x20	20x20
From 30,001 to 45,000	15x20	20x20	20x25
From 45,001 to 60,000	20x20	20x25	20x25

MINIMUM SECTIONS OF OTHER BOTTOM COMPONENTS

Net weight [kg]	Boarding [cm]	Under beams [cm]	Head-beams [cm]	Φ bolts [mm]
From 3.001 to 8.000	3	12x8	10x8	10
From 8.001 to 15.000	4	12x10	12x10	12
From 15.001 to 30.000	4	12x10	15x12	16
From 30.001 to 45.000	5	15x10	15x12	16
From 45.001 to 60.000	5	18x10	20x15	n°2 Φ16

For net weight up to 30.000 Kg you'd better use the standard case with plywood / OSB sheathing.

WALLS AND COVER

The **walls** (sides and heads) and the **cover** consist of an internal frame and an external sheathing. The all frame is made up of horizontal crossbeams and vertical struts; the cover frame is made up of longitudinal crossbeams and transversal cut-down sizes. The wall and cover sheathing is formed by wooden adjoining boards (see the figure).

The beams must be from **12 to 24 cm** in width.

The cover and the walls are waterproofed, the cover by a polyethylene film coating (0,1 mm min. thick) and by an undulated or alveolar polypropylene coating (specific weight 250 ÷ 300 g/m²); the walls by a polyethylene film coating (0,1 mm min. thick). These coatings are put between the external sheathing and the internal frame.



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On the contrary, the **bottom** must permit and facilitate the **drainage** of possible condensation or liquids.

An **auxiliary frame** must be put in the sidewalls. It consists of an upper horizontal crossbeam and of vertical struts. It strengthens the walls in order to give an appropriate superimposition load to the case.

The **minimum** sections of the wall and cover components and the minimum number of horizontal crossbeams are written in the following tables.

MINIMUM SECTIONS OF WALL AND COVER COMPONENTS				
Net weight [kg]	Frame [cm]	Sheathing cm]	Auxil. Struct. [cm] int. h. up to 200 cm	Auxil. Struct. [cm] int. h. over 200 cm
From 3.001 to 8.000	10 x 4	2.5	10 x 2.5	10 x 4
From 8.001 to 15.000	12 x 4	2.5	10 x 2.5	10 x 4
From 15.001 to 30.000	12 x 4	2.5	10 x 2.5	10 x 4
From 30.001 to 45.000	12 x 4	2.5	10 x 4	10 x 6
From 45.001 to 60.000	12 x 4	2.5	10 x 4	10 x 6

MINIMUM NUMBER OF CROSSBEAMS FOR EACH WALL	
External height of the case [cm]	N°
Up to 140	2
Up to 240	3
Up to 340	4
Over 340	5

- The vertical struts of the auxiliary frame must be placed at a maximum centre distance of **125 cm**

UNDERCOVER BEAMS AND STRENGTHENING STRUCTURES

Every case must have undercover beams. They have to be placed transversally; they must be leaned against the auxiliary frame and nailed to the upper edge of the sidewalls.

These structural components have a double function:

- they give a suitable superimposition load to the case and make it walkable;
- Together with the cover and the possible strengthening structures they bear the



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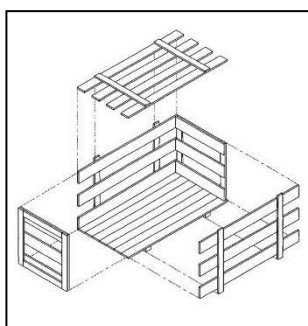
transversal compression produced by the ropes during the lifting operations. The undercover beams must be placed at a maximum centre distance of **100** cm and they must comply with the minimum sections that are written in the following table.

UNDERCOVER BEAMS				
Net weight	External width of the case [cm]			
	Up to 120	From 121 to 220	From 221 to 300	Over 270
From 3.001 to 8.000	8x10	8x10	10x12	12x15
From 8.001 to 15.000	8x10	10x12	12x15	12x15
From 15.001 to 30.000	10x12	10x12	12x15	12x15
From 30.001 to 45.000	10x12	12x15	12x15	12x15
From 45.001 to 60.000	10x12	12x15	12x15	12x15

The cases that have an external width over **270** cm or a net weight over **10.000 kg** have to be provided with wooden additional strengthening structures able to support the transversal compression that is produced by the ropes during the lifting operations.

Each strengthening structure consists of a frame that is put between two successive undercover beams (see the figure). The longitudinal cut-down sizes, stressed to flexion, have the same section of the undercover beams; the transversal listels, nailed to the undercover beams and subjected to compression, can have a smaller section (not less than half of the undercover beams).

9.3.6 Small-sized CRATES



Indications:

- External volume up to 3 m³
- Net weight up to 500 kg

SIZING



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
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These crates can be used for any type of forwarding, but with external volume **not less than 0.3 m.**

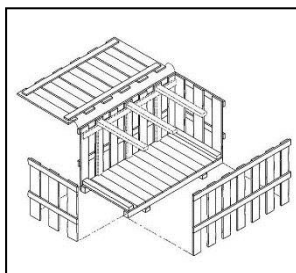
The bottom consists of longitudinal **boards** that are adjoined or spaced out and nailed to two or more transversal **under beams**; the walls and the cover are composed of **external crossbeams** nailed to an **internal boarding** made up of wooden boards that are placed longitudinally and spaced out (see the figure).

The wall and cover **sheathing** boards have to generate plenum surfaces not less than 45% of the total; if the contents makes it possible, also the bottom boarding can be discontinuous (crate boarding) with a plenum surface not less than **60%**.

The **minimum sections** of the structural parts are written in the following table.

MINIMUM SECTIONS		
Under beam section	External crossbeam thickness	Sheathing board thickness
[cm]	[cm]	[cm]
8x10	2,5	2,5

9.3.7 Reduced-sized CRATES



Indications:

- External dimensions up to 800 x 250 x 250 cm
- Net weight up to 3.000 kg

THE BOTTOM



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
HDPE-16	GM	00	PP	PRC	0001	03

The bottom is made up of wooden adjoining **boards** that are fixed transversally to two or more **longitudinal** underlying **beams**. If the contents make it possible, the bottom boarding can be discontinuous (crate boarding) with a plenum surface not less than 60%.

Some transversal or longitudinal **under beams** are positioned under the longitudinal beams and they are nailed to them. The under beams raise the bottom from the floor, so they allow the passage and the positioning of lifting ropes or forks.

The bottom is normally strengthened by two transversal **head-beams** that are nailed on the boarding.

The **load distributors** are other further possible components of transversal strengthening for the bottom. They are used to strengthen the crate bottom where the two lifting points are situated or to subdivide the load on the longitudinal beams.

The **minimum** sections of the bottom components are written in the following tables. They are valid as measures of reference with the following specifications:

- the number of the bottom beams is defined on the basis of a maximum centre distance of **100 cm**;
- the section of the possible **load distributors** must be calculated on the basis of the stress that is generated in the bottom during the lifting operations;
- if the bottom is supplied with suitable load distributors, the boarding thickness can be always limited to **2,5 cm**;

MINIMUM SECTIONS OF THE BOTTOM BEAMS			
Net weight	External length of the package [cm]		
	Up to 400	From 401 to 800	Over 800
Up to 1.000	8 x 8	8x10	8x10
From 1.001 to 3.000	8 x 10	10x12	10x12

MINIMUM SECTIONS OF THE OTHER BOTTOM COMPONENTS			
Net weight [kg]	Boarding [cm]	Under beams [cm]	Head-beams [cm]
Up to 1.000	2,5	10x6	10x4
From 1.001 to 3.000	2,5 / 3	10x8	10x6

A standard crate will have to be used for contents that have a net weight over 3.000 Kg.

WALLS AND COVER



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
Class 1	HDPE-16	GM	00	PP	PRC	0001 03

The **walls** (sides and heads) consist of an internal sheathing made up of wooden boards that are placed vertically and spaced out and of external linking crossbeams placed horizontally.

The **cover** consists of an external sheathing made up of wooden transversally adjoined boards and of internal linking crossbeams that are placed longitudinally.

The boards must have a **constant** width, from **12 to 18 cm**. They must generate plenum surfaces not less than 45% of the total.

An **auxiliary frame** must be put in the sidewalls. It consists of an upper horizontal crossbeam and of vertical struts. It strengthens the walls in order to give an appropriate superimposition load to the crate.

The **minimum** sections of the wall and cover components and the minimum number of horizontal crossbeams are written in the following tables.

MINIMUM SECTIONS OF WALL AND COVER COMPONENTS				
Net weight [kg]	Crossbeams [cm]	Sheathing	Aux. struct, [cm]	Aux. struct, [cm]
Up to 1.000	12x2,5	2,5	10x2,5	10x4
From 1.001 to	12x2,5	2,5	10x2,5	10x4

MINIMUM NUMBER OF CROSSBEAMS FOR EACH WALL	
External height of the package [cm]	N°
Up to 200	2
Up to 250	3

- The vertical struts of the auxiliary frame must be placed at a maximum centre distance of **125 cm**.

You have to use a crate with plenum heads for the packing of loose parts that are smaller than the distance between the sheathing boards.

UNDER COVER BEAMS

Every case must have **undercover beams**. They have to be placed transversally; they must be leaned against the auxiliary frame and nailed to the upper edge of the sidewalls.

These structural components have a double function:

- they give a suitable superimposition load to the crate and make it walk able;
- Together with the cover they bear the transversal compression produced by the ropes during the lifting operations.



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
HDPE-16	GM	00	PP	PRC	0001	03

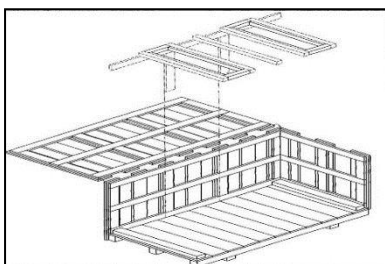
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The undercover beams must be placed at a maximum center distance of **100 cm** and they must comply with the minimum sections that are written in the following table.

UNDER COVER BEAMS		
Net weight [kg]	External width of the package	External width of the package
Up to 1.000	6 x 8	8x10
From 1.001 to 3.000	6 x 8	8x10

9.3.8 Standard CRATES



Indications:

- No limits of dimensions
- Net weight up to 60.000 kg

THE BOTTOM

The bottom consists of wooden adjoining boards that are fixed transversally to two or more **longitudinal** underlying **beams**. If the contents make it possible, the bottom boarding can be discontinuous (crate boarding) with a plenum surface not less than 60%.

Some transversal or longitudinal **under beams** are positioned under the longitudinal beams and they are nailed to them. The under beams raise the bottom from the floor, so they allow the passage and the positioning of lifting ropes or forks.

The bottom is normally strengthened by two transversal **head-beams** that are fixed on the boarding by nauling - for thickness up to 6 cm or by bolting (for higher thickness).

The **load distributors** are other further possible components of transversal strengthening for the bottom. They are used to strengthen the crate bottom where the two lifting points are situated or to subdivide the load on the longitudinal beams.



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
Class 1	HDPE-16	GM	00	PP	PRC	0001 03

The **minimum** sections of the bottom components are written in the following tables. They are valid as measures of reference with the following specifications:

- The number of the bottom beams will be defined on the basis of a maximum centre distance of **100** cm;
- Beams of a smaller dimensional category can be used for the packing of skid, that is plants, Machineries etc. that have a **self-load-bearing** structure;
- The section of the possible **load distributors** must be calculated on the basis of the stress that is generated in the bottom during the lifting operations;
- If the bottom is supplied with suitable load distributors, the boarding thickness can be always limited to 2.5 cm;

MINIMUM SECTIONS OF THE BOTTOM BEAMS			
Net weight [kg]	External length of the package [cm]		
	Up to 400	From 401 to 800	Over 800
From 3.001 to 8.000	10x12	12x15	12x15
From 8.001 to 15.000	12x15	12x15	15x20
From 15.001 to 30.000	15x20	15x20	20x20
From 30.001 to 45.000	15x20	20x20	20x25
From 45.001 to 60.000	20x20	20x25	20x25

MINIMUM SECTION OF OTHER BOTTOM COMPONENTS				
Net weight [kg]	Boarding [cm]	Under beams [cm]	Head-beams [cm]	Φ bolts [mm]
From 3.001 to 8.000	3	12x8	10x8	10
From 8.001 to 15.000	4	12x10	12x10	12
From 15.001 to 30.000	4	12x10	15x12	16
From 30.001 to 45.000	5	15x10	15x12	16
From 45.001 to 60.000	5	18x10	20x15	n°2 Φ16

WALLS AND COVER

The **walls** (sides and heads) and the **cover** consist of an internal frame and an external sheathing. The wall frame is made up of horizontal crossbeams and vertical struts; the cover frame is made up of longitudinal crossbeams and transversal cut-down sizes.

The wall and cover sheathing is formed by wooden spaced out boards (see the figure). The boards must have a constant width, from **12** to **18 cm**. They must generate plenum surfaces not less than 45% of the total.

An **auxiliary frame** must be put in the sidewalls. It consists of an upper horizontal crossbeam and of vertical struts. It strengthens the walls in order to give an appropriate superimposition load to the crate.



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
Class 1	HDPE-16	GM	00	PP	PRC	0001 03

The **minimum** sections of the wall and cover components and the minimum number of horizontal crossbeams are written in the following tables.

MINIMUM SECTION OF WALL AND COVER COMPONENTS				
Net weight	Frame	Sheathing	Auxil. struct, [cm]	Auxil. struct, [cm]
From 3.001 to 8.000	10x4	2,5	10x2,5	10x4
From 8.001 to 15.000	12x4	2,5	10x2,5	10x4
From 15.001 to 30.000	12x4	2,5	10x2,5	10x4
From 30.001 to 45.000	12x4	2,5	10x4	10x6
From 45.001 to 60.000	12x4	2,5	10x4	10x6

MINIMUM NUMBER OF CROSSBEAMS FOR EACH WALL	
External height of the package [cm]	N°
Up to 140	2
Up to 240	3
Up to 340	4
Over 340	5

The vertical struts of the auxiliary frame must be placed at a maximum centre distance of **125 cm**.

You have to use a crate with plenum heads for the packing of loose parts that are smaller than the distance between the sheathing boards.

UNDERCOVER BEAMS AND STRENGTHENING STRUCTURES

Every crate must have **undercover beams**. They have to be placed transversally; they must be leaned against the auxiliary frame and nailed to the upper part of sidewalls.

These structural components have a double function:

- they give a suitable superimposition load to the crate and make it walkable;
- Together with the cover and the possible strengthening structures they bear the transversal compression produced by the ropes during the lifting operations.

The undercover beams have to be placed at a maximum centre distance of **100 cm** and they have to comply with the minimum sections that are written in the following table.

UNDERCOVER BEAMS



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
Class 1	HDPE-16	GM	00	PP	PRC	0001 03

Net weight [kg]	External width of the package [cm]			
	Up to 120	From 121 to 220	From 221 to 300	Over 270
From 3.001 to 8.000	8x10	8x10	10x12	12x15
From 8.001 to 15.000	8x10	10x12	12x15	12x15
From 15.001 to 30.000	10x12	10x12	12x15	12x15
From 30.001 to 45.000	10x12	12x15	12x15	12x15
From 45.001 to 60.000	10x12	12x15	12x15	12x15

The crates that have an external width over **270 cm** or a net weight over **10.000 kg** have to be provided with wooden additional strengthening structures able to support the transversal compression that is produced by the ropes during the lifting operations.

Each strengthening structure consists of a frame that is put between two successive undercover beams (see the figure). The longitudinal cut-down sizes, stressed to flection, have the same section of the undercover beams; the transversal listels, nailed to the undercover beams and subjected to compression, can have a smaller section (not less than half of the undercover beams).

9.3.9 CRATES for pipes

The packing of pipes in crates is provided in the following cases (see 5.2.3):

- Bituminized or not sheathed pipes and pipe-lines up to DN80 (3")
- Insulated pipes and pipe-lines in general - road / railway transport

From a structural point of view, the crates for pipes are not different from the small-sized, reduced-size and standard crates. To choose among them the following indications of volume and net weight are valid.

N	PACKAGE	INDICATIONS
6	Small-sized CRATES	<ul style="list-style-type: none"> • Volume up to 3 m³ • Net weight up to 500 kg
7	Reduced-size CRATES	<ul style="list-style-type: none"> • External dimensions up to 800 x 250 x 250 cm • Net weight up to 3.000 kg
8	Standard CRATES	<ul style="list-style-type: none"> • No limits of dimensions

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Class 1

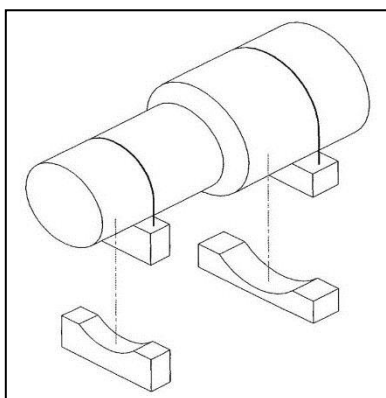
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		• Net weight up to 60.000 kg
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Some constructive or stowage peculiarities that must be adopted to prevent the pipes from coming out or to protect their integrity distinguish the crates for pipes:

- In case of packing of pipes (or other loose parts) that are smaller than the distance between the sheathing boards, the crate must have **plenum heads**;
- The bituminized pipes must be stored up in **separate layers** to avoid that, in case of high environmental temperatures, the bituminized sheathings of superimposed pipes adhere one on another and tear irreparably when each pipe is taken.

9.3.10 Saddles



Indications:

- Dimensions of the apparatus $> 5 \text{ m}^3$

The **saddles** are shaped structures, normally concave, in wood or in steel and they are secured to the apparatus to be packed; they have got the simple function of support and ground hold, but they don't offer other kinds of protection (against bumps, dust, humidity, etc.). The saddles are suitable - as the paragraph 2.3 says in detail - to pack **self-load-bearing apparatuses**, metallic - provided that they aren't supplied with instrumentation or insulation - and nonmetallic - provided that air transport or conventional sea transportation isn't arranged. On the contrary, if the apparatus has got its own hold structures, these ones must be equipped with simple wooden **baseboards** that are fixed to the base plates by bolts or passing thread bars.

Constructive notes

The minimum indicative **length** of the saddles must be at least the same as the external diameter of the apparatus (D) to facilitate the anchorage between the saddles and the apparatus itself.



Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
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The **width** of the saddles is suggested by the following table; as a rule the baseboards are built with the same length and width as the plates to which they are fixed.

SADDLE WIDTH	
Net weight [kg]	Width [cm]
Up to 2.000	15
From 2.001 to 6.000	20
From 6.001 to 10.000	30
From 10.001 to 20.000	40
Over 20.000	50

The depth of the cradle (that is of the shaped part) - measured on the vertical - must be at least equal to 15% of the diameter D. For example, for the apparatuses that have got a diameter of 2 m, the depth of the cradle must be of 30 cm at least (200 x 0,15). It should be noted that a hold arc of about 90°, generally enough to guarantee a stable accommodation of the apparatus, corresponds to this minimum depth.

The ground elevation reached by an apparatus put on the saddles must be as minimum as possible in order not to compromise the strength of the saddles themselves and the passage of the lifting ropes (unless it is used another kind of lifting, for example by eyebolts).

The number of saddles to be prepared (2, 3 or more) is defined on the basis of the technical information of the manufacturer. Particularly this number will depend on the apparatus weight and rigidity; besides, the type of planned transport will be considered to ensure a correct distribution of the weight on the load plane.

The combination of the length and width measures, the number of the saddles or of the baseboards and the total weight (apparatus + saddles) must generate a bearing load not over 10.000 kg/m². For example 2 saddles of 200 x 50 cm are suitable to support a total weight not over 20.000 kg (2 x 0,5 x 2 x 10.000).

The saddles are built with a single beam in wood or by superimposing more beams in crossed layers; in this second case the beams that go from the base to the lowest point of the cradle will be kept in an only piece in order not to compromise the strength of the cradles themselves.

The saddles must be firmly anchored to the apparatus, alternatively by:

- steel **rope**, of suitable section, covered by a protective rubber sheath;
- steel **hoop**, of suitable section (min. 50 x 3 mm), by putting a protective strip between the hoop and the apparatus.

In the case of **rope** anchorage, the connection with the saddle can be realized by a passing thread bar and an eyebolt or by a head-screwed plate: a closed eye turn-buckle of adjustment must always be interposed.

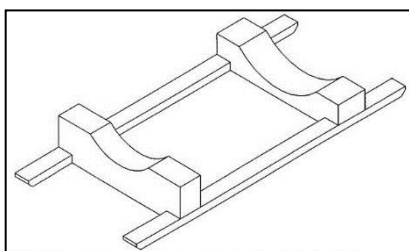
Project	Phase	Unit	Disc.	Type	Serial No.	Rev.
HDPE-16	GM	00	PP	PRC	0001	03

In the case of **hoop** anchorage, the connection with the saddle is realized by a passing thread bar that operates on a bracket shut to each end of the hoop; the adjustment of the tightening force is achieved by operating on a nut-counter nut couple.

The Supplier has the right to build sheet-steel saddles. In this case they must be equipped with:

- rubber strips put between the saddles and the apparatus to protect the apparatus itself;
- Wooden baseboards fixed to the saddle base plates by bolts or passing thread bars.

9.3.11 Saddles on Slides



Indications:

- Dimensions of the apparatus $> 5 \text{ m}^3$
- for insertion in containers with frontal opening

The saddles on slides are normal saddles of the kind that is described in the preceding paragraph that are connected to each other by longitudinal boards (slides - see the figure). The slides facilitate the insertion of the packages in box-type containers (with frontal opening).

For this type of packing the constructive specifications concerning the independent saddles are applied in full, with the exception of the bearing load that, in this case, can reach higher values; as regards the slides, they must be made in an only piece and they must have a head chamfer to facilitate the sliding of the package on the container bottom.

9.3.12 Rope

Indications:

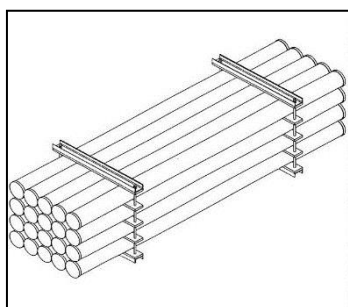
- Pipes and pipe-lines in general over DN600 (24")

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The pipes of big dimensions that are not bituminized or insulated shall be sent individually as loose parts (with ropes), with their ends protected with suitable caps. The Supplier shall protect pipe ends.

It should be handle with care to ensure the pipe has no scratches or dents on the external or internal surfaces before being run in the well, as any inclusions on the pipe body can help accelerate corrosion in an already corrosive environment.

9.3.13 Bundles



Indications:

- Gross weight up to 8.000 kg
- Dimensions (Width x Height) up to 120 x 150 cm

The bundles are groups of rigid parts (self-load-bearing) that are stacked and fixed to each other by suitable fasteners or ties (see the figure). They are typically used to pack pipes, parts of heavy carpentry and bearings that can be easily piled up.

The bundles are suitable to pack the pipes that have a diameter included in the interval DN80-250 mm (or even more, if there are advantages regarding the handling or the marking), while, as a rule, the pipes that have big dimensions are sent one by one.

Essentially the number of fasteners depends on the length of the bundle. Approximately:

- For bundles of a length ≤ 6 m: two fasteners are used;
- For bundles of a length > 6 m: three or more fasteners are used.

In the case of road transport without intermediate storages and gross weight up to 1.500 kg, the bundles can be tied with simple steel straps or wire rods, of suitable section; the distance between two successive ties mustn't be over 1,5 m.

If in the bundle formation, where the fastening points are situated, some empty spaces are generated by the different dimensions of the piled components, these empty spaces will have to be filled up by wooden baseboards in order to guarantee a suitable fastener clamping.

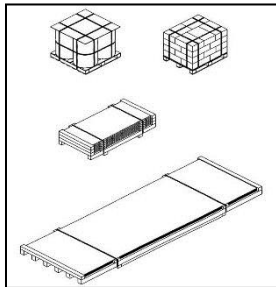


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The section bars that are used for the fasteners must be zinc-plated or painted with antirust enamel in order not to dirty the transported material.

The pipe ends must be plugged as it is shown in the paragraph 4.1.

9.3.14 Pallets



Indications:

- Plates
- Products that are not dangerous and that are prepacked in metallic drums or sacks

The pallets are wooden bases that are used for the storage and the transport of goods that need a distributed support, such as plates, metallic drums or sacks, but that don't require any special mechanical guards.

Generally, for the packing of goods that can be stacked, such as metallic drums or sacks, the commercial **standardized** pallets are used, naturally within the fixed limits of load. In this case, and if the nature of the goods makes it possible, the placing of the goods on the pallet will have to favour the stacking of identical palletized packages.

Pallets **made to measure**, that are similar in the construction to the bottom of the cases are used for the packing of very bulky or heavy goods, such as the plate packages (actually the pallets can be seen as cases or crates without walls and cover).

The pallets for the plate packing must have head-beams with a height that is at least equal to the thickness of the plate package so as to form a strong control side.

All the goods must be adequately tied to each other and secured to the pallet on which they are placed and, if necessary, they must be wrapped up with extensible or thermo shrinking film.

The minimum sections of the structural components are written in the following tables.



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MINIMUM SECTION OF THE LONGITUDINAL BEAMS

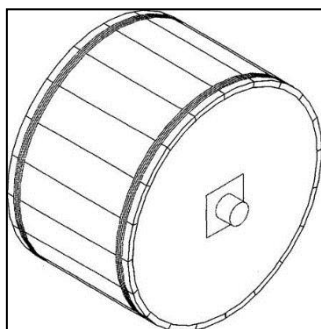
Net weight [kg]	External length of the package [cm]		
	Up to 400	From 401 to 800	Over 800
Up to 1.000	8x8	8x10	8x10
From 1.001 to 3.000	8x10	8x10	10x12
From 3.001 to 8.000	10x12	12x15	12x15

MINIMUM SECTION OF THE OTHER PALLET COMPONENTS

Net weight [kg]	Boarding [cm]	der beams [cm]
Up to 1.000	2,5	10x6
From 1.001 to 3.000	2,5	10x8
From 3.001 to 8.000	3	12x8

In the case of rigid plate packing, the bottom boarding may be omitted.

9.3.15 Staved REELS



The reels of big diameter - provided that new or in good condition - that contain electrical or instrumental cables are sent like they are, but the external surface included between the two reel flanges must be closed before. The closing is realized by wooden adjoining boards that are nailed to the flange edges (staving).

The staving must be realized by using new boards of a width that is suitable to the flange diameter; particularly too large boards mustn't be used in order to avoid fissurations or breaks.

Afterwards the boards must be tied by steel straps of suitable section; the strapping must be executed near the flanges (no more than 5 cm far) in order not to until and stress the boards.

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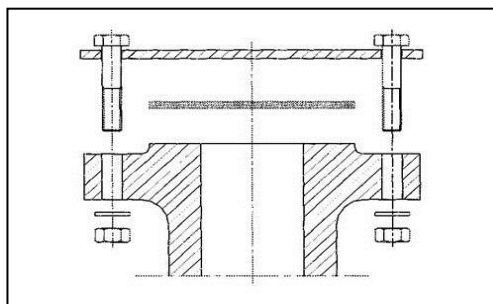
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The approximate sections of the boards are written in the following table.

STAVING		
Flange diameter	Board width	Minimum thickness
<200	8 – 10	2.5
≥200	10 – 12	4
	11	
	12	

9.4 Complements

9.4.1 Plugging



If it is not differently specified, the nozzles, the pipe ends or other openings on the goods to be packed must be appropriately plugged.

The nozzles provided with flanges that are present on the apparatuses packed on saddles have to be plugged as it is shown in the figure (rubber gasket + plywood disc, all closed by a suitable number of bolts and taped).

The ends of the pipes that are packed in bundles must be plugged:

- or singly, by plastic plugs fixed to the pipe by linen tape;
- or as a whole, by a double polyethylene film coating (0.1 mm min. thick) fixed to the bundle by linen tape and wooden covers made to measure and secured to the bundle by strapping.

The ends of the pipes that are sent singly must be plugged:

- or by plastic plugs fixed to the pipe by linen tape;
- or, if - for big diameters - the above-said plastic plugs weren't available, by wooden plugs connected to each other by a steel wire stretched in the pipes.

The openings present on goods that are packed in cases or in crates must be always plugged by plastic plugs or plywood discs, secured with linen tape.



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9.4.2 Storage

The goods must be secured to the package so as to avoid falls or shifts that are dangerous, above all, during the lifting and transport operations. For the same reason, in the case of transport in containers, the package must be immobilized towards the container.

Where it is possible, the material must be directly secured to the **bottom** by bolts, tie-rods, clamps or other suitable fasteners. The possible holders or fasteners to the **walls** mustn't bear **static** loads (i.e. loads that are present when the package is motionless); if necessary, they can be prepared to contribute to bear **dynamic** loads (i.e. loads that are generated by the lifting and transport operations).

Where it is possible, it is better to place the heaviest parts or items in the lower part so as to increase the package stability. The stainless steel pipes packed in a crate must be placed in the upper part and must be separated from the carbon pipes by wooden boards or panels. The possible small parts will be pre-packed in wooden small-sized cases placed in the main package. In the case of transport in containers, the filling operations of the container and the immobilization measures of the load in the container are charged to the Supplier.

The main dynamic loads to which the package is subjected during the transport operations are listed in the following table.

Transport	Manoeuvres	Dynamic Loads
Road	<ul style="list-style-type: none"> heavy accelerations or decelerations 	<ul style="list-style-type: none"> inertial force
Railway	<ul style="list-style-type: none"> heavy braking 	<ul style="list-style-type: none"> inertial force
Sea	<ul style="list-style-type: none"> rolling 	<ul style="list-style-type: none"> loss of balance
Air	<ul style="list-style-type: none"> take-off 	<ul style="list-style-type: none"> loss of balance

The goods sensitive to humidity (typically the ones belonging to the group of goods D (Equipment **sensitive to dust or humidity**) must be closed in a suitable **barrier bag** - according to MIL B131 E Class 1 - that, with a suitable quantity of **dehydrating salt**, can keep a humidity rate below 35% - at the temperature of 20°C - for the period of one year. The remaining material (packed in cases or crates) must be covered with a polyethylene film hood (minimum thickness 0.1 mm) not sealed to avoid the formation of condensation.

When the plants belonging to the group of class C (Packages) are equipped with components belonging to the group of goods D (Equipment), the package must be protected in full with a barrier bag; alternatively it is possible to cover only the equipment by using specific products (sponges, films etc.) that release progressively protective substances (VCI).



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If it is necessary to perforate the barrier bag to allow the passage of fastening bolts, the bag integrity must be restored with suitable gaskets.

In the case of a gross weight over 2,000 kg, cases and crates must be equipped with steel strengthening **brackets** and **angle bars** that are fixed respectively to the bottom and to the upper edges of the sidewalls where the ropes pass. They must be sized so as to avoid abrasions and damages produced by the action of the lifting ropes or chains. During the lifting of Fix Equipment that is packed on saddles some protective rolling shutters must be put between the ropes and the Fix Equipment.

9.4.3 Preservation

9.4.3.1 Preservatives

All commodities could be exposed to severe climate conditions. The nature of the commodity will determine the type of preservative to be used.

All metal commodities subject to corrosion (rust) shall be processed with a suitable preservatives in accordance with manufacturer's specifications. Preservatives must be easily applied to all kinds of metal surfaces by a variety of methods and must coat the surface with a sufficiently thick film to exclude moisture and air. This film must remain in position for an indefinite period of time and yet be completely removable without undue labor. The preservatives themselves must have no corrosive action of any kind on metal.

Equipment and components that require to be protected from the atmosphere must be processed in one or more of the following ways:

- Wrapping in Vapour Corrosion Inhibitor (VCI) wraps (film or emitters) with all lines, joints and folds sealed with linen tape.
- Packing in totally closed wooden boxes coated with plastic film or other waterproof preservatives impregnated with VCI.

When it is impractical to protect equipment from the atmosphere by VCI products, external and internal metal unpainted surfaces that do not require sandblasting and painting on site must be protected as follows:

- Oil lubricated pump bearing housings, equipment cases, stuffing boxes and gearboxes must be fogged and filled 10 to 50 percent of the internal volume with VSI circulating Oil and then all openings must be tightly sealed.
- Internal surfaces of equipment that can be made airtight by flanges or plugs must be dusted with VCJ and the openings sealed. VSI circulating oil or - if necessary - VCI emitters will be preferred for the surfaces which later will be in touch with lubricating oil. Equipment will be tagged. Tags will be waterproof, tear-resistant and attached with stainless steel wire. They will have to indicate the



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parts preserved, type and number of preservatives used, date and location and they will be signed by the person responsible. For multiple chambered equipment, each chamber will be individually tagged.

Items in leather, mica, rubber and similar material mustn't be coated with the preservatives to avoid damaging.

Austenitic stainless steel equipment must be protected with a waterproof wrap to prevent any chloride contaminations. The wrap will have to be chloride free.

9.4.3.2 Vapor Space Inhibiting (VSI) circulating oil

VSI circulating oil contains an oil soluble, volatile anti-rust compound. This corrosion inhibitor evaporates to form a preventive barrier towards the oxygen that is present in the moisture and in the atmosphere. VSI oil is available in several viscosity grades and is suitable to protect hydraulic components, turbines and lubricating systems.

9.4.3.3 Watertight integrity

When expressly required in the Material Requisition, the interiors of vessels and exchangers shipped separately must have an additional protection from the intrusion of moisture or other contaminants. Unless it is explicitly specified, the protection method will be arranged with the manufacturer.

If desiccants are used, type, amount, container and placement must be indicated.

If inert gases are used, gas type, pressure and precautions of use must be indicated. Warning tags saying "Depressurize before opening" will be attached on each opening.

9.4.4 Marking

The package marking must allow a sure **identification** of the items and give useful information to carry out the **lifting, transport and storage** operations correctly (for example gross weight, guaranteed superimposition load, environmental conditions that are tolerated etc.).

The package marking must be clear, indelible and proportionate to the package dimensions. It can be executed directly on the package by black characters on light background, or indirectly on A3 / A4-size **plastic-coated signboards** filled in by black characters on white background.

On each **case, crate** and Fix Equipment on **saddles** the gross weight, the centre of gravity and the lifting or forking points (symmetrical and adequately placed out from



Packing, Marking and Shipping Procedure



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the load barycentre) must be clearly marked; each package must be marked on two adjoining walls (sidewall and head) and on the cover.

If it is necessary, the maximum superimposition load that is guaranteed must be marked on the four **case** or **crate** walls - in the upper right corner. For the crates, the marking must be written on a suitable plywood panel - minimum thickness 3 mm.

For the Fix Equipment that is positioned on **saddles**, the marking can be executed directly on the apparatus or on the saddles.

For the **bundles**, the marking must be made with metallic plates or with two plastic-coated signboards fixed on plywood panels. They must be placed on the two sidewalls and tied with wire or steel straps.

For the **pallets** the marking must be made on two adjoining sides and on the upper part.

For the **reels** the marking must be made on the flanges.

On the **homologated packages** that contain products which are classified as "dangerous", the specific markings of danger that are provided by the reference norms must be executed.

The markings must be executed in accordance with the **international symbols** (see Attachment 9). The Supplier will give the instructions relating to the affixing of the following further conventional indications concerning the **storage** on the Packing Lists and on the markings:

- A Outdoors
- B Outdoors, sheltered
- C Indoors
- D Indoors, heated area
- E Indoors, air-conditioned area

If it is required by the CONTRACTOR, the upper corners of the packages will have to be marked by an identification **coloured strip** (to be defined) that is executed with indelible paint.

For the perishables, the package marking will have to include the words "**PERISHABLE GOODS**".



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9.4.5 Testing

The CONTRACTOR reserves the right to check the suitability of packing and stowage and the right marking. Should all this result not in conformity with this specification or with any exceptions as may be provided for in the M.R. or Purchase Order, the Supplier will be bound to complete or to remake the packing - whether entirely or partially - at his own care and expense, in due time so to meet the delivery term provided for in the contract.

On packing completion, the Supplier will have to give the CONTRACTOR the Inspection Notice for packing & marking duly stamped and signed.

9.5 General Items

Packing and conservation of goods shall be sufficient to protect them from damage during transit from point of manufacture to after arrival at job site under conditions which may involve multiple handling, extended storage, exposure to moisture and the possibility of pilferage. The contents must withstand 1 year transit conditions without suffering damage and SUPPLIERS shall give recommendations for further two (2) years storage under site conditions.

All items of fragile nature shall be suitably packed with special precaution against risk of breakage. Where material is encased or otherwise completely enclosed, SUPPLIER shall be responsible for suitable inner packing, blister of package and wrapping of any items subject to damage from moisture and/or corrosion. Provision must also be made to include desiccant materials, such as silica-gel where appropriate.

Hay, straw or similar vegetable fibres subject to disease or fungus shall not be used in packing, second hand cases, crates, and/or other type of wood packing constructed with "used" timber is prohibited.

9.5.1 Equipment and Machinery

9.5.1.1

Rotating GOODS shall be securely braced so as to prevent rotation or displacement during handling or transport, and SUPPLIER shall provide instruction on the correct removal of such bracing.

9.5.1.2

When practical, gearboxes shall be transported filled with oil. Where this is not practical, vapour phase inhibitors shall be used to protect internal surfaces. SUPPLIER shall provide instructions detailing the type of inhibitor and the procedure for its removal prior to operating.



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9.5.1.3

All bright and machined parts shall be coated with a recognized rust preventative suited to the particular application concerned. All internal parts of machinery shall be treated with lubricant containing rust and oxidation inhibitors to protect equipment from any damage possible. Such lubricants shall be compatible with those which will subsequently be used in service and shall be identified by appropriate tagging.

9.5.1.4

All flanges, machined working surfaces and threaded parts of all equipment shall be suitably protected. All flanged connections of vessels shall be protected by metal plates correctly casketed by wooden plugs or plastic caps suitably secured in position.

9.5.1.5

Fire bricks, special tiles and insulation refractories shall be boxed after sealing in a polyethylene liner. These boxes shall be skid mounted. Instructions regarding storage prior to installation shall be stenciled on each box with particular reference to adverse weather/temperature/humidity conditions.

9.5.1.6

All electrical motors whether coupled or uncoupled, generators and electrical EQUIPMENT shall have all openings sealed with protective tape, shall be packed in suitable weather proof cases, and protected from moisture ingress by desiccant as described above.

Items with brushes shall be brushed and rust removed before shipment.

All electrical EQUIPMENT shall be suitably protected to withstand 1 year transit conditions and SUPPLIERS shall give recommendations for further 2 years storage under SITE conditions.

Batteries shall be shipped dry with electrolyte packed separately and shall include charging instructions.

9.5.2 Pressure vessel & Heat Exchanger

9.5.2.1

Filling with dry nitrogen (0.2 bars), silica gel or other corrosion inhibition materials for apparatus made of stainless steels and nonferrous metals, and also for apparatus made of rust-sensitive steels with column trays or stationary stainless steel demister packages. For that purpose a filler nozzle with threaded valve (vehicle-tyre valve) with thread acc. to DIN 7756 -VG8 or ISO 4570 -8VI shall be used; that valve as well as a control pressure gauge (protected against mechanical damages) remain on the apparatus. A well



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visible danger signal (sticker) stating internal pressure and necessary venting prior to access (danger of asphyxiation!) shall be applied.

- Boreholes open to atmosphere such as test holes and vents shall be filled with putty resistant to seawater.

- Threads in parts made of rust-sensitive steel shall be protected with graphite, grease or oil (with the exception of parts for oxygen service).

9.5.3 Electrical, Telecommunication

9.5.3.1

Electrical & Electronic equipment shall be protected against defect from moisture during transportation or storage at site before installation. Any precaution marks should be clearly shown. Electrical & Electronic equipment which is not weatherproof type shall be wrapped with plastic shrink film and vacuum sealed. Before outer packing, each electrical & electronic equipment shall be packed rigidly and stuffed with shock absorbent material and outer packing shall be rigid and strong enough to withstand impact on every side of the package.

9.5.3.2

Staved Reel shall have timber battens and also follow the full circumference of the drum (For local transportation staved reels shall have timber battens or carton last). The internal end of the cable must be secured firmly to the drum to preventive breaking loose during transport.

9.5.3.3

All electronic and pneumatic instruments to be packed in accordance with given instructions and must be suitably protected to withstand 1-year transit conditions and SUPPLIERS are to give recommendations for a further 2 years' storage under SITE conditions.

9.5.4 Electrical Panels and instruments

This specification is for the package SUPPLIER'S guidance only. SUPPLIER shall remain fully responsible for selecting suitable materials for proper packaging.

The package SUPPLIER shall comply with the latest issues of the following British Standards. Where these standards conflict with this specification, this specification shall govern.

METHOD



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Shroud

The instrument or panel which shall be thoroughly clean, dry and free from rust shall be totally enclosed in a polythene shroud after sharp projections on the instrument or panel have been padded. Silica gel or other approved desiccant shall be strapped inside the shroud, but shall not come into contact with the paint work.

After the desiccant is strapped into position, the open ends of the shroud shall be heat sealed; only leaving an opening large enough for the insertion of an air extracting pipe. After extraction of the air from the shroud, the opening shall be completely sealed.

Securing Instruments or Panels inside Packing Case

- a. The instrument or panel shall be completely secured by wooden battens faced with suitable rubber or other shock absorbing materials.
- b. Wood, wool and other hydroscopic materials shall not be used.
- c. Hay and straw shall not be used.

Sealing of Packing Case

After nailing, joints in the case shall be sealed with Bostik Sealing Compound and the outside bound with steel strapping. MARKING OF PACKING CASES

Marking of Packing Cases

Cases which are for Carriage by sea shall be marked "HOLD STORAGE".

9.5.5 Hazardous material

Hazardous materials shall be suitable packaged, packed separately to all other GOODS and must not be encased inside other packaging. All hazardous material must be prepared in adherence to the detailed requirements relating to packing, marking and labelling set out in the International Maritime Dangerous Goods Code (IMDG Code), for sea freight and the restricted articles regulations, laid down by the International Air Transport Association, for airfreight. SUPPLIERS in complying with all regulations and code shall ensure required documentation duly completed with the correct information being promptly provided.



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9.5.6 Accessories

9.5.6.1

All accessories (such as special tools) when available at time of shipment of main equipment, must be packed in inner box, clearly marked such as “TOOLS” on the top of inner box and included in main packing case attached to base boards.

9.5.7 Spare Parts

9.5.7.1

Spare parts for two years’ operation, which shall be individually tagged, must be covered with a suitable preservative and wrapped with greaseproof paper and be packed in separate cases from the prime item. The cases are to bear the markings as specified and in addition the words "SPARE PARTS FOR TWO YEARS OPERATION".

9.5.7.2

Commissioning spares shall be individually tagged and marked "COMMISSIONING SPARES" and shall be packed and shipped with the prime item.

9.5.7.3

Capital Spare Parts, which shall be individually tagged, must be covered with a suitable preservative and wrapped with greaseproof paper and be packed in separate cases from the prime item. The cases are to bear the markings as specified and in addition the words "SPARE PARTS FOR TWO YEARS OPERATION".

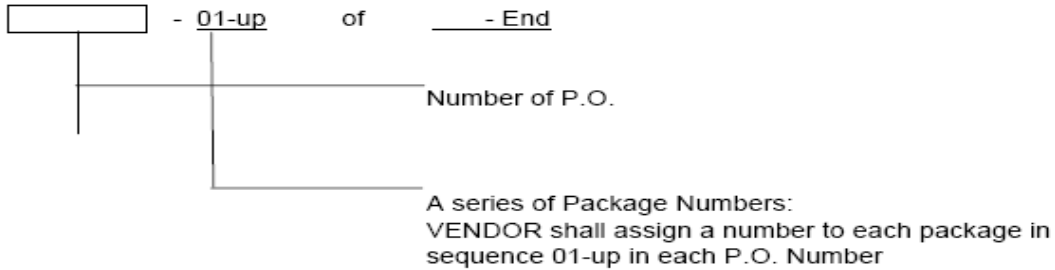
10 PACKAGE NO

10.1 Package No.

SUPPLIER shall assign a package number to each package in accordance with the following manners:

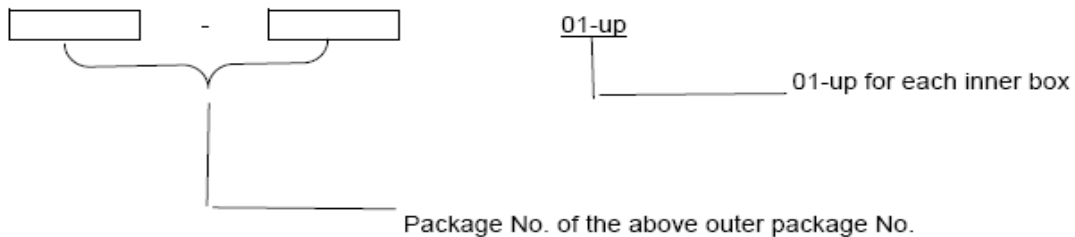


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10.2 Inner Box No.

SUPPLIER shall assign a number to each inner package in sequence, 01-up in addition to the number of the above outer package.



10.3 Tag No.

The purpose of attaching tags is to facilitate identification of supplied goods (Parts), while receiving inspection is made at site by these Tags referring to packing lists and/or the relevant drawing.

Tag of SUPPLIER's standard shall be used.

10.3.1 Attaching of Tag

Tags shall be individually attached to every part or materials in principle. However, for the small pieces having same kind and size and packed in one bag or box, etc. Only one tag may be attached on the outside of such container.

If equipment or materials are packed in crate, tags shall be enclosed in polyethylene bags and sealed with waterproof tape.



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10.3.2 Handling of Tag

After attaching tags, when the equipment of materials are packed into the package, one tag of duplicate tags shall be cut off and collected, so that the packing list of each package may be made out accordingly.

If SUPPLIER shall deliver the equipment or materials to the packing workers in bare condition, duplicate tags shall be attached by SUPPLIER, and SUPPLIER shall instruct the packing workers to cut off one tag at the time of packing.

10.3.3 Description Items and Confirmation of Content

Description of tags shall be written according to the original Basic Supplier's List of materials made by SUPPLIER as the original.

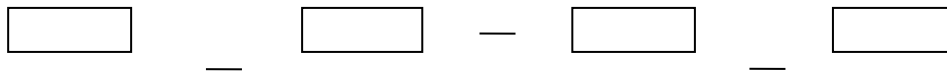
SUPPLIER shall confirm the coincidence between description of tags and that of packing list.

10.3.4 Other Notice

If SUPPLIER delivers the equipment or materials to the packing workers for export packing, he has to instruct the packing workers to pack them immediately after arrival of the equipment or materials.

10.4 Packing List No.

SUPPLIER shall assign a packing list number to each package in accordance with the following manners:



Project Abbreviation PO Serial Number SUPPLIER Abbreviation 001 up to End

For Example: AOGC - 5001 – DB – 001

Project Abbreviation: AOGC

PO Number: AOGC-PPS-PT-PO-5001 PO Serial Number: **5001**

Vendor Abbreviation: DB (will be handed over Kick of Meeting)



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10.5 Marking

10.5.1 General

All packages in which the goods are packed, shall be clearly marked for easy identification and sorting purposes. The marking shall consist of the following and be provided as indicated in the relevant attachment;

-Marking Instruction Number and Place of Print	Attachment-5
-Main Shipping Mark	Attachment-6
-Instruction for Handling Mark	Attachment-7
-Storage Category Mark	Attachment-8
-IATA/ICAO Hazard and Handling Label	Attachment-9

10.5.2

All packages shall be clearly stenciled on two opposite sides with black, indelible and seawater proof paint, as follows:

Wherever possible, the stenciled characters shall be 8 cm high.

In case the surfaces of a package are too small to permit stenciling, sheet metal tags shall be embossed with the above marking and shall be securely fastened on two opposite ends of the package.

10.5.3

Relevant contract/order No. and L/C no. shall be marked on all packages.

10.5.4

Orientation mark as marking on vertical equipment shall be prepared by vendor.

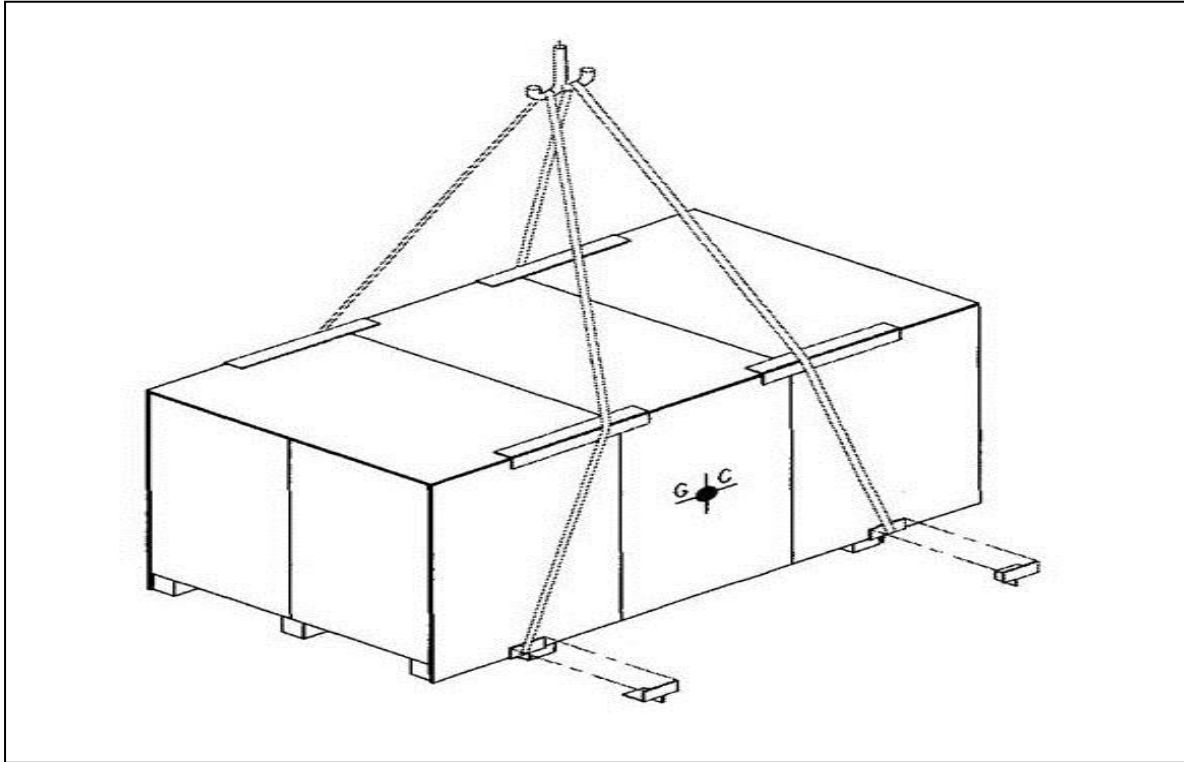


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11 LIFTING





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12 APPENDICES

Attachment-1	Delivery Schedule
Attachment-2	Hazardous Cargo Sheet
Attachment-3	Special Handling Instructions
Attachment-4	Packing List And Relevant Documents Filling Manual
FORM-01	Packing List
FORM-02	Heavy and / Or Bulky Cargo Sketch
Attachment-5	Marking Instruction Number And Place Of Print
Attachment-6	Main Shipping Mark
Attachment-7	Instruction For Handling Mark
Attachment-8	Storage Category Mark
Attachment-9	IATA/ICAO Hazard and Handling Label
Attachment-10	Photograph of package
Attachment-11	Outside View